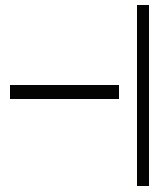


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Further Observations on Shapes, Inscriptions, and Functions of Neopalatial Nodules and *Noduli*

Abstract: **Further Observations on Shapes, Inscriptions, and Functions of Neopalatial Nodules and *Noduli*.** Some reflections on shapes, inscriptions and functions of Neopalatial *noduli*, flat-based nodules and hanging nodules are shown, by taking examples from the documents found at Ayia Triada, in South-Central Crete, and Zakros, in Eastern Crete, some of which is currently housed in two Italian Museums: ‘Museo Archeologico Nazionale’ of Florence (MAF) and ‘Museo Nazionale Preistorico Etnografico “L. Pigorini”’ of Rome (MPR). These documents date to the Late Minoan IB, which corresponds to the middle of the 15th century B.C. according to the traditional “Low Chronology”, or the middle of the 16th century B.C., according to the “High Chronology”.

Key words: Neopalatial administration; sealings; Linear A script

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1. Aims and methods.

The present contribution stems from a study carried out by the author on the Neopalatial sealings housed in two Italian Museums: the ‘Museo Archeologico Nazionale’ of Florence (MAF) and ‘Museo Nazionale Preistorico Etnografico “L. Pigorini”’ of Rome (MPR)¹. The main aim of the study was the application of digital technologies for the virtual representation, reconstruction and dissemination of such materials. Some preliminary results have already been presented at the 18th edition of the CHNT Conference held in Vienna². Here, I intend to share some further brief reflections on the shapes, inscriptions and functions of Neopalatial *noduli*, flat-based nodules and hanging nodules, which emerged from that study of examples dating to the LM IB (i.e. around the middle of the 15th century B.C., according to the traditional “Low Chronology”, or the middle of the 16th century B.C., according to “High Chronology”), found at Ayia Triada (in South-Central Crete) and Zakros (in Eastern Crete) and currently housed in the Italian Museums mentioned above (tab. 1).

In order to clarify the terminology, it must be remembered that a *nodulus* is a small clay lump of about 2.2-3.7 x 1.2-2.5 cm bearing from one to three seal

¹ I warmly thank Dr G. C. Cianferoni, director of the MAF, and Dr. F. Di Gennaro, director of the MPR, for the permission to study, photograph and publish the Neopalatial sealings housed in the two museums.

² Albertini – Jasink – Montecchi (2013).

impressions, at times inscribed, and which was never fastened to anything. The so-called flat-based nodules are little clay lumps of about 2 x 1.5 cm, whose main characteristic is the negative impression on their reverse (or base), which shows traces of fairly thin threads. Hanging nodules are also small clay lumps, about 2 cm in length, characterized by string holes which show that this type of nodule hung from a string in turn tied to something else (an object or a document). Hanging nodules are in turn divided in two- and single-hole hanging nodules (hereafter T-H and S-H nodules). The T-H type shows a string-hole that goes all way through the long axis of the nodule, while the S-H has a single aperture at one end of the nodule. The impressions left by the string through the holes of the broken nodules show that the T-H nodule had been formed over the two ends of a string, instead, the S-H nodule was formed over a single knotted end of a string, just to label it.

2. Documents from Ayia Triada and Zakros: museums where they are currently housed and principal editions

The administrative documents found at Ayia Triada at the beginning of the 20th century B.C. by the Italian Archaeological Mission in Crete, as well as those found at Zakros by Nicolas Platon in the early Sixties, are chiefly kept in the Archaeological Museum of Heraklion (Crete), while a small, but significant group is shared between the L. Pigorini Museum of Rome (three Linear A tablets, five *noduli*, two 1-seal recumbent flat-based nodules and twenty-three single-hole hanging nodules, which were all found in the “Villa” of Ayia Triada)³, and the Archaeological Museum of Florence (nine single-hole hanging nodules from the “Villa” of Ayia Triada and one 2-seal standing flat-based nodule from Kato Zakros)⁴. Moreover, we find a single roundel from Ayia Triada in the Allard Pierson Museum of Amsterdam⁵, some documents from Zakros in the Ashmolean Museum of Oxford, and one sealing, also from Zakros, in the Metropolitan Museum of New York.

All of these have been published. The first editions of the Linear A tablets from Ayia Triada are [Pugliese Carratelli 1945 and 1963], while [Platon – Brice 1975] is for the tablets from Zakros. The edition currently followed is GORILA: vol. I, for Ayia Triada, and III for Zakros, as volume II is the catalogue of the inscriptions on sealings (with *addenda* and *corrigenda* in vol. V). The seal impressions were first published by [Hogarth 1902] and [Levi 1925-1926], but it only provides drawings of seal types, while the most recent corpora, which are CMS II/6, for Ayia Triada, and CMS II/7 for Zakros, also offer also photographs

³ In addition to the documents currently kept in MPR, we must mention one lost tablet (HT <12>), and two lost nodules (Wa <71968> and <71970>). For a complete catalogue with colour photographs of the sealings kept in MPR see Del Freo 2002-2003.

⁴ For a complete catalogue of seals and sealings kept in MAF see Jasink 2009.

⁵ Olivier 1983.

for each seal type. A complete list of the sealings can also be found in [Hallager 1996: II], but only the roundels have been provided with complete descriptions, photographs and drawings.

While the amount and typology of documents from Zakros are quite certain (31 tablets, 1 roundel, 6 *noduli*, 492 F-B nodules, 6 S-H hanging nodules, and 55 T-H hanging nodules), the exact amounts and types of sealed documents found at Ayia Triada are still not certain because of the discrepancies in the information available in literature and missing pieces. The preparatory list of all clay tablets and sealed documents from Ayia Triada one can obtain by comparing the information available in literature is the following:

- 147 Linear A inscribed tablets. To the 147 tablets classified as HT 1- 154N in GORILA I, whose provenance from Ayia Triada is certain, we might add also the one classified as PH(?) 31, whose provenance from Phaistos or from Ayia Triada remains doubtful⁶.
- 22 roundels: of these 21 are inscribed (Wc 3001-3019, 3022, and 3024), while one is not (Wc 3023).
- 53 *noduli*, of which seven are inscribed (We 1019-1021, 1023-1024, 1852, 3020).
- 3 direct object sealings: two are certain (HM 1686 and 1721), but the Ayia Triada provenance is doubtful for the second⁷; the third is inscribed, but its classification as a direct object sealing is more doubtful (HM Bk)⁸.
- 1 missing clay bar with 3 seal impressions (one of these is CMS II/6.021) and one inscription (Wy <1021bis>).
- About 80 F-B nodules, of which only 75 are certain. Of these one is inscribed (HM 1667)⁹ and another bears two seal impressions which are not present in CMS (HM 558)¹⁰. Then we find 1 doubtful inscribed fragment (HM Ad)¹¹, 2 certain F-B whose provenance from Ayia Triada is not certain though

⁶ Tablet PH(?) 31 was given to the Archaeological Museum of Heraklion by the son of a worker who had worked with L. Pernier, the Italian archaeologist well known for his excavations at the Palace of Phaistos and the discovery of the famous Disc [Godart 1979: 354]. However, the person who delivered the tablet to the museum did not know the precise provenance of this tablet, and some paleographical features resemble Linear A tablets from the Neopalatial Ayia Triada more than those from the Protopalatial Phaistos.

⁷ CMS II/6.035, and 289.

⁸ GORILA II, Wc 3021. HM Bk is classified as *direct sealing* Wg 3021 in Hallager (1996: II, 291), but is not recorded in CMS II/6.

⁹ CMS II/6.031; GORILA II Wb 2001.

¹⁰ HM 558 is mentioned as “*Päckchenplombe, Vertikalshelbe, giebelförmig*” in CMS II/6, pp. 429 and 449, but is not included in the catalogue. I wonder whether the reason why the two seal impressions on this nodule were not catalogued is because they are not legible or because the authors of CMS II/6 could not personally examine the nodule.

¹¹ GORILA II Wb 2002.

(HM 1697 and 1690)¹², 1 fragment listed in HALLAGER 1996, II, p. 221, but not mentioned in CMS (HM Bm), and a doubtful fragment (HM 512 = CMS II/6.079).

- At the most 6 T-H nodules: 4 certain (HM 547, 1657, 1667, and 1687)¹³ and 2 uncertain (HM 546/1 and 480/2)¹⁴.
- 943 S-H nodules¹⁵. Among these, 838 are inscribed (Wa 1001-1018, 1022, 1025-1119, 1122-1145, 1147-1261, 1265-1466, 1470-1617, 1621, 1623-1832, 1834-1844, 1846-1847, 1849-1851, 1853-1858, 1860-1861), and at least four fragments are uncertain: HM 1714/Bi¹⁶, HM 1663¹⁷, 1684¹⁸, and 1720¹⁹.
- 21 fragments of hanging nodules, which we cannot say whether they originally were S-H or T-H²⁰. Of them 19 are inscribed.

3. Shapes

Noduli, F-B and S-H nodules may have different shapes, but it is unclear if they are significant from the point of view of their function. In general, the *noduli* may be dome-/gable-shaped or disk-shaped²¹, F-B nodules may be “standing” or “recumbent”, S-H nodules have been divided into “pendant”, “pyramid”, “cone” “dome” and “pear”²².

The disk *nodulus* is a flat and circular piece of clay (D ca 2 cm), generally with a seal impression on either side, each from a different seal (only two disk *noduli* from Knossos bear only one seal impression). The dome-shaped *nodulus*

¹² CMS II/6.286-287.

¹³ CMS II/6.118,095, 069, and 062.

¹⁴ CMS II/6.065, and 133.

¹⁵ Such a number includes all those classified as “*Schnurendplombe*” in CMS II/6, tab. 2, pp. 451-479, + HM 1714/Bi, even if it is defined as “*Plombenformen nicht mehr bestimmbar*” in CMS II/6.11 (GORILA II Wa 1470). Moreover, the examples housed in the Museo Pigorini at Rome are counted as 25, even if two are now missing [Del Frio 2002-2003: 58-70]. Cf. also Hallager (1996: II, 247-288).

¹⁶ See n. 14.

¹⁷ CMS II/6.64; GORILA II, Wa 1143. It seems a single-hole variety in disguise, with a second hole caused by careless knotting, as is the case with HM 1673 (CMS II/6.39, Wa 1617), but both HM 1663 and 1673 are classified as T-H hanging nodules, Wd 1143 and Wd 1617 respectively, in Hallager (1996: II, 243).

¹⁸ CMS II/6.70; GORILA II, Wa 1261, it might be a F-B nodule, rather than a S-H hanging nodule.

¹⁹ CMS II/6.288, this is a S-H, but the provenance from Ayia Triada is doubtful.

²⁰ HM 451/4, 467/14 (Wa 1859), 474/27, 478/20, 484/12 (Wa 1833), 512, 555/1 (Wa 1870), Ac (Wa 1845), Af (Wa 1120), Ag (Wa 1121), Ah (Wa 1618), Ai (Wa 1619), Aj (Wa 1620), Ak (Wa 1262), Al (Wa 1263), Am (Wa 1264), An (Wa 1467), Ao (Wa 1468), Ap (Wa 1469), Ar (Wa 1146), Bc (Wa 1848), Bj (Wa 1622), and 1719. All these pieces are classified as S-H hanging nodules in Hallager (1996: II, 247-288), with the only exception of HM 1719 (CMS II/6.285), which is not mentioned there, because the provenance from Ayia Triada is not certain.

²¹ Krzyszkowska (2005: 161-163).

²² Hallager (1996: I, 121, 136-137 and 162-163).

has one flat surface which bears the seal impression and a dome- or gable-shaped reverse. Two such main varieties do not seem to refer to different functions, but reflect different ways the lump was held when the seal was impressed, possibly according to different local traditions. All the *noduli* from Ayia Triada are, in fact, dome-shaped, while the majority of those from Zakros are disk-shaped.

In the F-B nodules of the “standing” variety, the height exceeds the thickness of the base on which the impression of the threads is visible. They may bear two or three seal impressions and represent the bulk of the F-B nodules found at Zakros. In the case of the “recumbents”, the height is lower than the thickness of the base on which the impression of threads is visible. They may bear one or, more rarely, two seal impressions and represent the bulk of the F-B found at Ayia Triada. Once again, two such main varieties do not seem to be linked to different functions, but reflect different ways the lump was impressed with the seals.

Finally, as stated above, S-H nodules are clay lumps with a string hole at the top. The Neopalatial examples have been divided into “pendant”, “dome”, “pyramid”, and “cone” according to the different shapes they may assume. The pendants have three sides, two flat, one with the seal impression and the other quite often written with one or two signs, and a third convex side. The domes have the same shape as the dome-shaped *noduli*, with a flat face with the seal impression and a gable/dome-shaped reverse side, often inscribed. The pyramids have a triangular base and three flat faces, one with the seal impression, another with the inscription and a third blank. The cones have a very slight triangular shape and bear the seal impression on the flat base. This type was created by the pressure of fingers in connection with the impression of the seal, and was deliberately shaped into a cone either by the fingers or by rolling the clay lump before it was impressed with the seal and inscribed. Summing up, as far as the shape and use are concerned, the main difference between pendant and dome, on the one hand, and pyramid and cone nodules, on the other, is that the two first varieties are baseless and thus cannot stand, instead the other two varieties have a base and thus may stand. Nevertheless all the S-H nodules hung from a string and did not need to stand on a surface. Moreover, the actual shaping of a hanging nodule must have been a routine job and was therefore not always executed with the same precision. Among the pieces housed in MAF and MPR, in fact, we have five nodules whose shapes are not so clear: Nr. 94759 in MAF and 71964 in MPR have been classified as pendant, but they have a base just like the pyramidal variety, and thus can be placed in a vertical position as the pendants cannot; Nr. 94760 in MAF and 71965 in MPR are very flattened pendants, with a convex non-functional base; Nr. 71967 in MPR has been previously classified as pendant, but it is actually a hybrid: a pyramid with the seal impression on its base, like the cone.

In conclusion, different shapes are certainly caused by different manufacturing methods, but we still lack evidence to argue that they were intended for different functions.

4. Inscriptions.

Noduli are rarely inscribed: on a total of about 185 pieces, only nine dome-shaped *noduli* bear very short inscriptions. Of these, seven come from Ayia Triada (HT We 1019, 1023, 1024 = CMS II/6.122; We 1020 = CMS II/6.80; We 1021 = CMS II/6.98; We 1852 = CMS II/6.75; We 3020 = CMS II/6.115), and two from Samothrace (SA We 3 and 4 = CMS V/Suppl. 1B nr. 327, and V/Suppl. 3,2 nr. 343). Besides these, only two disk-shaped *noduli* from Knossos, dated to the Mycenaean Period, are inscribed with the Linear B ideograms for man and woman (respectively KN Wn 8713 and Wn 8752). On the other hand, inscriptions on Neopalatial *noduli* are heterogeneous and may occupy one or two faces. We find ideograms and ligatures, probably indicating agricultural commodities (A 303 and A 304+03), single syllabic signs, monograms, syllabic groups, and fraction signs. It is possible that syllabic groups represent personal names, since some of them overlap with records written on tablets likely interpretable as lists of personnel. *PA-TA-NE*, for example, written on *nodulus* We 1019 from Ayia Triada, also occurs in a list of five words, each followed by one unit and finally summed up on tablet HT 94b.1. In any case the textual overlaps with tablets and roundels²³, and the presence of ideograms and numerals suggest that the *noduli* were used as accounting tools complementary to tablets.

F-B nodules are even more rarely inscribed than *noduli*: we only have HT Wb 2001 and 2002, with the single sign AB 02/*RO*, perhaps ZA Wb 37, with a sign doubtfully readable as AB 41/*SI*, and PH Wb 33-35, 55, with illegible signs²⁴. As we will see below, *RO* and *SI* are signs largely attested on S-H nodules.

T-H nodules are virtually never inscribed²⁵. By contrast, S-H nodules very frequently bear an inscription on one side (never the same as the side bearing the seal impression), normally only one sign, although a few are inscribed with two signs on one or two faces, generally taken from a restricted repertoire of signs (the most common are: A 301, AB 81/*KU*, 44/*KA*, 41/*SI*, 02/*RO*, 74/*ZE*, 28/*I*, 04/*TE*, 54/*TA*). The use of such signs on the tablets is not constant: some of them occur often as first elements of likely personal or place names, some as

²³ For roundels see Hallager (1996: I, 116-120).

²⁴ The *nodule* from Phaistos identified as Wb 36 in GORILA II is inscribed with the sign AB 04/*TE*, but it was subsequently classified as a direct object sealing Wg 36 by Hallager (1996: II, 295 and 299).

²⁵ Two hanging nodules inscribed with a single sign from Ayia Triada (Wa 1143 and 1617) and two from Khania (Wa 1003 and 1004) are considered T-H in Hallager (1996: II, 243), but they are more likely S-H as is shown in CMS II/6.064 and 039, and CMS V/Suppl.1A.153.

“transaction signs”, others as abbreviations for names of commodities²⁶. In other words, it is very hard to reach a secure conclusion on the meaning of such signs from the evidence at our disposal. It is even possible that they served as symbols rather than as true legible syllables (i.e. abbreviations and/or monosyllabic words).

Here I would like to point out that the recognition of the signs is not always so clear and certain as one may believe on the grounds of GORILA II. The sign inscribed on two S-H nodules kept in MAF, Nos. 94759 and 94760 (Wa 1557 and 1558) is generally read as *81/*KU*, but it might resemble *41/*SI* as well (Fig. 1).

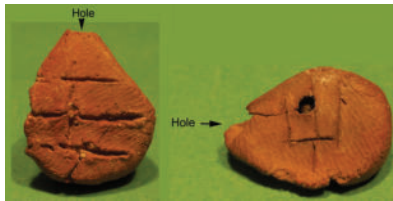


Fig. 1: From the left to the right: MAF 94759 - HT Wa 1557, and MAF 94760 - HT Wa 1558. Not to scale: 2.0 x 1.6 cm; 2.0 x 1.4 cm (Photos of the author, courtesy of the Museo Archeologico Nazionale di Firenze).

The same doubt also afflicts nodules 71973, 71976 and 71961 in MPR (Wa 1593, 1547, and 1542). In the latter case, the sign may resemble either *28/*I* or *09/*SE* (Fig. 2).



Fig. 2: From the left to the right: MPR 71973, 71976, and 71961 - HT Wa 1593, 1547, 1542. Not to scale: 2.0 x 1.5 cm; 1.9 x 2.0 cm; 2.4 x 1.45 cm (Photos of G. Dionisio, courtesy of Museo Nazionale Preistorico Etnografico “L. Pigorini” Roma).

Numbers 71964, 71966 and 71967 (Wa 1559, 1560 and 1512) are incised with an oval sign cut in the middle by a segment, whose reading as *81/*KU* is indeed doubtful (Fig. 3). On 71966 the oval sign is open and thus may look like *44/*RE*, but it is odd in any case.

²⁶ Hallager (2000).



Fig. 3: From the left to the right: MPR 71964, 71966, and 71967 - HT Wa 1559, 1560, 1512. Not to scale: 2.1 x 1.7 cm; 2.1 x 1.5 cm; 2.0 x 1.4 cm (Photos of G. Dionisio, courtesy of Museo Nazionale Preistorico Etnografico “L. Pigorini” Roma).

Also the sign on nodule 71965 (Wa 1561) is generally read as *81/*KU*, but it might resemble *08/*A* as well (Fig. 4).



Fig. 4: MPR 71965 - HT Wa 1561. Not to scale: 2.2 x 1.6 cm (Photo of G. Dionisio, courtesy of Museo Nazionale Preistorico Etnografico “L. Pigorini” Roma).

Finally, on number 71972 (Wa 1301) the incision is so light and inaccurate that it remains doubtful whether a true writing sign, possibly *74/*ZE*, or rather unintentional marks, such as impressions left by threads, must be detected (Fig. 5).



Fig. 5: MPR 71972 - HT Wa 1301. Not to scale: 2.1 x 1.65 cm (Photo of G. Dionisio, courtesy of Museo Nazionale Preistorico Etnografico “L. Pigorini” Roma).

As far as the palaeography is concerned, L. Godart and J.P. Olivier made a great effort to group the inscriptions on sealings from the same site according to different graphic characteristics which should correspond to different scribal hands²⁷. Such work is fundamental in order to state how many people were responsible for the inscriptions on the sealings and, as a consequence, were

²⁷ GORILA V, pp. 87-103 for the sealings from Ayia Triada. Different hands are identified by numbers, as it is shown in the eighth column of table 1 (*infra*).

involved in those affairs. Nevertheless, the identification of different “scribes” is particularly problematic, because, as we have already said, the inscriptions on the sealings are chiefly made up of one or two signs only. Even some groups suggested by GORILA might be questionable. This is, for example, the case with the sign incised on three nodules kept in MPR, nr. 71964, 71966 and 71967 (Fig. 3). These three inscriptions are attributed to the same hand in GORILA V (Wa 86), but, on the grounds of my first-hand examination of the material, the way in which the sign was written on 71967 seems to differ from that of the other two nodules. Therefore, I think it would be worth having a fresh look at the palaeographical characteristics of the inscriptions on sealings and contrasting them with those on tablets. With the necessary permits from the museum of Heraklion, this study might reveal possible new connections between different kinds of documents.

5. Functions.

As far as the *noduli* are concerned, the hypothesis that they were used as tokens to check incoming and outgoing commodities and workforce is supported by Near-Eastern and Egyptian patterns²⁸, by the function of the rooms where they are usually found (chiefly storerooms in central buildings and private houses), and by the number of seal impressions and inscriptions at times appearing on them. It is likely, in fact, that the seal impressions, at least on the dome-shaped *noduli*, served not only to identify different people or officials²⁹, but also corresponded to “one unit” of a certain item, as has been suggested for the use of seal impressions on the roundels³⁰. Fraction signs incised above the seal on four *noduli* from Ayia Triada (fraction sign “J” on We 1020, 1023, and 1024, and “JE” on We 1021) could indicate, in fact, that these *noduli* exceptionally did not deal with one whole unit, but, respectively with $\frac{1}{2}$ and $\frac{3}{4}$ of a unit of a certain commodity³¹. In this light, the two impressions from the same seal on *nodulus* HT We 1852 may indicate two units. Moreover, I think that the hypothesis that the *noduli* served as “tokens” is more flexible than the idea that they served as dockets, i.e. receipts for work done³², and better fits the evidence from Ayia Triada, where 45 un-inscribed *noduli* impressed by the same seal (CMS II/6.20) were found together in a storeroom of the main building (room 27 of the so-called “Villa”). The position of storeroom 27 close to an outside door, in fact, suggests that the *noduli* might be tools used in monitoring incoming and outgoing commodities³³. The five *noduli* kept in the MPR (71956-

²⁸ Weingarten (1990b) and Krzyszkowska (2005: 163).

²⁹ Weingarten (1987: 7).

³⁰ For the similarities between *noduli* and roundels see Hallager (1996: I, 130).

³¹ For a discussion of the relative values of Minoan fractions see Montecchi (2009 and 2013).

³² Weingarten (1986b and 1987); Hallager (1996: I, 130-133).

³³ See also Hallager (2002).

60) were originally part of such a group of 45 un-inscribed *noduli*, characterized by seal impression CMS II/6.20.

F-B nodules have been interpreted as sealings placed upon folded pieces of small, thin and lightly worked leather, presumably documents written on parchment, around which was wound a thread, traces of which are still detectable on their base³⁴. This process is clearly described in CMS II/6³⁵: 1) small pieces of parchment were ordinarily folded sideways two or three times and then once or twice from top to bottom; 2) a fine thread was wound several times around the packet and held in place with a tiny piece of clay; 3) the clay lump itself was firmly pressed over the “packet”; 4) the thread was wound into the clay (at least in some cases) to ensure that the nodule remained firmly attached to the packet; 5) the nodule was smoothed; 6) the nodule was impressed by one, two or three seals.

Some F-B nodules certainly travelled, as is attested by clay analyses and by the discovery of sealings impressed by the same seals or “replica rings” found in different sites, such as Ayia Triada, Akrotiri (Thera), Gournia, Skalvokambos and Zakros³⁶. The 1-seal recumbent F-B nodule nr. 71980 in MPR, for example, was found at Ayia Triada but bears the same seal impression as two T-H nodules found at Zakros (CMS II/7.71). At first sight one may think of a document sent from Zakros to Ayia Triada (incidentally, we can recall that only 80 F-B nodules were found at Ayia Triada, but 492 at Zakros), but it is even possible that documents and/or functionaries owning sealing rings were sent by the most important centre of the Neopalatial Period, the Palace of Knossos, to other peripheral administrative centres, such as Zakros and Ayia Tirada³⁷.

In addition to this, the precious material (worked leather) and the care put into sealing them suggest that the documents to which the F-B nodules were fastened were important and confidential. On the other hand, due to the small size of the sealings, the original pieces of parchment (unfolded) must have been around 6 x 6 cm, and, consequently, the written and sealed messages must have been as important as short. For this reason, the previous idea that they concerned diplomatic correspondence or other lengthy documents has been quite dismissed³⁸. Nevertheless it remains difficult to suggest what kind of message could have been contained there. The small sizes and the fact that they were found stored in groups, as in an archive, may recall accounting/administrative documents, like the clay tablets. In this light, one could think of commercial

³⁴ Weingarten (1983a); Hallager (1996: I, 135-145); CMS II/6, pp. 349-360, 367-68, figs. 7-16; Krzyszkowska (2005: 155-158).

³⁵ CMS II/6, pp. 349-360, 367-68, figs. 7-16.

³⁶ Hallager (1996: I, 145-146); Karnava (2010).

³⁷ Cf. *inter alios* Betts (1967: 15-40); Hallager (1995b); Weingarten (1990b: 111) and Weingarten (2010).

³⁸ Krzyszkowska (2005: 156) with previous references.

documents travelling with the related commodities, such as descriptions of goods and commodities and/or transactions. Nevertheless, in such a case, they would not have been as important and confidential as we have just supposed. Moreover, most were found entire, as if they had not been removed from the documents once they arrived at destination. On the other hand, if the F-B nodule sealed the entire document, as if it were a tiny packet, it would have been difficult to open it without damaging it, due to the small sizes and the fragility of the material. Therefore, it seems more likely that the F-B nodule was not applied to the entire document, but rather to strips which tied it up or which were cut along the lower margin of the document, as in the medieval parchment documents³⁹. In both cases, the documents could be almost any size.

In order to clarify this last issue, shapes, sizes and traces detectable on the reverse of Neopalatial sealings must be contrasted to those detectable on later sealings, whose function is certain. This work will be part of the research project, generously funded by the Alexander von Humboldt Foundation, which I am going to carry out at the Institute for Classical Archaeology of the Heidelberg University.

Moving to the T-H and S-H nodules, they hung from a string tied to something, i.e. to commodities or documents written in perishable material, but the specific function and way of using them are already matters of dispute. I have already reviewed various hypotheses on this matter⁴⁰, thus here I limit myself to reiterating the current main hypothesis: T-H nodules would have labelled commodities, like the Mycenaean gable-shaped hanging nodules, while the S-H (which were no longer used by Mycenaean) papyrus documents. It is extremely important to face this issue from a diachronic perspective, starting with the use of direct object sealings in the Protopalatial period. The largest quantity of direct object sealings (which are large clay lumps, directly pressed on to objects, impressed several times by seals, and never inscribed)⁴¹ comes from the First Palace at Phaistos, only 2 km away from Ayia Triada, and are dated to the MMII, about one century earlier than our focus here. Only four S-H (of which only two are inscribed) were found there⁴². On the contrary, in the Neopalatial Villa at Ayia Triada, where the greatest use of S-H is attested, we have at most three or four direct object sealings: HM Bk (HT Wc 3021), 512 (CMS II/6.079), 1686 (CMS II/6.035), and 1721 (CMS II/6.289). Therefore, as

³⁹ Weingarten (1983a: 12-13, and 1983b: 40-41).

⁴⁰ Montecchi (forthcoming).

⁴¹ The direct object sealings from the First Palace of Phaistos were used on a very elementary functional level: a small percentage to secure goods like jars and baskets, the overwhelming number sealing wooden pommels or cylindrical pegs to control access to the doors of storerooms or chests within them. The broken sealings were stored, apparently as a kind of check on persons and frequent activities in the storage area [Weingarten 1986a]. Based on the Near-Eastern examples, written documents on clay tablets supported and integrated the legal value of direct object sealings by describing the bookkeeping operation [Ferioli – Fiandra 1990: especially 225].

⁴² Hallager (1995a: 12-13) and Hallager (1996: I, 64-65, and II, 289).

far as the sealings are concerned, a radical change occurred from Protopalatial Phaistos to Neopalatial Ayia Triada, and it can be suggested that this is a change in emphasis from sealings used for the practical action of closing to sealings which labelled and authenticated⁴³. It has been suggested that the Neopalatial functionaries copied the records previously written on clay tablets onto documents in perishable material, which were labelled by clay hanging nodules⁴⁴. However, in my opinion, it is unlikely that records of little value, such as those messily written on clay tablets, were then copied onto such an expensive material as parchment or papyrus, although we cannot rule out that other, cheaper materials, such as cloth, were used. At any rate, the analogies between the records written on the clay tablets from Protopalatial Phaistos and those from Neopalatial Ayia Triada are so close that we can argue that the two administrations used clay tablets in an analogous way and for the same purposes. Therefore, we have no evidence for the occurrence of a new need to copy them onto perishable materials, and no evidence which in this way explains the massive increase of S-H nodules in the new administrative centre. At this point we must take into consideration the hypothesis that different kinds of matters were recorded on different types of supports: in this scenario, the tablets would have recorded transactions with a low economic profile, and papyrus or parchment documents would have dealt with either legal issues, such as bilateral contracts, as suggested by E. Hallager⁴⁵, or transactions of a high economic profile or relating to foreign trade. In the Neopalatial period, in fact, we get a greater typological variety and variety of patterns of application of sealings, in addition to evidence for sophisticated intra- and perhaps inter-regional communication via perishable documents to which sealings might have been attached.

To conclude, it should be noted that in the Ayia Triada Villa, about 970 hanging nodules, almost all S-H, were found spread over a large area in the North-western quarter, with a few more specimens possibly coming from the North magazines. Sealings found in the North-western quarter were at a height of 0.50-1.50 m above the floor, for this reason it has been suggested that they had fallen down from an archive located on the first floor⁴⁶. In other words, a long-term archive might have been located above the Minoan hall 13, in a room

⁴³ Weingarten (1986a and 1990a). In the Mycenaean period too we have a few examples of direct object sealings, mostly stirrup jar mouth stoppers [Palaima 1990: 90].

⁴⁴ Militello (1992: 414) and Schoep (2002: 193-197).

⁴⁵ Such a hypothesis is based on the possibility that two different S-H nodules, possibly representing two legal entities, were fastened to the same string, one to each end [Hallager 1996: I, 224; Hallager 2000: 254 and 259].

⁴⁶ Militello (1988: 239).

facing a painted porch above court nr. 11⁴⁷. There, hundreds or thousands of papyrus documents written in Linear A would have been housed. This, however, needs to be checked by examining further material housed in the Heraklion Museum and by reading the original field notes, since a few S-H nodules were also found in other rooms.

Tab. 1: The Neopalatial sealings housed in Italian Museums. For reason of space and clarity, in the 7th column the signs incised on the sealings are indicated only by means of the conventional phonetic transcription commonly accepted for the correspondent Linear B signs, with the exception only of sign *301, because it has no correspondence in Linear B.

Museum	Prove-nance	Inv. Nr.	Type	Shape	Inscription		Scribe	Seal Nr.	
					Number	Sign		LEVI	CMS
MAF	HT	94757	S-H	Dome	Wa 1125	TE	Wa 57	79	II/6.70
MAF	HT	94758	S-H	Dome	Wa 1086	RO	Not Identified	79	II/6.70
MAF	HT	94759	S-H	Pendant/pyramid	Wa 1557	KU? SI?	Wa 90	19	II/6.117
MAF	HT	94760	S-H	Pendant	Wa 1558	KU? SI?	Wa 90	19	II/6.117
MAF	HT	94761	S-H	Pendant	Wa 1323	KA	Not Identified	125	II/6.11
MAF	HT	94762	S-H	Pendant	Wa 1471	KU	Wa 84	125	II/6.11
MAF	HT	94763	S-H	Pendant	Wa 1094	RO	Not Identified	105	II/6.28
MAF	HT	94764	S-H	Pyramid	Wa 1279	O	Wa 74	43	II/6.87
MAF	HT	94765	S-H	Pendant	Wa 1322	KA	Not Identified	147	II/6.66
MAF	ZA	94766	F-B	2-seal standing	-	Not inscribed	-	⁴⁸	II/7.104A and 157
MPR	HT	71950	S-H	Pendant	Wa 1014	SI-KA	Wa 54	125	II/6.11
MPR	HT	71951	S-H	Pendant	Wa 1472	KU	Wa 84	125	II/6.11
MPR	HT	71952	S-H	Pendant	Wa 1176	SI	Wa 68	125	II/6.11
MPR	HT	71953	S-H	Pendant	Wa 1150	I	Wa 63	125	II/6.11
MPR	HT	71954	S-H	Pendant	Wa 1294	ZE	Wa 80	125	II/6.11
MPR	HT	71955	S-H	Pendant	Wa 1744	*301	Wa 98	125	II/6.11
MPR	HT	71956	<i>Nodulus</i>	Dome	-	Not inscribed	-	118	II/6.20
MPR	HT	71957	<i>Nodulus</i>	Dome	-	Not inscribed	-	118	II/6.20
MPR	HT	71958	<i>Nodulus</i>	Dome	-	Not inscribed	-	118	II/6.20
MPR	HT	71959	<i>Nodulus</i>	Dome	-	Not inscribed	-	118	II/6.20
MPR	HT	71960	<i>Nodulus</i>	Dome	-	Not inscribed	-	118	II/6.20

⁴⁷ Paribeni (1903: 327 and 330).

⁴⁸ The two seal impressions on this F-B nodule were published for the first time in Hogarth (1902: 85, Nr. 89 and 71). Only the first one is mentioned also in Levi (1925-1926: 161).

MPR	HT	71961	S-H	Dome	Wa 1542	KU? SI? I? SE?	Wa 87	79	II/6.70
MPR	HT	71962	S-H	Dome	Wa 1408	KA	Not Identified	79	II/6.70
MPR	HT	71963	S-H	Dome	Wa 1407	KA	Not Identified	79	II/6.70
MPR	HT	71964	S-H	Pendant/pyramid	Wa 1559	Oval sign cut in the middle by a segment (KU?)	Wa 86	19	II/6.117
MPR	HT	71965	S-H	Pendant	Wa 1561	KU? A?	Wa 90	19	II/6.117
MPR	HT	71966	S-H	Pendant	Wa 1560	Open oval sign cut in the middle by a segment (KU? RE?)	Wa 86	19	II/6.117
MPR	HT	71967	S-H	Pyramid?	Wa 1512	Oval sign cut in the middle by a segment (KU?)	Wa 86?	95	II/6.101
MPR	HT	<71968>	S-H?	?	-	Possibly the same as 71967	-	95	II/6.101
MPR	HT	71969	S-H	Cone	Wa 1108	RO	Wa 63	34	II/6.140
MPR	HT	<71970>	S-H?	?	-	Possibly the same as 71970 (RO)	-	34	II/6.140
MPR	HT	71971	S-H	Pyramid	Wa 1759	*301	Not Identified	99	II/6.99
MPR	HT	71972	S-H	Pyramid	Wa 1301	ZE?	Not Identified	99	II/6.99
MPR	HT	71973	S-H	Pendant	Wa 1593	KU? SI?	Wa 93	105	II/6.28
MPR	HT	71974	F-B	1-seal recumbent	-	Not inscribed	-	145	II/6.44
MPR	HT	71975	S-H	Pyramid	Wa 1779	*301	Wa 100	45	II/6.85
MPR	HT	71976	S-H	Cone	Wa 1547	KU? SI?	Wa 89	116	II/6.18
MPR	HT	71977	S-H	Pyramid	Wa 1283	ZE?	Not Identified	13	II/6.110
MPR	HT	71978	S-H	Pyramid	Wa 1623	*301	Wa 100	38	II/6.84
MPR	HT	71979	S-H	Pyramid	Wa 1830	*301	Wa 106	140	II/6.1
MPR	HT	71980	F-B	1-seal recumbent	-	Not inscribed	-	146	II/7.71
MPR	HT	72460	S-H	Pendant	Wa 1110	RO	Not Identified	6	II/6.136

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