

# The clay cylinders from Room Δ17, Akrotiri, Thera: are they the remains of tally-sticks?

Richard J. FIRTH  
*Bristol*

## 1. INTRODUCTION

Iris Tzachili has provided an excellent account of the clay cylinders found at Akrotiri.<sup>1</sup> The description of the cylinders found in Room Δ17 is particularly intriguing because they each have markings of numerous impressed circles and, thus, have the appearance of being devices used for counting.

Although Tzachili does speculate on the possible use of these cylinders, it is judged that her suggestions are not compelling. Therefore the purpose of this paper is to explore an alternative suggestion: that the clay cylinders are the remains of tally-sticks.

All mycenologists will surely be familiar with the painting by Henry Hankey which is used on the front cover (and in Fig. 9) of John Chadwick's book, *The Mycenaean World* (1976). This painting is Chadwick and Hankey's representation of the Archive Room at Pylos. In addition to the scribe and a young tablet-maker, the painting includes a jovial man holding a tally-stick. Chadwick writes (p. 20): "Next to him [the scribe] stands an official who has returned from a tour of inspection and is dictating the details he wishes to record; he has brought with him a tally-stick to remind him of the correct figure – a gratuitous invention, but it is certain that some form of temporary mnemonic would have been needed to ensure that the official got his figure right". Chadwick has wrapped a number of assumptions into this sentence and we do not have to agree with all of them. Nevertheless, the fundamental idea is that a reliable person would have had to travel to the surrounding area to collect

<sup>1</sup> I. Tzachili, 2002-2003, "The clay cylinders from Akrotiri, Thera: A non literate alternative way of accounting", *Minos* 37-38, pp. 7-76.

the data which could then be recorded by a scribe and there was highly likely to have been a temporary method of recording the data prior to the information being passed to the scribe.

The tally-stick shown in the painting is a notched stick and, one presumes, that Chadwick intended that each notch on the stick represented one unit of the commodity being recorded, for example, one male sheep. On this basis, a stick with a hundred notches would have recorded a flock of one hundred sheep. In this paper, we will accept the possible usage of a tally-stick. However, instead of a notched stick, we will consider the possibility that, at least in this instance at Akrotiri, tally-sticks consisted of a stick with a cylinder of clay wrapped around a small part of its length, corresponding to one of the clay cylinders from Room Δ17.

In this brief paper, we will restrict our attention to these cylinders from Room Δ17. It is unnecessary to repeat the full descriptions given by Tzachili since they are very clearly set out in her publication. However, it is convenient to begin with a brief summary of Tzachili's findings, which will be largely given using her own words. We will then consider the hypotheses that have been put forward. Finally, we will consider the suggestion that the clay cylinders are the remains of tally-sticks.

## 2. A BRIEF DESCRIPTION OF THE CLAY CYLINDERS FROM ROOM Δ17

Tzachili states that, "The cylinders found in Δ17 undoubtedly form a group, not only because they were all found together in a heap in the south-west corner of the room, but also because, apart from being uniform, all but two of them bear small impressed circles. Numerically, they are the majority of the cylinders found in the settlement. All were made of the same off-white clay, and most of them were found squashed, probably under their own weight, though possibly also because they were piled up while still wet. Many of them had completely disintegrated, so it is impossible to ascertain the exact number." Tzachili gives a catalogue of 35 cylinders and suggests that there were probably originally a total of ~ 50 cylinders.

Most of the cylinders from Room Δ17 are typically 7½ -9 cm in diameter and 9-11 cm long and weigh roughly ½kg.

Tzachili notes, "These are the only cylinders from Akrotiri with impressed circles, except from those reported from the 1967 excavation, which were also found in the same way, in a heap, in the same area, and probably in the same room."

Tzachili emphasises that the cylinders were not fired. The suggestion is "that they were used very soon after they were made, possibly while they were still drying. This is attested by the marks left by the slab of the bench on one of them, HL2 [but note that this cylinder was not found in Δ17], and by the fact that all of them seem to have been affected by the pressure of their weight while drying, creating the flattened area at one

point on their [‘curved’] surface”. By considering the circular cross-section of the central hole through the cylinder, Tzachili concludes that the stick was in the hole when the cylinder was used (because, in every case, the cross-sections are round and not oval).

In an experimental reconstruction, the cylinders were completely dry after being left in the shade for 24 hours. The implication is that the process of marking the cylinders must have been completed a few hours after they were manufactured. Furthermore, since the cylinders were still wet when they were heaped on top of each other, then the whole time that they were in use must have been substantially less than 24 hours.

Tzachili identifies three clearly different styles of impressing circles on the cylinders from Δ17. These are labelled Recording Style A, B and C. She notes that the shape of the edges varies according to writing style. This tends to imply that each recorder made his own clay cylinders.

### 3. TZACHILI’S HYPOTHESES

Tzachili suggests a number of hypotheses:

1. The impressed circles are a record of some act of counting.
2. The objects to be counted were fixed or tied to the stick passing through the hole. These would have been small objects, like tokens, since they had insufficient weight to distort the clay cylinder. Tzachili then goes on to suggest a process by which when a token was removed a circular impression was made on the clay cylinder as a record of its removal.
3. There is a variant of this hypothesis. In this case, notches are made on the stick when an impression is made on the cylinder, so that the stick and the cylinder provided separate copies of the same accounting process.
4. The large pile of cylinders in Room Δ17 are a record of an exceptional situation and provide evidence of an emergency, possibly a sharing out of possessions prior to the evacuation of the settlement in anticipation of the volcanic eruption.

Let us now consider each of these hypotheses in turn.

The circles are not arranged in any pattern that could be regarded as decorative and the numbers of circles varied from cylinder to cylinder. Therefore, we can readily agree with Hypothesis 1, that the most likely explanation is that impressed circles represented some form of counting.

The second hypothesis is more puzzling and one is led to ask why should anyone in the Late Bronze Age tie small tokens to a stick and then indulge in a process of accounting for them when they are successively untied? We might try to search of

examples of an analogous sort of doubly verified accounting within the complexities of the modern world. However, there is no evidence to match the complexity of this type of hypothesis amongst the Linear B archives, for example.

Hypothesis 3 is perhaps more easy to accept with each partner in an exchange receiving a record of the exchange (i.e. one receives the clay cylinder and the other the stick, with an identical number of counts on each). However, the hypothesis is based on the supposed existence of a notched stick and there is, of course, no evidence for this.

Hypothesis 4 appears interesting because it tries to relate the pile of clay cylinders in Room Δ17 with the evacuation of town prior to the volcanic eruption. However, in practical terms, we might reasonably suggest that the citizens of Akrotiri would have been more concerned with making a quick exit rather than inventing a complex accounting scheme to divide up their possessions.

It is worth noting another hypothesis which I briefly considered before rejecting it. It is noted that a number of the cylinders had roughly 30 marks. This number is reminiscent of the numbers of textile items (*pa-we-a*) stored in a bundle on the Ld(1) series of tablets at Knossos. So could the cylinders be a record of the numbers of textiles (or something similar) in a stored bundle? However, we can reject this hypothesis because the cylinders were used as a temporary method of recording, rather than providing a longer term record. (The cylinders were found in a pile and there was no indication that any cylinder in the pile referred to any specific commodity.) Similarly, as the cylinders were found in a pile, we can reject the hypothesis that they were used as labels tied to bundles of textiles.

#### 4. CONSIDERING THE TALLY-STICK HYPOTHESIS

Let us now consider the tally-stick hypothesis. This would suggest that a number of individuals were required to go out into the countryside and count livestock (or some other commodities) using clay cylinders (each mounted on a stick) as a way of recording the numbers. In effect, a tally-stick would have been a portable clay writing tablet. The recorders would have made a circular indentation for each item observed and then they would return with their tally-sticks to Akrotiri where the sticks were passed to a scribe. We can speculate that it is likely that the scribe may have transferred these numbers onto some other medium which has not been preserved.

In practical terms, such a tally-stick would be a method of carrying a piece of clay over some distance so that the clay was still moist enough to receive the marks when necessary but yet could be carried (using the stick) so that the records were not smudged by handling. The weight of the cylinder (roughly ½kg) would readily

be portable. Indeed, it is possible that a recorder could set out with one tally-stick in each hand.

In this process, there would have been no requirement to retain the clay cylinders once the totals had been transferred on another medium. However, as we have already observed, the manner in which the cylinders were found does not suggest that they were being carefully stored as documents. Their state rather suggests that they were stacked in a corner awaiting a decision before their final disposal.

In some cases, the marks on the cylinders are made so that the numbers of marks are easy to assess. However, in the case of Recorder B, the numbers of marks are relatively large but, at the same time, there is no regularity of pattern in the way in which the marks were arranged. Because of this, there is a high level of difficulty in assessing the total numbers of marks on each of the cylinders of this recorder. The obvious conclusion is that Recorder B had no interest in the assessment of the number of marks on his cylinders. It was simply his task to make the marks on the cylinders. It would have been the task of some other hapless individual to interpret the mass of marks made by Recorder B.<sup>2</sup>

The high numbers of marks recorded on the cylinders of Recorder B (i.e. 91 on Δ17.15; 63 on Δ17.17; 52 on Δ17.18; and 48 on Δ17.20) are consistent with them being used to record the numbers of sheep in a series of flocks.

If we were to accept the tally-stick hypothesis, then it is possible that there is an increased level of sophistication beyond that of a simple count. For example, if the cylinders were recording a flock of sheep, it would be possible, say, that numbers of ewes could have been recorded on one flat face, numbers of yearlings on the other flat face and numbers of wethers on the curved surface. This is purely speculative, but it does provide some possible justification for the distributions of marks that are seen.

Let us now return briefly to Chadwick's description of the man with the tally-stick. Chadwick suggests that the man with the stick would have been 'an official who has returned from a tour of inspection'. However, this would appear to give this man a status which is beyond that inherent in the men who made records on the clay cylinders of Akrotiri. If we are correct in our interpretation, then the recorders would have necessarily been reliable (because otherwise the exercise would have been at best a waste of time and at worst it could have been fraudulent). However, they could have been non-literate functionaries rather than officials or overseers.

Thus, it is suggested that these clay cylinders from Akrotiri could be the remains of tally-sticks.

<sup>2</sup> Another suggestion would be that Recorder B was simply "going through the motions" of some worthless process and nobody would be interpreting the results. However, this is almost equivalent to suggesting that the marks on the clay cylinders were random doodles and have no significance.



## Addenda to “Writing the *wanax*: Spelling peculiarities of Linear B *wa-na-ka* and their possible implications”\*

Vassilis P. PETRAKIS  
*Athens*

Since the submission of the last revised draft of this article, evidence and discussions pertinent to the topics discussed therein have appeared that deserve mention or comment.

1) The ‘canonical’ spelling <*wa-na-ko-to*> /wanaktos/, identified as a Genitive Singular, appears on one non-sealed facet of an inscribed regular string-nodule (**HV Wq 117.β**) from the palace site of Ayios Vasileios near Xirokambi in Lakonia. No other signs or marks were incised on this or other facets of the nodule. This spelling had been hitherto unattested and should be added to the evidence presented in TABLE 1, pp. 68-70 and in the distribution map (FIGURE 1 on p. 71). The spelling <*wa-na-ko-to*> is perfectly ‘canonical’ according to the Linear B spelling rules, but belongs to a minority group rendering the orthographic vowel <o> as an Orthographic Copy Vowel or OCV (replicating the value of the following vowel /o/) (parallel to the spelling <*wa-na-ke-te*> for /wanaktei/ on **PY Fr 1215.1** and **TH X 105.2**) rather than preferring to render it as an Orthographic Arbitrary Vowel or OAV <a>, as in the Genitive Singular <*wa-na-ka-to*> on **PY La 622**. Thus, although ‘canonical’ according to the criterion of conforming to widespread spelling rules, such spellings, classified in §6 as belonging to ‘canonical’ Group I, are scarce and rare.

It is interesting that this new example of a ‘canonical’ spelling of this type appears on a *nodule* of a date earlier than the bulk of Mainland documents so far known,

\* I am grateful to Adamantia Vasilogamvrou, Director of the excavations at Ayios Vasileios, for permission to mention **HV Wq 117**. I wish to thank Tom Palaima, Aren Wilson-Wright and Vassilis Chrysikopoulos for insightful discussions. As always, responsibility for all views expressed herein remain with the author.

apparently within the LH IIIA2/IIIB1 period (the late 14th / early 13th century BCE). It has been argued, on palaeographic and linguistic grounds, that certain inscribed nodules represent “non-centralized features”.<sup>1</sup> The new Ayios Vasileios spelling, itself unattested and part of a scarce and sparsely distributed group of spellings that avoid the *orthographic cliché* of treating the orthographic vowel as an OAV (followed in all other sites where the term occurs, see FIGURE 1, p. 71), fits comfortably well within the pattern of occurrence of such “non-centralized” features attested on other (although not all) inscribed nodules.

Admittedly, the relatively earlier date of the Ayios Vasileios nodule does not support the view that OCV ‘canonical’ Group I spellings occurred when the aforementioned *orthographic cliché* was fading and was treated as ‘archaic’ (§6, pp. 102-103). But the type of document on which it occurs still allows us to treat such spellings as quite ‘peripheral’ to the dominant, but ‘idiosyncratic’ OAV Group II spellings.

2) Recently, Florian Ruppenstein supported the view strongly argued by Claude Brixhe, that the terms *wanaks* and *lāwāgetās* were part of a common Greek-Phrygian heritage (§ 7.1, pp. 104-105).<sup>2</sup> Following Brixhe, Ruppenstein has argued against the possible borrowing of these terms from Greek by Proto-Phrygian or Phrygian communities either in the Late Bronze or the Iron Ages and has *ad absurdum* concluded that “migrating Greek-speaking groups [placed in the EH II-III transition in the second half of the third millennium BCE] brought the terms ‘wanax’ and ‘lāwāgetās’ to their settlement area”.<sup>3</sup> Besides the likelihood that at least <λαφαγαται> is an error for \*<λαφαγεται> with a misplaced <ε> (pp. 104 and 106, n. 218) and therefore a patently Greek formation, the arguments against an adoption of the Greek terms by the Phrygians during the late Geometric or Archaic periods are not very convincing.<sup>4</sup> The sound point that the epic use of ἄναξ suggests “an honorary title”, rather than a formal official title is hardly an obstacle, since a similar “honorary” use is also probably attested on **M-01a** as well. That these terms did not belong to canonical Phrygian titles is strongly suggested by their *hapax* concurrence in the Phrygian corpus.

In contrast to the prolific use of ἄναξ in the epic and other poetic contexts, the epic absence of *lāwāgetās* can be assigned to its metrical incompatibility, but Pindaric λᾶγεταις suggests that the formation survived the Bronze Age. A more archaic uncontracted form preserving the glide (although absent from the extant alphabetic

<sup>1</sup> Palaima 2000, 228-230, 235-237.

<sup>2</sup> Ruppenstein 2015.

<sup>3</sup> Ruppenstein 2015, 100.

<sup>4</sup> Ruppenstein 2015, 98.

record) might have been the source of the Phrygian adopted title. As has often been noted, its concurrence with  $\text{φανακτει}$  on **M-01a** shows considerable distance from the Mycenaean use of the terms (where their assignment to the same individual cannot be supported), which is also compatible with a late, post-Bronze Age Phrygian adoption.

Contrary to Ruppenstein, there is a very plausible context for the adoption and adaptation or appropriation of these Greek titles (even as "honorary") by the Phrygian rulers, whose connections with the Greek world are noteworthy. Besides the testimony of Herodotus (1.14) that Midas dedicated his "ἄξιοθέητον" throne at Delphi and the tradition of his marriage to a Greek princess from Aeolian Kyme (Hermodikē in Aristotle, fr.611.37 or Demodikē in Pollux *Onomastikon* X.37), the very fact of the adoption of the Greek alphabet by the Phrygians (probably in the late 8th century BCE), and archaeological evidence for wide-ranging contacts between Phrygia and the Greek world during the 8th-7th centuries documents the considerable acquaintance between Phrygians and Greeks during this period, and provides a more than plausible background for the adoption of Greek titles.<sup>5</sup>

3) A last comment should be inserted regarding the form of the place-name spelled in the Knossos documents as  $\langle ru-ki-to \rangle$ . There may be some dim Egyptian sidelight into the possible nature of  $\langle -i- \rangle$  in this spelling as representing a true phonological vowel, rather than being orthographic: in the Kom El-Hetan list, dated to the reign of Amenhotep III (early 14th century BCE), a place-name  $rkt$  ( $ry-k^3-ti$ ) is identified. The Aegean associations of the place-names mentioned in this inscription are generally accepted without many reservations. The Egyptian spelling might indicate the perception of a phonological vowel between the velar and the dental stop in the original Aegean toponym; admittedly, there are alternative possibilities, such as vocalic epenthesis in the orthographic representation of a stop cluster, as well as a purely orthographic vowel. If the former hypothesis of a phonological representation applies, although the suggested Egyptian value seems to be closer to /a/, we should be reminded that this may well represent the Egyptian *perception* of a Minoan vowel, in which case the original value of the vowel may well have been different. It might therefore be tempting to associate this Egyptian type with the one spelled as  $\langle ru-ki-to \rangle$  at Knossos, rather than directly with  $\langle \Lambda\upsilon\kappa\tau\omicron\varsigma \rangle$ .<sup>6</sup> This evidence is compatible with the view supported here (§5, p. 95, with n. 149) that  $\langle -i- \rangle$  in this name was phonological rather than an OAV.

<sup>5</sup> For a still usable overview of the pertinent evidence see Muscarella 1989.

<sup>6</sup> Edel and Görg 2005, 188–89; Cline and Stannish 2011, 10.

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## Necrológica. Anna Morpurgo Davies (1937-2014)

Une grande dame s'en est allée : Anna Morpurgo Davies n'est plus. Il est impossible de dire tout ce qu'elle représentait : une référence, un exemple et bien plus encore. Ses domaines scientifiques de prédilection étaient vastes. Au deuxième millénaire avant notre ère, le grec mycénien (linéaire B) ; le linéaire A, notant un des parlers préhelléniques de Grèce ; dans le monde anatolien, le louvite, le hittite, le carien. Au premier millénaire, le grec alphabétique dans toutes ses dimensions : questions générales, lexicologiques, phonétiques, morphologiques, dialectales (arcadien, chypriote, dorien, éolien, thessalien, rapports interdialectaux...), anthroponymiques. Il s'y ajoutait la grammaire comparée des langues indo-européennes, la linguistique historique, la linguistique générale, l'histoire de la linguistique, l'histoire des écritures. Chacun de ses travaux était un modèle d'intelligence, d'esprit critique, d'intuition, d'information et d'exactitude. Anna Morpurgo Davies avait le talent de jeter un regard nouveau sur chaque problème qu'elle étudiait. Elle examinait toutes les opinions, y compris les mieux enracinées ou les plus évidentes, pour voir si elles étaient vraiment aussi valables qu'elles en donnaient l'impression. Souvent, le résultat était surprenant. C'était un plaisir d'entendre Anna intervenir après une communication dans un Congrès ou de discuter avec elle d'une question scientifique : elle avait l'art de débusquer les faiblesses d'une argumentation ou de suggérer des solutions imprévues. Toujours en souriant. Anna était également une conférencière hors pair, capable de passionner son auditoire tout en réussissant à le faire parfois rire (elle avait un immense sens de l'humour). Son talent pédagogique était exceptionnel, tout comme son dévouement à ses étudiants. Ce n'est pas par hasard que tant d'entre eux sont devenus de brillants chercheurs : elle leur consacrait un temps considérable et les formait de manière exemplaire. Anna était confondante de gentillesse, mais aussi de sagesse : elle avait le don de proposer la bonne solution à un problème professionnel épineux et d'éviter toute surenchère ou excès. Elle faisait d'ailleurs preuve d'un tact et d'une présence d'esprit qui m'ont toujours semblé quasiment surhumains. Lors du Colloque mycénologique de Skopje, en 1985, je me souviens que, juste au moment de passer à table, John Chadwick lui a demandé d'improviser un plan de table pour la vingtaine de collègues présents. Anna

s'est concentrée, le silence s'est fait, et quelques instants plus tard, chacun était assis à la place qui lui revenait.

Les qualités d'Anna Morpurgo Davies ont été largement reconnues. Après un doctorat à l'Université de Rome consacré, déjà, à la morphologie mycénienne (1959), elle y a été engagée comme assistante pendant deux ans. Après quoi, elle est partie en 1962 — 1963 comme Junior Fellow au Center for Hellenic Studies, Washington DC (Harvard University). Ce n'était pas de gaité de cœur : elle m'a dit que, dans l'avion, elle pleurait toutes les larmes de son corps. Ce séjour a pourtant été très profitable puisqu'il lui a fait rencontrer son futur mari. C'est en 1964 qu'Anna est entrée à l'Université d'Oxford. Elle n'allait pas la quitter jusqu'à son éméritat en 2004, mais ceci ne l'a pas empêchée d'être engagée temporairement dans nombre d'institutions étrangères : University of Pennsylvania ; University of Tampa (Linguistic Society of America) ; University of Yale ; Istituto Universitario Orientale di Napoli ; University of California at Berkeley (à plusieurs reprises) ; Istituto Universitario di Studi Superiori, Pavia ; University of California at Los Angeles ; Linguistic Institute of the Linguistic Society of America, Berkeley. Cette grande scientifique était aussi une excellente administratrice et a exercé une foule de responsabilités. Ainsi, Delegate d'Oxford University Press ; Curator à la Bodleian Library ; membre d'innombrables comités à Oxford et ailleurs. Toutes ces qualités lui ont valu d'entrer dans diverses académies (dont, bien entendu, la British Academy), de recevoir des doctorats honoris causa ou d'être nommée Dame Commander of the British Empire — devenant ainsi Dame Anna. Pourtant, Anna Morpurgo Davies ne faisait pas état de ces honneurs : sa discrétion et sa modestie étaient prodigieuses. Sa capacité de travail ne l'était pas moins : elle était submergée en permanence, mais faisait vaillamment face, en s'imposant constamment des horaires que d'autres n'auraient jamais pu tenir. Que de fois elle ne m'envoyait ses messages qu'à deux ou trois heures du matin... Ses dernières années avaient été éprouvantes : une série de cancers et d'opérations s'étaient succédé sans arrêt. Pourtant, Anna a tenu bon, en souriant, avec élégance. Mais c'est fini. Nous ne la verrons plus. Sa chère chatte Tawi ne pourra plus se promener avec elle dans le jardin. Merci, dearest Anna, pour tout. Tu nous manques. Beaucoup.

Yves DUHOUX

Quando este número de *Minos* se encontraba ya en prensa, nos llegó la triste noticia del fallecimiento de Martín S. Ruipérez en Madrid el 2 de julio de 2015 a la edad de 92 años. En una próxima entrega de la revista aparecerá el obituario de quien la dirigió durante muchos años.

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