

## *Alimenta* Revisited

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In my 1974 book *Alimenta Hethaeorum*<sup>1</sup> I sought to make available what could be known about Hittite foods and their production. The bulk of my evidence was textual, because not much was known about the subject from other evidence at the time. But even in 1974 I was aware of the emerging field of archaeobotany, whose chief practitioners in Near Eastern archaeology were Hans Helbaek and Willem van Zeist. But *Alimenta* could only scratch the surface in polling archaeological reports. Data from older excavations, such as from Hamit Koşay's Alaca expedition, was cited and more recent excavations, such as those at Çatal Höyük, Hacilar, Beycesultan, and Korucutepe, were useful as a prelude to the Hittite period, even though some of their evidence was from millennia earlier than the Hittite period. Now, 22 years later, employment of staff botanists is prevalent.

But in the intervening 25 years archaeobotany has assumed a major role in the study of ancient sites in Turkey. In 1996 Mark Nesbitt and Delwen Samuel tried to tally how many archaeobotanists were working in Turkey. They found "about 30... studying botanical remains from 39 excavations."<sup>2</sup> 20 of those were currently in progress, while the rest ended in the 1980s or earlier. Scientifically controlled analyses of plant remains formerly characterized only the digs at prehistoric sites. But now the value of such studies is recognized, even for Classical and Medieval sites. Samples are no longer recovered by optical sightings, but are the result of planned flotation analysis of soil samples from carefully selected loci on the site. Nesbitt and Samuel estimated that 75% of the 20 current excavations use a flotation machine.

As they observed,

The result of all this work is that regional and chronological patterns of agricultural change in Turkey are becoming increasingly clear.<sup>3</sup>

Supplementing the archaeobotanists work in identifying the plant remains is the ethnobotanist, whose studies of surviving traditional farming techniques provide important information, which enable archaeologists to detect on the plant remains evidence for how they were processed and used. Particularly useful for the student of Hittite agriculture are Gordon

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<sup>1</sup> H.A. Hoffner, Jr. 1974. Hereafter abbreviated *Alimenta*.

<sup>2</sup> M. Nesbitt and D. Samuel 1996, 91.

<sup>3</sup> Nesbitt and Samuel 1996, 91.

Hillman's studies of the steps in cereal crop husbandry among traditional farmers in contemporary Turkey.<sup>4</sup> One of his charts (his fig. 2) shows the sequence of steps Hillman identifies in processing free-threshing wheats and barleys, and the following one (his fig. 3) those for glumed varieties such as emmer, einkorn and club wheat.<sup>5</sup>

In a dynamic discipline like Hittitology 25 years is a long time for a book to remain useful which claims to present a complete picture of a complex subject. *Alimenta* requires revision, because of the dramatic enlargement of the published text corpus, advances in understanding the languages of the Hittite kingdom, and above all because of the proliferation of archaeobotanical evidence.

When the Hittites arrived in central Asia Minor, they may have brought with them food-producing traditions from their earlier home. But since we do not know its location, we cannot tell if its topography and climate were similar to that of second millennium Anatolia. It is likely that within a brief period they were able to learn about the food-producing habits of their predecessors, which would have included both a detailed knowledge of the edible wild flora of the region and the various cultigens. Although it is true that for millennia prior to the Hittite immigration most of the so-called Fertile Crescent, the Levant and Asia Minor shared a basic "package" of food cultigens which included barley, wheat, lentils, olives and dates, the package would have varied according to the regional climates and soil conditions. Unlike the Fertile Crescent and the Levant, the central Anatolian uplands did not enjoy mild, wet winters and long, dry summers.

In 1991 Naomi Miller of the University of Pennsylvania observed:

[In Turkey] the Late Bronze Age, Iron Age, and later periods are poorly represented by archaeobotanical finds. Plant remains from only a few sites are reported.<sup>6</sup>

Happily this situation is changing: this month on her web site (<http://www.sas.upenn.edu/~nmiller>) she has posted a bibliographical listing of publications of archaeobotanical finds from Turkish sites, including not a few from the Late Bronze Age (2nd millennium).

The first tentative analysis of plant remains from Boğazköy was published by Maria Hopf in 1992.<sup>7</sup> More recent finds come from Büyükkaya excavations and from the 1999 season under direction of Jürgen Seeher.<sup>8</sup>

<sup>4</sup> G.C. Hillman 1984; 1985.

<sup>5</sup> Hillman 1984 4-6, figures 2-4.

<sup>6</sup> N.F. Miller 1991, 152.

<sup>7</sup> M. Hopf 1992.

<sup>8</sup> J. Seeher 1997, 1998.

A report of plant remains from Hittite Kuşaklı was given in 1996 by Rainer Pasternak.<sup>9</sup> He stated that they had carried out bucket flotation of 10-40 liter samples. Stage one of the process consisted of analysis of samples from the big temple. In Pasternak's words: "The temple samples contained 20.000 grains of very well cleaned bread wheat, with einkorn and emmer in small numbers. Barley was obviously the second most important cereal. Lentil and common vetch were the only pulses in the temple." Stage two, not yet reported in the 1996 article, will study samples from other large buildings on top of the site, then probable domestic areas.

Also in 1996 Müller-Karpe summarized the results of plant remains analysis for a non-botanist readership as follows:

So zeigte beispielsweise die Analyse von Pflanzenresten aus Kuşaklı die Nutzung von Gerste, Saatweizen, Emmer und Einkorn als Getreidearten; zudem wurde Wein angebaut. Als wildwachsende Sammelfrüchte sind Weißdorn und Pistazie nachweisbar.<sup>10</sup>

Interesting, since pistachio occurs in Boğazköy texts as <sup>GIŠ</sup>LAM.GAL and <sup>GIŠ</sup>BUTUMTU.

In an interim presentation of the analysis of plant remains found during 1993-1995<sup>11</sup> Pasternak noted that, whereas samplings in the area of the big temple showed almost exclusively bread wheat (*Triticum aestivum*) and barley (*Hordeum vulgare*) — with other types in insignificant amounts as stray finds) — in the domestic quarters of the city appreciable amounts of einkorn and emmer appear alongside. Pasternak's explanation was that for purposes of the cult a finer quality of bread was needed, while the general population preferred a mixed diet including emmer and einkorn.<sup>12</sup> This pattern, which must also have been true of Hattuša, needs to be kept in mind in view of the primary concern for temple and palace in the texts found there. The cereal-based foods of the Boğazköy texts should therefore reflect the higher standards of temple and palace, which would have preferred bread wheat to emmer.

Despite the relatively small percentage of the total cereal seed finds at Kuşaklı constituted by barley, its large kernel size indicates the importance of that cereal species in Kuşaklı. Remarkable also for a plant assemblage from the Bronze or Iron Ages is the simultaneous intensive cultivation of diploid, tetraploid and hexaploid wheats. Among the pulses there was evidence for a regular cultivation of lentil (*Lens culinaris*) and bitter vetch (*Vicia ervilia*), again matching the textual evidence from Boğazköy (GÜ.TUR

<sup>9</sup> Nesbitt and Samuel 1996, 94.

<sup>10</sup> A. Müller-Karpe 1996, 66.

<sup>11</sup> Pasternak in Müller-Karpe 1997, 120-122.

<sup>12</sup> Müller-Karpe 1997, 122.

and GÚ.ŠEŠ), and an occasional cultivation of a relatively small-seed form of the grass pea (*Lathyrus sativus*).

Space constraint here does not allow me to give the details of Naomi Miller's report on plant remains from 2nd and 1st millennium Gordion,<sup>13</sup> Simone Riehl's from Kumtepe and Troy,<sup>14</sup> Hans-Peter Stika's from Miletus,<sup>15</sup> Mark Nesbitt's on second millennium Kaman Kalehöyük,<sup>16</sup> or the undersea recovery of plant remains on the Ulu Burun shipwreck discussed in three articles by Cheryl Haldane published from 1990 to 1993.<sup>17</sup>

Nothing is formally published yet about the samples from Kerkenes Dağ. Rumor from members of the team indicates that some cereal remains have been recovered, including some wheat. But no report has appeared indicating the species or the archaeological context. I also have not seen, nor am I aware of any publication of analysis of plant remains from Ortaköy-Şapinuwa, although I am told that samples have been given to scientists at the Middle East Technical Institute in Ankara.

I know of no published report on plant remains from Maşat. But of course we have textual evidence in the form of reports of annual sowing and reaping of cereals and pulses in HKM 109. We shall take a look at what that shows a bit later.

As we seek to utilize our limited textual evidence from Boğazköy, there are certain methodological errors we should try to avoid. Firstly, although the plants native to Iraq determined as referents of Sumerian and Akkadian terms are helpful starting points in interpreting logograms in Hittite, they can never be the final arbiters, since it is clear that the same terms *did* have different referents in other bio-zones. Secondly, it is also unsafe to rely heavily on the equivalents in Hittite translations of Sumerian, Akkadian and extra-Anatolian Hurrian literary texts, for these texts reflect the identifications of the named cereals in Syria or Mesopotamia, not Anatolia.

Taking these precautions, what can we say are the probable botanical referents of Hittite cereal terms? Perhaps the most important relevant textual data published since 1974 comes from the Maşat administrative texts studied by del Monte in 1995.<sup>18</sup> By combining information from these texts with data from excavations at Hittite sites we can gain new perspectives.

At Boğazköy ŠE can be used generically for "grain" and "barley." ZÍZ without added qualifiers is probably always a specific variety of wheat.

<sup>13</sup> N.F. Miller 1999.

<sup>14</sup> S. Riehl 1994; 1999.

<sup>15</sup> H.-P. Stika 1997.

<sup>16</sup> M. Nesbitt 1993.

<sup>17</sup> C.W. Haldane 1990; 1991; 1993.

<sup>18</sup> G.F. del Monte 1995.



Also in Mašat ZÍZ denotes that species of wheat sown in the greatest quantity, namely bread wheat (*triticum aestivum*). It is accompanied by ŠE “barley” and by a few other cereal types — including *šep̄pit*, KUNĀŠU, kar-šiš, and ZÍZ KALAG.GA — which were sown in smaller quantities.

Figure 1 shows the amounts reported sown or reaped at Tapikka over a four-year period. It is the relative amounts of each cereal that are of interest. By far the largest amount of cereal was ŠE. In this case I take ŠE to designate *Hordeum vulgare*, since at Kuşaklı the recovered samples show the largest fractions to be *Hordeum vulgare* and *Triticum aestivum*. At Mašat they together constituted 88% of the cereals cultivated during that four-year period. Of the remaining 12% the largest fraction was made up of *šep̄pit* and KUNĀŠU. And since at Kuşaklı the next two most common cereals were emmer and einkorn, it is prudent to assign to KUNĀŠU its usual Akkadian translation “emmer” (*Tr. dicoccum*) and to consider *šep̄pit* to be “einkorn” (*Tr. monococcum*). This, of course, creates a difficulty: Since the Akkadogram KUNĀŠU is virtually non-existent in Boğazköy,<sup>19</sup> are we to conclude that emmer played no significant role among the cereals used there for the cult, or are we to look for another syllabically written Boğazköy word to identify with emmer? If the *karšiš* listed as a cereal distinct from KUNĀŠU in HKM 109 is a form of Boğazköy *kar-aš*, we can exclude Boğazköy *kar-aš* as the equivalent of KUNĀŠU. The other syllabic candidates for KUNĀŠU at Boğazköy would include *kanza*, *ewan*, *parḫuenaš*, *ḫattar*, *zinail*, and *kūtiyan*. Although the *communis opinio* in 1974 for *ewan* was that it was a variety of barley, del Monte adduced good reasons to reconsider. The Boğazköy evidence for *kanza* is promising. The phrase *kán-za wa-ar-ḫu*(coll.)-iš “rough (that is, glumed?) *kanza*” might fit emmer as a glumed wheat with a husk of bran. ZÍZ KALAG.GA “hard wheat” may be *triticum durum* or *compactum*, both attested in Bronze Age levels in Anatolia. ZÍZ KALAG.GA is not attested in published Boğazköy texts, and its syllabic Hittite reading is unknown. But since it occurs here side-by-side with *šep̄pit* and *karšiš*, we can exclude these as its syllabic Hittite equivalent. I have no reason to prefer any one of the other candidates for ZÍZ KALAG.GA.

In *Alimenta* I sketched the stages in cereal cultivation and processing, drawing where possible on textual references to these stages. Today it is possible to enlarge on these examples and to interpret others differently than in 1974.

<sup>19</sup> Not in published Hittite texts outside of the Mašat texts. See H. Ertem 1974, 12 note 5.

I supposed two Hittite verbs denoting the breaking up of the soil and laying out of furrows. These were *harš-* and *teripp-*. I assumed that the *harš-* action preceded that of *teripp-* largely on the basis of the sequence of the verbs in the Yozgat tablet (VBoT 58 i 29-31).

There are two principal methods of depositing the seed that can be induced from the evidence in the ancient Middle East: (1) broadcast scattering of the seed over the plowed ground, and (2) use of a seeder plow or other similar mechanism to deposit the seed in the furrows. Most probably both methods were known to the Hittites and were described by different verbs, but we do not know yet which. Among the verbs that are likely candidates for sowing are *aniya-* and *šūniya-*.

The evidence for *aniya-* with direct object NUMUN includes a passage from Maṣat letter 54:

ŠA<sup>URU</sup> Kašipura GUD.ḪI.A (19) *kue* A.ŠA<sup>A</sup> *terippi* (20) A.Š[A] *terippiyat* (21) *nu-tta uwanzi* (22) *apedani uddani* (23) *išt[u]* É.[GA]L-LIM UL (24) *punu[šš]a[n]zi* (25) *kinuna apē dā* (26) *nu apē* NUMUN.ḪI.A *anniya*

What plow-fields you have plowed (with) the oxen of Kašipura, will they not interrogate you from the palace about that matter? Now take from there and sow those seeds!<sup>20</sup>

The verb *šūniy<sup>e</sup>/a-* “to drop” in both active and middle forms is used for sowing cereals in HKM 109 and 111.<sup>21</sup>

The Maṣat letters reveal concern for the safety of crops in the fields that have ripened. But the voiced concerns have to do with foreign enemies who might steal or sabotage them. There is no explicit mention of the other concern that must have beset all Hittite farmers, namely, animal predators such as birds and field mice. Whether the Hittites used fabricated scare-crows to ward off birds or simply had watchmen in the fields we do not know. In *Alimenta* I I devoted a long section to the Hittite words used to translate the names of various grain pests in Sumero-Akkadian lexical texts.

The primary verb for reaping is *warš-*. Traditional farmers use several

<sup>20</sup> HKM 54:18-26. In law §166 there is reference to the sowing of one crop on top of another: *takku* NUMUN-*ni* *šer* NUMUN-*an* *kuiški šūnizzi* “If anyone sows seed on top of (another farmer’s) seed”. In the passage [BÜLUG] (17) *māḫḫan tepšuš UL-an gimra ped[anzī]* (18) *n-an* NUMUN-*an* *īyanzi* “As [malt] is sterile, so that [they] do not carry it to the field and use it as seed” (KUB 17.10 iii 16-18) the verb *īyanzi* need not be a specific term for “sowing”, since the double accusative construction shows rather that it means “use as” or “treat as”.

<sup>21</sup> HKM 109:2, 10, 11, 111:14, 18, 23, 27, usually in the iter. form *šūniške-*, but also *šu-nu-mi-ni* (HKM 109:10, 11, 16), a 1. pl. pres. form influenced by the verb *šunna-* “to fill”, which inflects like *unnumeni-*, *pennumeni*, and *tarnumeni*.

methods of reaping cereals. They can either be uprooted or cut with a sickle. The evidence from Hittite cuneiform texts confirms the use of sickles, whose Hittite name was *kullupi*.<sup>22</sup> Reaping was normally men's work, as milling was women's, although exceptions can be found.

At the threshing-floor (Sum. *kislaḥ*)<sup>23</sup> the sheaves (Hitt. *šepa*-) were unbound, and spread out on the surface for threshing. Threshing floors were probably located, as in surviving communities practicing traditional farming, on the leeward side of the village, so that the wind would not blow the lighter particles from the winnowing process into the village.<sup>24</sup> Threshing floors formed one of the basic possessions of a farm, along with its buildings, fields, vineyards, workforce and livestock.<sup>25</sup> Maintaining threshing floors (KISLAḤ), grain-storage structures (É IN.NU.DA), vineyards, groves and administrative buildings in good condition was one of the responsibilities of the provincial governors (*BĒL MADGALTİ*).<sup>26</sup> That the threshing floor was enclosed, presumably to keep out scavenging animals, might be indicated by the mention of a "gate of the threshing floor,"<sup>27</sup> but it is equally possible that one of Hattuša's city gates was named by its proximity to a threshing floor.

After sun-drying, oxen trampled on the stalks and thus loosened the kernels from the husks.<sup>28</sup> The use of oxen in threshing is implied by the phrase "oxen of the threshing floor" in a passage from the instructions for temple officials.<sup>29</sup> They could have been used to draw a threshing sledge, or just to trample on the grain spikelets with their hooves. Both methods

<sup>22</sup> Sumerogram URUDU<sub>KIN</sub> or URUDU<sub>ŠU.KIN</sub>.

<sup>23</sup> Complementation of KISLAḤ in the locative (KISLAḤ-*ni*) indicates that the last consonant in the word was an *n*.

<sup>24</sup> Boğazkale has several threshing floors located on the east and south sides of the village (information courtesy H.G. and Frances Güterbock), but I do not know the direction of the prevailing winds there.

<sup>25</sup> DUMU.MEŠ LUGAL-*ma kuedani* (57) [*še*]r *ḥarkiškantari UL ANA É.MEŠ-ŠUNU A.ŠÀ.-ḪI.A-ŠUNU* GIŠ<sub>KIRI</sub><sub>6</sub>.GEŠTIN.ḪI.A-ŠUNU (58) [KISL]AḤ.ḪI.A-ŠUNU SAG.GEMÉ.İR.MEŠ-ŠUNU GUD.ḪI.A-ŠUNU UDU.ḪI.A-ŠUNU KBo 3.1 ii 56-58 (Telepinu procl. OH/NS). See also KUB 21.1 + 19.6 + iv 33-35, 42-44 (Alakš. treaty). In OH times the threshing floor was named as an essential part of a land grant in the town of Tuḫuppiya to a man named Talakka, a beneficiary of the king's largesse: 2 IKU A.ŠÀ Š[À.B]A (6) GIŠ<sub>KIRI</sub><sub>6</sub>.GEŠTIN GIŠ<sub>PÈŠ</sub> (7) QAQARA ŠA É-TIM (8) U KISLAḤ § (9) ŠA <sup>m</sup>[Tal]akka (10) G[AL LÚ.MEŠ] MUḪALDIM (11) [INA <sup>URU</sup>T]uḫuppiya SBo I 2 = LSU 2 obv. 5-11.

<sup>26</sup> KUB 13.2 ii 18-20 (MH/NS).

<sup>27</sup> KÁ KISLAḤ.

<sup>28</sup> GUD.APIN.LÁ.ḪI.A in threshing in KUB 13.4 iv 22-25 (ed. A. Süel 1985 78 f.).

<sup>29</sup> ŠA KIS[LAḤ] GUD.APIN.LAL.ḪI.A in KUB 13.4 iv 25, ed. Süel 1985.

are known to traditional farmers.

A pile of threshed stalks and spikelets on the threshing floor,<sup>30</sup> after they were raked together, was called a *ḫuigatar ḫaḫhariyan* “a raked-together pile of threshings”.<sup>31 32</sup>

Some activity at the threshing floor in connection with this *ḫuigatar* is referred to by the infinitive *ḫu-ga-an-na* (stem *ḫuek-*, verbal substantive *ḫuigatar*, infinitive *ḫuganna*) in the following list of agricultural activities:<sup>33</sup>

*te-ri-ip-pu-u-wa-an-zi wa-ar-šu-wa-an-zi*

ÉSAG-an-zi *ḫu-ga-an-na a-ra-u-wa-aš* NU.GÁL

“No one shall be exempt from plowing, reaping, filling grain-storage pits(?), and ...ing(?)”

Although the chronological sequence of filling ÉSAGs and threshing is the reverse of the expected, I am skeptical of any attempt to include ritual slaughter in this context.<sup>34</sup> Instead both *ḫuigatar* and *ḫuganna* are clearly associated with actions performed on the cereals near the KISLAḤ (threshing floor).

After the grain was threshed by the trampling of oxen, the *ḫuigatar*-pile of grain, stalks, spikelets, rachis, and glumes<sup>35</sup> was winnowed. In traditional farming the straw fractions are used differently depending on their length and the species of cereal from which they were separated. Some types are used as animal fodder, others as temper for clay bricks, and still others as fuel. Nothing but the lightest wispy fraction that the wind disperses during winnowing goes unused. From this comes Hattusili

<sup>30</sup> Puhvel (*HED* H 6) reads KUB 24.8 i 13's K[I.U]D-aš (i.e., KI[SL]AḤ-aš) as “*uddani*” with no explanation. The traces in the copy do not permit a reading \**u[d-d]a-ni*.

<sup>31</sup> KUB 24.8 i 13-14 (Appu story, OH/NS), ed. StBoT 14: 4 f., 20, referring to such a pile as a metaphor for accumulated wealth.

<sup>32</sup> Since the words for gold and silver are both animate (common) gender, *ḫaḫhariyan* “raked together” (neut. participle) must refer to the *ḫuigatar*.

<sup>33</sup> KUB 31.57 i 14'-19'. Cf. AASOR 16 88:11 and MDP 23 278:8 in *CAD* Z 29.

<sup>34</sup> It is so interpreted by *HED* H 329 “free from plowing, harvesting, garnering, and butchering”, although there is no reason why butchering should appear at the end of such a list of grain-related chores. Nor is ritual slaughter likely, since the activities described immediately before have nothing to do with ritual. *ḫuigatar* (KUB 24.8 i 13-14; 685/z 7') is related to *ḫuek-* as *karšatar* is to *karš-*, or as *marratar* is to *marra-* (E. Laroche 1968 777 f.). In *HED* H 6 Puhvel translated *ḫuigatar* in this passage as “grain-pile(?)”.

<sup>35</sup> S. Alp 1991 313 has proposed that the word *dukanzi* means “Spreu”, but H.C. Melchert (in an unpublished paper kindly shared with me) has assembled persuasive evidence for a different meaning of that word.

III's threat of divine retribution to anyone coveting even the *ezzan* GIŠ-*ru* of the threshing floor he had devoted to <sup>d</sup>IS<sup>T</sup>AR of Samuḫa.<sup>36</sup>

On the spot where the winnowing was performed there would have been piles of threshed and winnowed grain (either *ḫarpali* or *šeli*-).<sup>37</sup> Here they were easily accessible to animals. Thus in an oracle text (KUB 30.46 left col. 7-9) the significance is explained of an eagle's alighting upon a *šeli*- and upon a *ḫarpali*- in the vicinity of a threshing floor. Since eagles are carnivorous, the eagle would not have been attracted to the grain, but to the likely presence of rodents in the vicinity. In Hittite law §86 a pig gets into a *šeli*- and is killed by the owner of the field.

In traditional cereal cultivation as it is practiced today winnowing is followed by a series of siftings and sortings, designed to remove impurities. Sometimes a flotation procedure is used to separate the kernels of healthy grain from impurities that float to the surface. Possibly, the occasional reference to "washed" grain (*arrant*-) may refer to this cleaning. Traditional farmers used sieves with different sized holes for the various stages, depending on what particular impurities they wish to remove. One Hittite term for a sieve seems to have been *pattar*.<sup>38</sup> Since grain was taken directly from the threshing floor to the grain storage structures,<sup>39</sup> and it is unlikely that uncleaned grain would have been put into storage, we must assume that all these washings, siftings and sortings transpired at the threshing floors.

Since 1974 sufficient new evidence has been published to isolate at least one of the Hittite verbs for the sifting and hand sorting of grains and grain fractions produced in the actions between threshing and hand milling. The verb is *ḫaššu(wa)ngai*- a denominative from the action noun *ḫaššu(wa)nga*-.<sup>40</sup> Three techniques could be indicated by this verb: hand sorting (*keššarit*), sorting using a sieve or basket, and perhaps even flotation sorting (*wetenit*).

After threshing and winnowing were completed, workers cleared (*war-šiya*-) the threshing floor.<sup>41</sup> The grain was gathered into the grain-storage pits (ÉSAG.ḪI.A), and the chaff which remained was stored in the *taišzi* (or

<sup>36</sup> KUB 1.1 iv 82-84 (Apology of Hattusili).

<sup>37</sup> H. Otten 1958 140 f.; *HW<sup>1</sup>* Erg. 3 (1966), 28.

<sup>38</sup> See *CHD* P s.v.

<sup>39</sup> See 18 *PA*. 3 BÂN ZÍZ.ŠE ŠÀ.BA 13 *PA*. ZÍZ.ŠE ŠA KISLAḪ KUB 57.108 ii 15 (cult inventory, NH).

<sup>40</sup> *HED* H 246 contains almost all of the references. The action noun also occurs in KBo 40.339 ii 4' [... *ḫaššunga išḫūwanz[i]*.

<sup>41</sup> Hittite law §158.

É IN.NU.DA).<sup>42</sup>

When the threshed, winnowed and sifted grain was brought from surrounding areas to the royal silos in Hattuša, a record was kept of the point of origin, which was sometimes expressed as "threshing floor of such-and-such a city".<sup>43</sup>

In the instructions for the *BĒL MADGALTİ* mention is made of records of the contents of ÉSAGs:<sup>44</sup>

*na-aš-ma-kán* ÉSAG.ḪI.A *ku-iš-ki ša-ra-a* (19) *a-da-a-an ḫar-zi nu-za* GIŠ.ḪUR.ḪI.A  
*ḠUB-la-aš-ma ḫar-ni-in-kán ḫar-zi*

"Or (if) someone has eaten(?) up (the contents of) ÉSAGs and has destroyed the records, ..."

Here they are called GIŠ.ḪUR.ḪI.A, usually taken to refer to wax-covered wood tablets used for temporary records. An example of a clay tablet compiled as the basis for such a report to the emperor is HKM 109, which lists the quantities of grain harvested at Mašat. The original report, of course, was sent off to Hattuša.

In *Alimenta* (1974) I used textual evidence to show that where ÉSAG occurs nothing indicates that it is a building. The verb which describes its construction is not *wete-* "to build, construct" (used for buildings), but *iya-* "to make".<sup>45</sup> The opening of an ÉSAG is described by the verb *kinu-*, which elsewhere portrays the opening of vessels (*išpanduzzi-*, <sup>DUG</sup>*ḫarši-*, <sup>DUG</sup>*ḫaršiyalli-*, <sup>DUG</sup>*KUKUBi*), sealed objects, or pits dug in the ground (*a-a-bi*) which were afterward closed and sealed.<sup>46</sup> The opening of doors, gates, windows and buildings, on the other hand, is described by the verb *ḫaš-/ḫeš-*.<sup>47</sup> That an ÉSAG could be "filled" (*šunna-*) with grain<sup>48</sup> is more appropriate for a vessel or pit than for a building. In KUB 31.71 iv 8ff. it is said that ÉSAGs were *ḫal-lu-uš* "deep". I suggested that these *ésags* were underground grain storage pits and supported this claim with passages showing that one "dug" (*padda-*) an ÉSAG.<sup>49</sup>

<sup>42</sup> The *taišzi-* = É IN.NU.DA was the Hittite counterpart to the Turkish *samanlık* "chaff storage building". Cf. also *HZL* p. 314, which so translates the Sumerogram.

<sup>43</sup> KUB 31.65 + Bo 8169 obv. 12, ed. Verw. 16 f.

<sup>44</sup> KUB 13.2 iv 18-19, ed. E. von Schuler 1957, 51-52.

<sup>45</sup> *nu* ÉSAG *īyanzi* "and they make a grain storage pit" KUB 12.16 ii 12.

<sup>46</sup> H. Ehelolf 1930 141 n. 2, 395 n. 5; A. Goetze 1930 79; E. Laroche 1963 58-59. On *a-a-bi* cf. H.A. Hoffner, Jr. 1967 and the treatments in *HW*<sup>2</sup>, 1 and *HED* A s.v.

<sup>47</sup> Friedrich, *ZA* 37 (1926) 298f.; H. Ehelolf 1930 141 n. 2.

<sup>48</sup> Hittite laws §§96-97.

<sup>49</sup> KUB 12.16 ii 11ff.; KUB 7.44 obv. 7'-11' (with restorations from the duplicate KBo 22.111 iii 10'-14'. We can now add KBo 21.5: 2', a text not yet published in 1974.

There also exists a denominative verb written logographically in the infinitive as ÉSAG-*an-zi* “to store in ÉSAGS”.<sup>50</sup> The phonetic complements to ÉSAG indicate that the Hittite noun underlying the logogram was an a-stem common gender noun whose final consonant was an *n*.

Although we have little information from texts about the appearance of these ÉSAGs, Jürgen Seeher identified the objects themselves in his excavations on the Büyükkaya.<sup>51</sup> According to an interview with Seeher published in the September 13th issue of the Turkish newspaper *Cumhuriyet*,<sup>52</sup> during the 1999 season the Boğazköy excavators discovered structures similar to the Büyükkaya grain-storage pits in the area of the Great Temple in the Lower City, structures which probably served the city’s grain storage needs from the Old Hittite period down to Muwatalli II’s transfer of the capital to Tarhuntašša. The Büyükkaya installations were built by Tudḫaliya IV and served the city until its destruction.<sup>53</sup>

The pits are 6 to 7 meters deep, fully qualifying as Hittite *halluš* “deep”. They were lined with straw and sealed on top with layers of *kerpiç* or soil. The interior of the sealed pits was oxygen free and rich in carbon dioxide, allowing the grain to be preserved for several years, if the seal was not broken. That they were indeed sealed helps us understand the use of the verb *kinu-* rather than *heš-* for opening them. Every aspect of these finds fits what the texts have been telling us about the ÉSAGs.

Although the excavators did not identify similar structures at Mašat, we know from the texts found there that they used them locally. HKM 18 contains the following passage:

*nu uwat duwaddu (2) ḫalkiš-ma- <šm> aš apiya aniyanza (3) kuit nu EGIR-an tiyatten (4) n-an anda epten n-an-kan ÉSAG-ḫi (or: ÉSAG-tén) (5) anda išḫūitten nu ANA <sup>d</sup>U[TU-ŠI ḫatrāitten]*<sup>54</sup>

Look sharp! Since grain has been sown for you (pl.) there, get busy and gather it, pour it into the silos (or: bring it to the silos [and] pour it in), and [report it] to My Majesty.

Although the excavation of Mašat is completed, now that we know from Boğazköy what these silo structures look like, it ought to be possible to identify them in future excavating at Ortaköy and Kuşaklı.

<sup>50</sup> KUB 31.57 i 14-15.

<sup>51</sup> Seeher 1998.

<sup>52</sup> “Hattusa’da ilginç bulgular ...” by Bahar Tanrısever.

<sup>53</sup> Initial information from Mr. Scott Branting (conversation on Aug. 20, 1999).

<sup>54</sup> HKM 18 left edge 1-5, ed. HBM 146ff.



	Year 1	lines 1-4	Year 2	lines 5-10	Year 3	lines 11-15	Summary	
Name	Amount in <i>PARISU</i>	% of Cereals	<i>PARISU</i>	% of Cereals	<i>PARISU</i>	% of Cereals	Total <i>PARISU</i>	Average % of Cereals
ŠE	900	61	2100	62	1300	71	4300	66
ZÍZ.ĦI.A	300	20	900	27	400	22	1600	25
šēppit	100	7	100	3	50	3	250	4
KUNĀŠU	100	7	100	3	60	3	260	4
karšiš	70	5	90	3	30	2	190	3
ZÍZ.ĦI.A KALAG.GA	0	0	80	2	0	0	80	1
Total	1470	100	3370	100	1840	100	6490	100

Figure 1: Three Consecutive Years of Cereal Cultivation at Tapikka (Mašat H.)  
in the Report found in *HKM* 109

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