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Daniel Soliman

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Ostraca with Identity Marks and the Organisation of the Royal Necropolis Workmen of the 18th Dynasty

DANIEL SOLIMAN*

RÉSUMÉ

On sait peu de choses concernant l'administration de l'équipe des ouvriers de la nécropole royale durant la XVIII^e^ dynastie, mais les ostraca portant des marques d'identité non textuelles sont une source de connaissance non négligeable pour cette période. Beaucoup de ces derniers sont conservés au Caire, soit au Musée égyptien soit à l'Ifao, et restent pourtant à ce jour inédits et mal compris. La présente étude est consacrée au contexte fonctionnel et social de ces documents. Bien que la signification précise des ostraca avec marques d'identité soit souvent difficile à saisir en raison de leur nature implicite, ces sources fournissent des indications d'importance concernant l'organisation et la taille de l'équipe, l'administration du travail, et l'absence d'une tradition locale de scribes.

Mots-clés : Deir el-Medina, Vallée des Rois, ostraca, XVIII^e^ dynastie, marques d'identité non textuelles, pratiques scribales, administration.

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ABSTRACT

Very little is known about the administration of the 18th Dynasty crew of royal necropolis workmen, but ostraca inscribed with non-textual identity marks provide a significant source of information for this period. Many of the ostraca are kept in Cairo in the Egyptian Museum and the IFAO, and remain unpublished and poorly understood. This article discusses the functional and social context of these documents. Although the precise meaning of the ostraca with identity marks is often elusive because of their implicit nature, the documents provide valuable insights into the organisation of the crew of workmen, the administration of work, the size of the crew, as well as the absence of a local scribal tradition.

Keywords: Deir el-Medina, Valley of the Kings, ostraca, 18th Dynasty, non-textual identity marks, scribal practice, administration.

1. STRUCTURE

The following text is divided into four sections. Section 2 provides an introduction to the usage of non-textual identity marks during the 18th Dynasty in Egypt, and at Deir el-Medina in particular. It also summarises the current understanding of the organisation and administration of the 18th Dynasty crew of royal necropolis workmen, and the scant prosopographic records we possess for this period. Section 3 then discusses four groups of 18th Dynasty ostraca with identity marks, for which a date is proposed. On the basis of these core groups, a relative date can be established for other 18th Dynasty ostraca with identity marks. Section 4 presents an analysis of reoccurring sequences of marks on ostraca, and of the function and the usage of ostraca composed with marks. In addition, is it demonstrated that the ostraca provide new insights into the organisation and the size of the workforce, and into the significance of identity marks in the workmen's community in the context of scribal practice and competence. Finally, section 5 presents the conclusions of this contribution.

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2. CONTEXT

2.1. Non-textual identity marks in the 18th Dynasty

Countless non-textual marking systems are attested from various periods of pharaonic Egypt, and from the 18th Dynasty in particular. Marks of which the exact meaning is unclear occur often on utensils, tools, and weaponry dating to different periods,[1] while those used in different phases of the construction of the temple of Thutmosis III at Deir el-Bahari have been thought to refer to teams of workmen, to individual workmen, or to institutions or high-ranking officials contributing to the building process.[2] Masons' marks from the end of the 18th Dynasty are found on the building blocks used in the Small Aten Temple,[3] and a mark incised on the underside of a block from an edifice erected near the Ramesseum for Nehy, first herald of the king, demonstrates that more marks may be hidden from sight in the masonry of buildings.[4] Related to the building process are the marks found in stone quarries, such as those at Deir Abu Hinnis,[5] Gebel el-Silsila,[6] and Dra Abu el-Naga.[7] The Thutmoside marks in the quarry of Aswan have been interpreted as control marks.[8] Non-textual marks occur also in construction on a smaller scale, as (re)assembly marks carved in the wooden components of sarcophagi.[9] Marks used in the branding of cattle[10] probably referred to the institution that owned the animals. Some of the marks found on linen[11] and on ceramics[12] may similarly refer to the owner of such objects, although in some cases it is clear that the marks were left by the manufacturers. The exact meaning as well as the date of the individual marks incised in the ram-headed sphinxes situated along the dromos west of the temple of Karnak is unclear, but the sphinxes themselves probably date to the time of Amenhotep III.[13]

1 E.g. Petrie 1917, pl. III [103–106], [108], pl. IV [123–124], [127], pl. XVI [70], pl. XVII [87], [92], pl. XXVIII [206–207], pl. XXIX [240], pl. XLII [200–202], pl. LXIII [45], pl. LXV [60], pl. LXXI [53].

2 Budka 2009a, pp. 78–81; Budka 2009b, pp. 187–195.

3 Pendlebury 1951, pp. 92–93, fig. 17; Kemp (ed.) 1989, pp. 138–139, figs. 6.12, 6.23.

4 Leblanc 2009, pp. 241–242, pl. I-B.

5 Van der Perre 2015, pp. 69–80.

6 Nilsson 2014, p. 123.

7 Nishimoto, Yoshimura, Kondo 2002, p. 21, figs. 2, 6, 9; twelve out of the fourteen marks in the quarry are also attested among the identity marks of the 18th Dynasty necropolis workmen of Deir el-Medina, and those dated to the reign of Amenhotep III in particular; ostraca O. Stockholm MM 14130, OL 6788 and ONL 6465 display similar clusters of marks. The possibility exists that the quarry had been visited by the royal necropolis workmen, and they may have even been put to work at the site.

8 Arnold 1991, pp. 37–38, fig. 2.15.

9 Bell 1990, pp. 107–124; Daressy 1902, pp. 1–2; Curto, Mancini 1968, p. 77, fig. 1.

10 See e.g. P. De Varzy, Loffet, Matoïan 1996, pp. 29–36; two actual brands in the Eton College Myers Museum consist of hieroglyphic sign groups, for which see Reeves (ed.) 2008, cat. nos. 101–102.

11 Janssen 1995, p. 387; on royal linen: Winlock, Arnold 2010, pp. 32–34, figs. 25, 77; Schaden 2008, pp. 233, 235, 252, fig. 20. A study of these objects and their marks is in preparation by Elise van Rooij.

12 See e.g. Hope 1999, pp. 121–146; Rose 2007, *passim*.

13 Cabrol 1995, pp. 21–23.

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2.2. Identity marks used in the 18th Dynasty community of the royal necropolis workmen

A particularly interesting marking system is attested within the community of royal necropolis workmen of the New Kingdom. These workmen, responsible for the construction and decoration of the royal tombs in the Valley of the Kings and the Valley of the Queens, were settled in the village of Deir el-Medina, and their lives are exceptionally well documented. The settlement was in use during the 18th, 19th, and 20th Dynasties, and the rich archaeological evidence allows the marking system to be studied throughout generations of workmen. The workmen's marks are essentially identity marks, and it is clear that each member of the crew possessed his own personal mark. The identity marks of the 18th Dynasty, often readily distinguishable from those of the Ramesside period,[14] were employed by the necropolis workmen to mark property by incising or inscribing them on objects, which have been found at work sites in the Theban valleys as well as in the settlement of Deir el-Medina.

They feature also on objects that were included in the tombs of workmen, which were prepared in the cemeteries to the east and to the west of the village.[15] This practice is best illustrated by the tomb of Kha, TT 8, situated in the Western Cemetery. Among Kha's grave goods are numerous objects with his personal identity mark,  , engraved in bronze vessels, incised in pottery and tools, and embroidered and inscribed on linen clothing.[16] Two other 18th Dynasty funerary contexts enable the identification of the individual connected to a particular identity mark. In tomb DM 1350, a ceramic jar was discovered that is inscribed with the name of a Heqanakht and is also incised with an allomorph of mark  .[17] Heqanakht is not known from other sources, but it is plausible that he was the workman to whom the mark refers. Another 18th Dynasty tomb, DM 1099, was attributed to a man named Nekhunefer on the basis of a hieroglyphic inscription on a ceramic vessel. Six ceramic vessel fragments incised with workmen's marks were discovered in the tomb, of which mark  occurred most frequently,[18] and it is possible that the mark referred at some point to this Nekhunefer. Outside of the workmen's village, the identity marks have been found on pottery fragments in the Theban valleys. Most of these ceramics must have been used by the workmen, perhaps at temporary huts that were built close to the tomb under construction. When clusters of such

14 Haring 2009b, pp. 125–126, 133–134.
15 Soliman 2015, pp. 109–132.
16 Schiaparelli 1927, pp. 110–112.
17 Bruyère 1937a, p. 112, fig. 48 [7], p. 121.
18 Three instances; see Bruyère 1928a, pp. 11–13; Nagel 1938, p. 54, fig. 35 [6c], [12c].

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fragments are found, they are informative of the activity of the 18th Dynasty workmen, and they allow one to trace the activity of the crew in the Valley of the Kings,[19] the Valley of the Queens,[20] and the Wadi Gabbanat el-Qurud.[21]

2.3. The 18th Dynasty crew of royal necropolis workmen

In addition to their function as property markers, series of identity marks were inscribed on ostraca to record information. Together with the objects with identity marks, the ostraca are of great importance to our understanding of the organisation of the 18th Dynasty crew of workmen. Indeed, a large gap exists in our knowledge of the organisation, administration, and social lives of the workmen of this period, due to the paucity of epigraphic sources from that time. Whereas the Ramesside period is well documented, we possess virtually no written texts from the 18th Dynasty that inform us about the organisation of labour during the construction of the royal tombs, or of the provision and the private lives of the workmen.

The earliest phase of the workmen's community is particularly poorly documented. It is generally assumed that the mud-bricks in the oldest structures at Deir el-Medina stamped with the cartouche of Thutmosis I indicate that the settlement was built during the reign of that king.[22] Such a conclusion is not entirely unproblematic, because the tombs of Thutmosis I and Thutmosis II have not been securely identified.[23] Andreas Dorn has suggested that the former king may have been buried in the Valley of the Queens, and that the workmen's settlement was established at Deir el-Medina because of its vicinity to that necropolis.[24] Despite the lack of any archaeological evidence for the tomb of Thutmosis I in the Valley of the Queens, this

19 E.g. the pottery from the workmen's huts near WV 22, the tomb of Amenhotep III, for which see Yoshimura (ed.) 2011, pp. 90–98.

20 Fekri, Loyrette 1998, fig. 4, [1–5]; three marks ( , , and) incised on ceramic fragments found in the fill of the burial chamber of tomb 34 are exclusively attested in the 18th Dynasty. It is therefore very likely that the fragment with mark  , and the fragment with what is probably mark  , date to the same period. The marks occur on ostraca attributed to groups B and C (see below, sections 3.2 and 3.4). At least some of the marks on ceramic vessels from the Valley of the Queens, described and attributed to the 18th Dynasty in Lecuyot 1996, pp. 148, 150–151, should refer to necropolis workmen of Deir el-Medina as well.

21 Marks ,  , and  are incised on fragments of a plate and a bowl, and mark is inscribed in black ink on a storage jar, see fragments p25, p27, p81 and p102, Lilyquist 2003, pp. 58–73, figs. 59j, 60a, 71d, 78d. All four marks are attested in the 18th Dynasty community of necropolis workmen, although they are not securely attested in the time of Thutmosis III. The first three fragments were found in Area I, at the head of the *wadi* leading to the tomb of the three foreign wives of Thutmosis III, and the jar with the inscribed mark was discovered at the pit with the foundation deposit. The pit contained intrusive material from area I. Even though the function of all the Thutmoside ceramics was interpreted as funerary or cultic in nature, I believe that these vessels could well have been deposited in front of the tomb by the workmen who had used them in temporary huts. The best identifiable forms p81 and p25 are also found at Deir el-Medina, and fall into Nagel's types V and XXIV respectively, see Nagel 1938, pp. 161–163, 198–199, pl. III (1169.101, probably from the 18th Dynasty), pl. XVI–XVII (1164.96 and 1170.6 probably from the 18th Dynasty). Vessel type V was probably used as a drinking bowl in daily life.

22 Bruyère 1939, pp. 3–4, 241, 246, 269, 279, 301; Bruyère 1953, pp. 83, 87; Bonnet, Valbelle 1975, pp. 436–440; Valbelle 1985, p. 2.

23 For the debate on this matter, see i.a. Polz 2007, pp. 211–221; Aston 2014, pp. 85–86.

24 Dorn 2013, p. 35.

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area was certainly in use as a cemetery during his reign,[25] and the presence of QV 46, the tomb of the vizier Imhotep who was active under Thutmosis I,[26] may be an another indication that the king was interred there.[27]

Perhaps the most important indication that connects the early settlement with a group of necropolis workmen is the tomb of Amenemhat (TT 340) located in the Western Cemetery. The tomb was dated to the time of Ahmose–Amenhotep I by Nadine Cherpion,[28] which would make it older than the settlement of Deir el-Medina itself,[29] but the style of the tomb's decoration has many parallels that date as far back as the reign of Amenhotep II, and I believe TT 340 may well have been constructed at a time when the earliest phase of the village had already been built.[30] The tomb's owner is described as *sḏm-ʿš*, servant, without further specification, but it is reminiscent of the title *sḏm-ʿš m s.t ʿ3.t* borne by the necropolis workmen of the 18th Dynasty. In fact, Amenemhat's son Sennefer, not recorded with any title, was most likely a necropolis workman, as he claims to have been personally responsible for the tomb's decoration.[31] The connection of the early 18th Dynasty settlement with work on the royal tomb may thus be inferred from TT 340's vicinity to Deir el-Medina.

An anonymous burial pit in the Western Cemetery, DM 1042, was said to be contemporaneous with TT 340,[32] but no other material can be securely dated to the early 18th Dynasty. In tombs DM 1163 and 1164, both anonymous but dated to the 18th Dynasty by Bernard Bruyère, mud-bricks stamped with the cartouche of Thutmosis I were discovered,[33] but they may have come from the wall around the village. The same cartouche was impressed on a jar of which a fragment was found in a trench just south of the village,[34] and pottery from the Eastern Cemetery was reportedly dated by Pamela Rose to the early to mid-18th Dynasty.[35] According to B. Bruyère, the oldest part of the sanctuary of Hathor to the north of the settlement was datable to the beginning of the 18th Dynasty because several architectural elements from this site were inscribed with the name of king Amenhotep I.[36] Later, however, these parts of the building were thought to belong to younger structures dedicated to kings of the early 18th Dynasty.[37] Nevertheless, the statues of Amenmes and Wesersatet indicate that the temple existed already in the middle of the 18th Dynasty.[38]

25 Lecuyot 1992; Lecuyot 2011.
26 Schiaparelli 1923, pp. 25–34.
27 Cf. the sepulchres of non-royal individuals in the Valley of the Kings, which were located close to the ruler they had served, see e.g. Bickel 2016, p. 230.
28 Cherpion 1999, pp. 31–39.
29 Cf. Dorn 2011b, p. 35, n. 31.
30 Cf. Dimitri Laboury who dates the tomb more broadly to the beginning of the 18th Dynasty (personal communication, 2012).
31 Cherpion 1999, pp. 44, 50–51, pl. II.
32 Bruyère 1926, p. 48.
33 Bruyère 1929, pp. 74, 100.
34 Bonnet, Valbelle 1976, p. 338, fig. 10.1.
35 Meskell 2000, p. 262.
36 Bruyère 1948, pp. 14–17.
37 See e.g. Valbelle 1985, pp. 18–19, 315; Jauhiainen 2009, pp. 151, 153–154.
38 *Infra*, n. 45.

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Still, there is very little material in the available archaeological record that can be dated to the very beginning of the 18th Dynasty, and one gets the impression that the settlement was not permanently inhabited during the reigns of Thutmosis I and Thutmosis II.[39] A clue about what may have been the first permanent occupation of the village is provided by the oldest chapels and sanctuaries north of the village. Foundation deposits inscribed with the cartouche of Thutmosis III suggest that such edifices were first erected during his reign.[40] Indeed, it is from this reign onwards that the archaeological record becomes more reliable. It has even been suggested that a number of hieratic documentary ostraca, dated to the middle of the 18th Dynasty, may have come from the settlement of Deir el-Medina. However, Ben J.J. Haring's survey of these documents concluded that none of the records can be securely connected with the work on the royal tombs and its workmen, and they seem instead to concern building activities at the temples of Hatshepsut or Thutmosis III.[41] This would indeed mean, as argued by B.J.J. Haring, that we do not possess any hieratic documentary ostraca of that period.[42]

Despite the absence of documentary texts from the 18th Dynasty, a rough outline of the external and internal organisation of the crew of necropolis workmen can be drawn up on the basis of other epigraphic material.[43] The evidence suggests that at the beginning of the New Kingdom the mayor of Thebes was primarily responsible for the realisation of the royal tomb.[44] Around the middle of the 18th Dynasty, the final responsibility for the construction projects seems to have fallen on the overseer of all construction works of the king.[45] At Deir el-Medina itself, the crew was directed by a foreman, who, among other titles, was referred to as chief in/of the great place, overseer of the construction works in/of the great place, and overseer of the constructions works in the rock tomb of the king. At least three individuals from the

39 Compare similar remarks in Dorn 2011b, p. 35; but note that the ubiquity of objects with the identity marks of 18th Dynasty necropolis workmen from the tombs in the cemeteries of Deir el-Medina indicate that at least from the time of Thutmosis III onwards, the workmen were buried at the site, which strongly suggests they were permanently stationed at the settlement during that period.

40 Baraize 1914, p. 39.

41 Haring 2006, pp. 107–112. Ostraca O. DeM 10001 and O. DeM 10002, not discussed by B.J.J. Haring as they were not fully published at the time, date to the 18th Dynasty but are equally difficult to interpret as records from the workmen's settlement. It is unknown how O. DeM 10001 ended up in the IFAO, while O. DeM 10002 was a gift from J. Černý.

42 Two rare exceptions are perhaps a ceramic ostracon found in the Valley of the Queens near tomb 82, which mentions the demise of prince Minemhat, see Koenig 1988, p. 122, doc. VIII = IFAO no. SA 339/82; and a limestone ostracon O. No. 7 found near KV A, mentioning only "Height: 6 cubits," see Yoshimura (ed.) 2011, pp. 84, 89, fig. 52. According to B. Bruyère, ostraca dating to the beginning of the 18th Dynasty were found in the debris of tomb 1249, but no details are provided, see Bruyère 1934, p. 28.

43 Compare Valbelle 1985, pp. 1–26.

44 During the time of Thutmosis I, such an official was Ineni (TT 81), see Dziobek 1992, pp. 122, 135–139.

45 This is clear in the case of Amenmes, whose name and titles are attested on a scribal palette included in the tomb of Kha (TT 8) and that is generally interpreted as a gift from Amenmes to Kha, for which see Schiaparelli 1927, p. 75; Russo 2012, pp. 32, 35–36. As mentioned above, a fragment of a statue of Amenmes dedicated to Hathor was discovered in the foundations of the north-eastern corner of the external Ptolemaic wall of the Hathor temple, see Bruyère 1952a, pp. 106–107. Two other high officials of the 18th Dynasty are attested at the temple area, and their connection to Deir el-Medina may indicate that they were involved with the construction of the royal tomb as well: like Amenmes, the viceroy of Kush Wesersatet had a statue placed in the Hathor temple of Deir el-Medina, and mud-bricks impressed with the seal of Senenmut, also overseer of all construction works of the king, found at the same area suggest that he contributed to the construction of the sanctuary, see Bruyère 1952a, 15, 31, 37. Additionally, a scarab of the high priest of Amun and overseer of all construction works of the king Hapuseneb ended up in tomb DM 1370, see Bruyère 1937b, p. 67, and may have been a gift to one of the necropolis workmen.

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middle of the 18th Dynasty are attested in this position: Kha, Neferhebef, and Khaemwaset.[46] Since Neferhebef and Kha must have been contemporaries at a certain time, Barbara Russo suggested that they directed the work on the tomb together, in a construction similar to that of the Ramesside period where the workforce was divided into halves, a right side and a left side, each with their own foreman.[47] There are however no indications for such an organisation, other than the fact that Kha and Neferhebef were probably both alive during the same period. B. Russo hypothesised furthermore that one could only become a chief of the great place after having been an overseer in/of the great place.[48] Again, there is no explicit evidence for this assumption and both titles may well have been interchangeable, like the titles *ꜥ3 n ỉs.t*, great one of the crew, and *ḫr.y ỉs.t*, chief of the crew, during the Ramesside period.[49]

Two professional scribes are attested in relation to the work on the royal tomb,[50] one as *sš n(y)-sw.t n s.t ꜥ3.t*[51] and one as *sš n s.t ꜥ3.t*.[52] A small number of workmen can be identified on the basis of their titles such as *sḏm-ꜥš m s.t ꜥ3.t*,[53] *sḏm-ꜥš m s.t mȝꜥ.t*,[54] *sḏm-ꜥš m s.t nfr.t n n(y)-sw.t*,[55]

46 Scenes and objects from the tomb of Kha (TT 8), see Schiaparelli 1927, pp. 179–180; Vandier d'Abbadie, Jourdain 1939, p. 11; Russo 2012, pp. 13–14, 48. A possible third colleague of Kha is a man named Hormes, attested in tomb DM 1159 A, but the evidence is very meagre. According to Bruyère and Černý, at least one door jamb from the tomb describes Hormes as a *ḫry s.t ꜥ3<.t>*. Bruyère 1929, p. 37 gives both *ḫry s.t ꜥ3.t* and *ḫry s.t mȝꜥ.t*; fig. 25. Bruyère's notes are not helpful, see Bruyère 1928b, p. 6. Černý 2001, p. 73, n. 10 explicitly states that the reading *ḫry s.t mȝꜥ.t* is incorrect. However, Davies 1999, p. 28 identifies this individual as the chief workman Hormes (ii) who lived in the 20th Dynasty, thus opting for the reading of *ḫr.y s.t mȝꜥ.t*. Indeed, the title *ḫr.y ỉs.t m s.t mȝꜥ.t* is attested during the Ramesside period, see Černý 2001, pp. 121–122. Moreover, just west of tomb DM 1159, B. Bruyère discovered in the court of TT 356 a limestone statue fragment that mentions Hormes (ii) and his brother Qenna (i), for which see Bruyère 1929, p. 93, which suggests monuments for members of this Ramesside family were erected in the area.

47 Russo 2012, p. 73.

48 Russo 2012, pp. 73–74, 78.

49 Černý 2001, p. 121.

50 A third scribe (or perhaps a draftsman) is mentioned on a limestone stela fragment found near tomb DM 1170, dated to the 18th Dynasty, but no affiliation or name is preserved, see Bruyère 1929, p. 122 and fig. 67.a. A scribe named Amenmes is recorded on a simple painted stela Turin CG 50006 from Deir el-Medina that is dated to the 18th Dynasty, see Tosi, Roccati 1972, pp. 37, 263. However, the orthography and the palaeography of the inscription render it very improbable that this Amenmes operated as an administrative scribe.

51 Amenemope, stela Turin CG 50004 from Deir el-Medina, Tosi, Roccati 1972, pp. 35–36, 263; dated to the reign of Thutmosis III in Schlögl 2001, p. 432.

52 Pay, scribal palette Louvre N 3023 of unknown provenance, Andreu (ed.) 2002, p. 226, no. 179.

53 This title, not attested after the Amarna period, is recorded for Amenemope, son of Kha, see Vandier d'Abbadie, Jourdain 1939, p. 12; Teti, see Dodson 2000, pp. 92–93; Amenhotep, see Spiegelberg et al. (ed.) 1902, p. 15, pl. XIV; Nu, see Bruyère, Kuentz 1926, pp. 40, 43, 46–47; Nakhtmin, see Bruyère, Kuentz 1926, pp. 40, 46; Nakhtmin's father Minhotep is attested as *ḫsy n nb=f m s.t ꜥ3.t*, see Bruyère, Kuentz 1926, p. 39; Setau, see Grimm, Schlögl 2005, p. 15; Djehutymose, see Bruyère 1952a, p. 49, pl. XIV, fig. 167 [bottom right]; perhaps a Wadjetshemes who bears the incomplete title *sḏm-ꜥš m s.t* [sic] on the 18th Dynasty stela Turin CG 50002 from Deir el-Medina (see Tosi, Roccati 1972, pp. 34, 262), who could be the son of the *sḏm ꜥš m s.t ꜥ3.t* Amenhotep, cf. Russo 2012, p. 75; perhaps an Amenemhat attested on a damaged stela where the element after *s.t* is illegible as a result of the erasure of the element Amun in the name of the dedicatee, which does point to a pre-Amarna date for the stela, see Bruyère 1952a, pp. 114–115, n. 270, pl. III, fig. 104; Russo 2012, p. 76. The title is perhaps recorded on a fragment of a limestone doorjamb from DM 1180, dated to the 18th Dynasty, see Bruyère 1929, 132, fig. 56.4, and a similar title is perhaps *bȝ nb mw ḫm=f m s.t ꜥ3.t* borne by a man named Sia, but it is not certain if the inscription reads *s.t ꜥ3.t* or *s.t mȝꜥ.t*, see Bruyère 1952a, p. 34, pl. XXIII [24].

54 Not attested in the Theban necropolis before the Amarna period, see Černý 2001, pp. 29–85, and Haring 2017.

55 Head rest Cairo JE 63791, see Bruyère 1937a, p. 101, no. 10. The title should perhaps be amended to read *sḏm-ꜥš m s.t nfr<.w>*, referring to the Place of Beauty, a designation for the Valley of the Queens, cf. Černý 2001, pp. 88–89.

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and *sḏm-ʿš n ỉmn*.[56] The latter title seems to suggest a connection with the temples of Amun at Thebes.[57] The inconsistency in titles during the 18th Dynasty can be interpreted as an indication that the organisation of the workmen at this time was of a more fluid nature than that of the Ramesside crew, which would tie in well with the observation that many individuals of the 18th Dynasty are attested without title at Deir el-Medina.

Indeed, there is ample evidence of individuals who must have lived at Deir el-Medina during the 18th Dynasty but who do not bear a title, which hinders their identification as necropolis workmen.[58] Among them are individuals whose names have survived in 18th Dynasty burials of the Eastern Cemetery. There has been some controversy regarding the question if they were necropolis workmen or not, but some of the burials included pottery with workmen's marks, which suggests that the tombs belonged to the workmen and their family members.[59] A few other men are named on 18th Dynasty monuments from Deir el-Medina, but often little is known about their occupation.[60]

56 Attested on a shabti inscribed for a Samut, bought in Cairo by B. Bruyère, who believed it to have been stolen from his excavation of tomb DM 1352 (attributed to Setau). The shabti closely resembles that of Setau and it appeared on the art market in the year that he worked on DM 1352, see Bruyère 1937a, p. 99; J.-F. Aubert, L. Aubert 1974, p. 56. The stela of the *sš n(y)-sw.t n s.t ʿɔ.t* Amenemope also records his son Tener, a draughtsman who bears the title *sš-ḳd n ỉmn*. A Maya is described as *sš-ḳd n ỉmn m s.t mɔʿ.t* in his tomb TT 338, dated to the time of Tutankhamun–Horemheb, see Tosi 1994.

57 Several workmen of the early 19th Dynasty also seem to have been connected with the Amun temples of Luxor and Karnak, cf. Bogoslovsky 1982, p. 276; Davies 1999, pp. 76, 149, 274. This may also explain the seal of Amun-Re on vessels from tombs 1388 and 1389 in the Western Cemetery of Deir el-Medina (see Bruyère 1937b, pp. 194–195, 201), which I believe belonged to royal necropolis workmen and their family members.

58 There is evidence of individuals at Deir el-Medina prior to Amarna period, but often the names are incompletely preserved, and the material is insufficiently accessible to be properly studied. Some are listed here: a *[…]-nb-nfr.y* or *nfr.y* (anthropoid coffin fragment from DM 1069, Bruyère 1927, pp. 30–31, fig. 15); an *ỉmn-[…]-ṯ* (name inscribed on a large amphora from DM 1445, Bruyère 1929, p. 25); a *tw-ỉɔ-[…]* (anthropoid coffin fragment from DM 1156–1157, Bruyère 1929, p. 34); a *ỉmn-ḥtp* (fragment of a limestone statue from DM 1129, Bruyère 1929, p. 130, fig. 67.5); perhaps several incompletely preserved names on wooden coffin fragments (from DM 1180, Bruyère 1929, p. 132); perhaps draftsman *styt/ɔb-tw* (?) (lintel of a naos, dump site south of village, Bruyère 1933, p. 7); a *ỉɔ-tw.t* (fragment of a naos from DM 1245, Bruyère 1934, p. 11 and fig. 10); a *nb=ỉ-m-nḫw* and a *ḥr-ms* (funerary cone, court of TT 286, Bruyère 1934, p. 53); a *ỉy-ỉmn* (limestone stela from DM 1304–1307, Bruyère 1937a, p. 18, fig. 7); a *ɔ-ɔ-ỉ* (limestone lintel from DM 1006, Bruyère 1937a, p. 27, fig. 13); a *ḥɔ-m-ɔ.wy* (fragment of a shabti box from DM 1323, Bruyère 1937a, p. 60; perhaps the same man as the *sḏm-ʿš* called *ḥɔ-ɔ.wy* on a chest of unknown provenance, Louvre Inv. N 2918, Andreu (ed.) 2002, p. 110, no. 51); an *ỉmn-m-wsḫ.t* (?) (fragment of a limestone stela, debris around Eastern Cemetery, Bruyère 1937b, p. 16); an *ʿbd.y* (fragments of a limestone stela from eastern face of the Ptolemaic enclosure wall of Hathor temple, Bruyère 1952a, pp. 33, 89, pl. II, fig. 103); a *[…]-ɔ.wy* and a *ɔ-ỉwn.t* (fragment of a limestone stela from Ramesside chapel against the northern enclosure wall of temple, Bruyère 1952a, pp. 78–79, no. 133b); a *ɔ-my.t* (?) (fragment of a limestone stela from same chapel, Bruyère 1952a, pp. 79, 89–90, fig. 165, no. 133f); *[…]-y* (fragment of a limestone stela from northern section of village, Bruyère 1952b, p. 44, n. 30, fig. 29.3.

59 I must disagree with Onderka, Toivari-Viitala 2014, p. 56, that there is no evidence for a relation between the individuals in the Eastern Cemetery and the community of royal necropolis workmen. The objects with identity marks prove that the necropolis workmen contributed to the tomb inventories of the graves of the men, women, and children buried in the Eastern Cemetery, as these must have been their colleagues and family members, see Soliman 2015, pp. 118–123. It is likely that the bronze chisels found in tombs 1368, 1370, 1375, 1379–1381, and 1389 (Bruyère 1937b, p. 120) were also grave gifts given by the necropolis workmen.

60 Stela of a Pakhen, Turin CG 50003, see Tosi, Roccati 1972, pp. 34–35, 262; stela of Mekymontu and his wife Nebuemweskhet dedicated by their son Semenkh, Turin CG 50005, see Tosi, Roccati 1972, pp. 36–37, 263; Hapy-ʿa, attested on the stela of Setau and on a shabti from his tomb, see Louvre E 14374, Bruyère 1937a, pp. 98–100; Andreu (ed.) 2002, pp. 292–293, no. 238; shabtis of Hesymeref, three of which mention him with the title *sḏm-ʿš*, see Aubert 1976, pp. 60–63; Schlögl, Brodbeck 1990, p. 83; perhaps the sons of Maya, recorded in his tomb with the titles of *sš-ḳd*, *sḏm-ʿš*, and *ɔy*, see Tosi 1994.

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In general, there is very little textual material that dates from this period. While there are over 2 000 graffiti in the Theban valleys that date to the 19th and 20th Dynasties, not a single textual graffito can be securely attributed to the 18th Dynasty.[61] In addition, there is remarkably little inscribed material from funerary contexts. The few inscriptions that have survived in tombs of the middle of the 18th Dynasty contain numerous scribal errors. For instance, the common *ḥtp-dỉ-n(y)-sw.t* formulae on the coffins from the Eastern Cemetery contain mistakes in the orientation and position of signs, whereas some words and sign groups are erroneously omitted while others are present were they should not be.[62] In the same vein, the texts in the tomb of Amenemhat (TT 340) are teeming with scribal mistakes. The artist of the tomb certainly had some knowledge of script, but his texts contain many errors. He seems to have had a predilection for the use of uniliteral signs, and many of his words were improvised phonetically rather than spelled correctly.[63]

3. OSTRACA WITH IDENTITY MARKS: RELATIVE DATING

Fortunately, ostraca with identity marks from the 18th Dynasty shed some more light on the organisation of the crew of workmen. The identified corpus currently consists of 137 ostraca with identity marks of the 18th Dynasty, ranging from completely preserved documents to very fragmentary or nearly illegible pieces.[64] The majority was discovered at the village of Deir el-Medina, but only in a few rare cases has their exact find-spot been recorded. Three sectors can be distinguished: the Grand Puits and its immediate vicinity,[65] the dump sites

61 Although unlikely, Theban Graffito no. 1670 which mentions a scribe named Kha could theoretically be the foreman known from TT 8, see Peden 2001, p. 141, n. 43, p. 243, n. 742; Russo 2012, p. 57. A number of graffiti from sections D and E of the Valley of the Kings comprise of or include names of members of the royal family of the 18th Dynasty but are not necessarily contemporaneous, see Peden 2001, pp. 144–145. A small number of inscriptions in 18th Dynasty royal tombs are perhaps contemporaneous with the construction of these tombs, see Peden 2001, pp. 141–144; Yoshimura (ed.) 2011, pp. 101–102 [AG 2], p. 106 [AG 11]. Brief hieratic inscriptions were found on stone blocks that closed off access to the cache of royal mummies in the tomb of Amenhotep II (KV 35), but these have been attributed to the end of the 20th Dynasty, see Van Siclen 1974, pp. 129–133.

62 Soliman 2015, pp. 120–121. For the coffins, see Bruyère 1937b, p. 41; Andreu (ed.) 2002, fig. 32; Verner 1982, Náprstkovo Muzem 1/322–1/334.

63 See the contribution of J.-M. Kruchten in Cherpion 1999, pp. 41–55; Soliman 2015, p. 113.

64 There are 14 ostraca that defy comprehensive analysis because the pieces are poorly preserved and/or display only a small number of marks, or because the marks cannot be securely identified due to the crude handwriting of the author of the ostracon: ONL 6331, perhaps groups B–D; ONL 6401, date unclear; O. Cairo JE 96285, perhaps group B; O. UC 45683, perhaps group A or D; O. Cairo CG 25327 bis, perhaps groups B–D; O. BTdK 832, perhaps group B; ONL 6341, date unclear; ONL 6362, perhaps group A or D; ONL 6589, perhaps groups C–D; ONL 6457, perhaps groups C–D; ONL 6608, uncertain if identity marks; O. IFAO C 1298, probably prior to the reign of Amenhotep III; ONL 6520, perhaps group B; O. IFAO C 2503, date unclear. There are an additional 27 ostraca not included in the total of 138, that are inscribed with a single mark only. They cannot be accurately dated, but should date to the 18th Dynasty because the marks are not attested in the Ramesside period.

65 ONL 6589; OL 6788; ONL 6457; ONL 6214; ONL 6216; and ONL 6293.

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adjacent to the living quarters,[66] and the dump heap known as Kom 2.[67] These find-spots are hardly informative of the date or usage of the ostraca, because the ostraca from the Grand Puits were probably not deposited there before the Ramesside period, and the other sites only demonstrate that the ostraca were discarded at some time either during or after the 18th Dynasty. Fortunately, some of the ostraca discovered in the Valley of the Kings offer an indication of the period during which they were created. The ostraca can be placed into five groups:

1. A number of ostraca were found in the branch of the Valley of the Kings that leads to KV 34, the tomb of Thutmosis III and includes KV 40, KV 26, KV 30, KV 59, KV 31 and KV 33.[68] Very little is known about most of these, but they are dated to the 18th Dynasty, some more specifically to the reign of Thutmosis III.[69] O. Cairo JE 72498 was found in the vicinity of KV 42,[70] tomb of Hatshepsut-Meryt-Re, queen of Thutmosis III, and can therefore be attributed to the reign of that king. O. CG 25321 is associated with KV 37[71] and O. Cairo JE 72490 and O. Cairo JE 72494 with the area between KV 30 and KV 26.[72] Very little is known about these three tombs, but KV 37 has been dated to the reign of Thutmosis III as well.[73]
2. O. Cairo CG 24105–24108[74] and O. Cairo JE 96650[75] are associated with KV 35, the tomb of Amenhotep II, and they were presumably made during work on this sepulchre.
3. O. WV 1–6 and 8–13[76] are datable to the reign of Amenhotep III because they were found at the site of the workmen's huts near WV22, the tomb of this king.

66 ONL 6266 and ONL 6305 were found in the vicinity of tomb DM 1360 near the south west corner of the settlement; ONL 6514 came perhaps from room III in house S.O. IV, built in the Ramesside period and situated in the same area; ONL 6287 was found in the south-eastern quarter of the village, which was also constructed after the 18th Dynasty in an area that was previously used as a dump site.

67 ONL 6210 and ONL 6520 from the vicinity of TT 290; OL 6789 from the vicinity of TT 291; ONL 6340 from the *kom* south of TT 215; perhaps also ONL 6298 + ONL 6577, of which the larger fragment was excavated in 1922 when TT 290 and 291 were already investigated, but see below.

68 O. KV 10002, 10004, 10010–10012 (from layers of debris at "site K," west side of the branch leading to KV 34, see Hawass 2011, pp. 57–71) and O. ARTP 02/236 (between KV 47 and KV 37, or between KV 11 and KV 57, cf. Reeves [ed.] 2002) were discovered in the same branch leading to the tomb of Thutmosis III, but their exact find-spot is unknown and they are therefore less reliable for dating purposes. O. KV 10002, O. KV 10011 and O. ARTP 02/236 are attributed to group A (temp. Thutmosis III), but the other ostraca could be of a later date.

69 Preys 2011, pp. 322–324, 333–338; Roehrig 2006, pp. 248–250; Eaton-Krauss 2012, pp. 53–60.

70 End of branch leading to KV 34. According to Abdel Samie 2009, p. 94, the ostracon bears number 329, as attributed to it by its excavators. After Reeves 1990, p. 329, it must therefore have been discovered at site 15 of the mission of H. Carter and Lord Carnarvon in season 1920–1921.

71 Daressy 1901, p. 82.

72 In the same area where deposit foundations were found, see Reeves 1990, pp. 328–330, [307–308].

73 *Theban Mapping Project*, KV 37.

74 Entrance of KV 35, Daressy 1902, pp. 64–65.

75 Branch leading to KV 35. The ostracon is inscribed with a note by its excavators: "Davis 1905–6. P.A.," referring to site 16, the branch leading to the tomb of Amenhotep II, after Reeves 1990, p. 303.

76 Area between WV 22 and WV A, see Yoshimura (ed.) 2011, pp. 74–89, 173.

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4. O. KV 47/278[77] and O. Cairo JE 72492[78] have been discovered near the entrance to the branch in the valley mentioned above. It is possible that they date to the same period, but because they were discovered in disturbed layers their provenance is unreliable.
5. O. Brock 27,[79] O. BTdK 832 and O. BTdK 833[80] were not found at a site that is particularly close to a tomb of the 18th Dynasty. Their original provenance is therefore uncertain, and the exact date of the ostraca is obscure.

Groups 1, 2, and 3 serve as chronological anchor points, because their provenance suggests a date in the reign of Thutmosis III, Amenhotep II, and Amenhotep III respectively. In the remainder of this article, the ostraca associated with the reign of Thutmosis III will be referred to as group A, those found near the tomb of Amenhotep II as group B, and those from the West Valley as group D. It will be shown in section 3.4 that there is a fourth group, C, which bridges the gap between groups B and D.

Apart from the four core groups, dating relies on ostraca with sequences of marks which seem to represent ordered lists of workmen (see section 4.1). Such ostraca are comparable to ordered lists with names of workmen from the hieratic administration of the royal necropolis during the Ramesside period, which record the members of the crew in a particular sequence that is to a certain extent dictated by the hierarchical position they held within the crew. In Ramesside times, the captains of the work and the most prominent workmen were typically listed at the beginning of the list, while younger workmen appear further down. Ordered lists played an important role in the collective administration of the work on the tomb and must have been used to keep track of absenteeism, but more importantly to document the rations distributed to the individual members of the crew.[81] The assumption that several ostraca with marks record hierarchical ordered lists agrees with the ascertainment that the 18th Dynasty workforce was not a homogenous group of workmen, but included a foreman and several specialists.

The four core groups are presented in sections 3.1– 3.4 to establish a framework by which a relative date for the other 18th Dynasty ostraca with identity marks can be proposed (section 3.5). The interpretation of the meaning and the usage of the ostraca, including the significance of black and red ink, and of tally marks added to the identity marks, will be discussed further below in section 4. Most of the identity marks in this article are represented as characters of a font, to introduce some uniformity to the text and increase its readability. However, where necessary, drawings of the marks which closer resemble the actual marks are added to elucidate the discussion. As will be made clear further down, and in general in section 4.6, identity marks on ostraca are sometimes mirrored or inverted by the scribe, with no change to their meaning. When such marks are represented here by their font type, their different orientation has not been taken into account.

77 Vicinity of KV 47, Cilli 2011, p. 95.

78 The designation "419" on this ostracon indicates that it was discovered by the Carter-Carnarvon mission on the east side of the hill containing the tomb of Siptah (KV47), close to the entrance of the branch leading to the tomb of Thutmosis III, see Reeves 1990, pp. 330–331.

79 Entrance KV 17, information provided by Rob Demarée, personal communication, 2015.

80 South east of KV 18, not *in situ* but discovered among pottery dated to the reign of Thutmosis III, see Dorn, Paulin-Grothe 2011, p. 17.

81 Donker van Heel, Haring 2003, pp. 18–27; Collier 2004, p. 14; Collier 2014, pp. 1–2, *passim*.

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3.1. Group A: ostraca from the reign of Thutmosis III

The most important document in this group is O. Cairo JE 72490 (fig. 1). The sequence of the marks on this ostracon is probably an ordered one, as will be discussed in section 4.1 below. It features 22 marks (see table 1; thicker vertical lines in tables represent line breaks) but only 20 different ones, as marks □ and ○ are included twice. The marks are written in two lines, but they converge at the right end of the ostracon. It thus appears that the upper line was written from left to right, and at the right end the scribe of the ostracon inscribed mark 𓈖 below mark 𓄡, and then continued the second line from right to left. This *boustrophedonic* way[82] of inscribing signs is very different from hieroglyphic and hieratic scribal practice, but it will be shown that other 18th Dynasty ostraca were inscribed in the same way. In the lower line of O. Cairo JE 72490, we recognise 𓎛, the identity mark of the overseer of the construction works, Kha, but it is unknown if he held this position already at the moment this ostracon was inscribed, and here the mark could refer to someone else. Supposing that the sequence of marks begins with 𓊪, the reading of the ostracon is as follows:

𓊪	𓏏	𓌙	𓎛	𓐍	𓏠	𓊹	○	𓉔	𓌳	□	□	𓄡	𓈖	𓇋	𓏤	𓏲	𓎟	𓎛	𓊃	○
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Table 1. Sequence of marks on O. Cairo JE 72490.

O. Cairo JE 72494 shares three marks with O. Cairo JE 72490 (see table 2): 𓌳, 𓎛, and 𓊃. A fourth sign is damaged and unidentifiable. The ostracon seems to be closely related to O. Cairo JE 72490, as the handwriting is very similar in both documents. O. Cairo JE 72498 is incompletely preserved and displays nine marks, two of which are fragmentary and cannot be securely identified. The ostracon shares four marks with O. Cairo JE 72490 and one with O. Cairo JE 72494. O. Cairo CG 25321 (fig. 2), which is also incompletely preserved, displays at least 12 marks, of which two are unidentifiable. The ostracon shares eight marks with O. Cairo JE 72490 and three marks with O. Cairo JE 72498. Together, the ostraca in group A contain at least 24 different marks. The group A marks are presented in table 2, where the occurrence of marks on O. Cairo JE 72494, JE 72498 and CG 25321 is compared against the marks of O. Cairo JE 72490:

82 The term *boustrophedon*, literally "as the ox turns," is used for inscriptions in which the writing is reversed from one line to the next. A common trait of *boustrophedonic* inscriptions is that individual characters are reversed as well, but this is not the case with the marks inscribed on ostraca.

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JE 72490	JE 72494	JE 72498	CG 25321
			
			
			
			
			
			
			
			
			
			

JE 72490	JE 72494	JE 72498	CG 25321
			
			

Table 2. Marks attested on the ostraca of group A.

3.2. Group B: ostraca from the reign of Amenhotep II

The provenance, palaeography, and style of O. Cairo CG 24105–24108 suggest that they were written by the same scribe. Two key ostraca are O. Cairo CG 24105 and O. Cairo CG 24107 (fig. 4), because they display almost the same sequence of marks (see table 3). The former piece is damaged and seems to be missing two marks, but the remainder is perfectly legible. Like O. Cairo JE 72490, it is written in *boustrophedon*: the first inscribed mark is  , and from that point onwards the scribe followed the contour of the ostracon. At the rounded left end of the limestone sherd, the line of marks curves around, with the result that the lower line of marks was inscribed from left to right.

The rightmost mark in the upper line of O. Cairo CG 24107 is . Left of it, one observes mark . The same mark features on O. Cairo CG 24105 left of , but here it is orientated to the right, in contrast to , the example found on O. Cairo CG 24105, which is orientated to the left. Mark and must nevertheless be allomorphs of the same mark, as is suggested by the following marks on O. Cairo CG 24107, and , which also follow on O. Cairo CG 24105. Moving onward in the sequence of O. Cairo CG 24107, one encounters the same phenomenon: it displays mark at the position in which O. Cairo CG 24105 records its mirror image . We are here introduced to a peculiar and sometimes problematic feature of the 18th Dynasty workmen's marks: the orientation of the marks varies from ostracon to ostracon, and it is not restricted by the direction in which the marks were inscribed (see also section 4.6 below). There are no indications that the orientation of a mark has any effect on its meaning, and owing to similarities in the sequence of marks on O. Cairo CG 24105 and O. Cairo CG 24107 can securely be equated with .

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The mark after  is  in both ostraca. O. Cairo CG 24107 then displays mark  , which resembles O. Cairo CG 24105's  , demonstrating that there are not only mirrored variants of marks, but also variants that are turned on their side. Of the following three marks,  and  agree with O. Cairo CG 24105, but is another mirrored allomorph of CG 24105's mark  . The next mark on O. Cairo CG 24105 is  , and it is at this point that we lose the sequence for a moment. Mark is situated at the left end of the lower line of O. Cairo CG 24107, with left of it only and immediately right of it  , both absent on O. Cairo CG 24105. In the latter ostracon, mark is followed by , which in turn is not inscribed on O. Cairo CG 24107. The sequence can be picked up when continuing down the lower line of O. Cairo CG 24107: after is  , which is situated at the beginning of the sequence of O. Cairo CG 24105. The subsequent marks are  ,  ,  ,  , and  , which must be allomorphs of the corresponding marks on O. Cairo CG 24105, respectively , , , , and , thus proving that O. Cairo CG 24107 too was written in *boustrophedon*. Additionally, it becomes clear that allomorphs of a mark may also be mirrored horizontally. Particularly revealing is the observation that apparently is an allomorph of , despite the absence of the little stem. This indicates that not only was the orientation of a mark flexible, so was its particular shape. It should be emphasised that with O. Cairo CG 24105 and O. Cairo CG 24107, marks and can be securely identified because of their corresponding positions in the same sequence of marks, but on ostraca with marks that are not ordered according to such a sequence, the variability in the shape of particular marks occasionally leads to confusion.

After , the sequence of O. Cairo CG 24107 continues with what probably is mark  . This mark is not present on O. Cairo CG 24105, which instead records . The next mark on O. Cairo CG 24107 is  , which may have been inscribed in the lacuna of the corresponding ostracon. Similarly, mark  , which follows after on O. Cairo CG 24107, may once have stood in the area of the second lacuna of O. Cairo CG 24105, immediately left of . It is plausible that at the end of the lower line of O. Cairo CG 24107, the scribe once again turned a corner and continued from left to right. The first mark is then  , which cannot be an allomorph of the corresponding mark on O. Cairo CG 24105, because marks and occur together on O. Cairo CG 24106. Subsequent marks and are found in reverse order on O. Cairo CG 24105.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Table 3. Sequence of marks on O. Cairo CG 24107 (top) and O. Cairo CG 24105 (bottom).

O. Cairo CG 24106 (fig. 3) and O. Cairo CG 24108 (fig. 5) are not written in a sequence that conforms to that of the latter two. On O. Cairo CG 24108, marks and reoccur, which are known from group A. Not yet attested are and an allomorph of turned upside down. The other marks are all attested on O. Cairo CG 24105 and O. Cairo CG 24107. It would appear that the flower-shaped mark is an allomorph of and . Evidence supporting this equivalency is found on O. Louvre E 32940,[83] discussed below. It is because of the similarity

83 This ostracon is also known as O. Varille 423.

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to O. Cairo CG 24105 and O. Cairo CG 24107 that one can identify marks  ,  ,  ,  , and  on O. Cairo CG 24106 as allomorphs of  ,  , ,  , and  . Mark  is probably an allomorph of  , despite the fact that this mark is already present elsewhere on O. Cairo CG 24106. O. Cairo JE 72490 already demonstrated that a particular mark can be repeated within the same ostracon. This appears to have happened to mark  on O. Cairo CG 24106 as well. Marks  and  are not found on the other ostraca of group B, and they appear to be uniquely attested on this document.

O. Cairo JE 96650 displays nine marks, which are arranged in an order that is not related to the sequence of O. Cairo CG 24105 and O. Cairo CG 24107. Eight of the marks are also attested in the previous four ostraca, but mark  is new.

Together, the ostraca in group B contain at least 37 different marks (table 4). Of this total, 15 are also found in group A (table 7), but it will be demonstrated that there are indications that mark  (found in group B) is an allomorph of mark  (found in group A), at least in the case of ONL 6302.

CG 24105	CG 24106	CG 24107	CG 24108	JE 96650
				
				
				
				
				

CG 24105	CG 24106	CG 24107	CG 24108	JE 96650

Table 4. Marks attested on the ostraca of group B.

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3.3. Group D: ostraca from the reign of Amenhotep III

This group contains 12 ostraca[84] found in the area between KV 22 and KV A. The ostraca are clearly related to each other because most marks occur on several ostraca (table 5). O. WV 3 (fig. 6) is inscribed with a sequence of marks that reoccurs on several other ostraca from the 18th Dynasty, and it will be shown in section 4.1 below that its sequence is to some extent recognisable in O. WV 1, O. WV 4 and O. WV 10 (fig. 7). One of the most evident parallels for the sequence of O. WV 3 is OL 6788 (fig. 8),[85] and the similarity between both documents is so great that the latter ostracon can securely be attributed to group D. Before OL 6788 is discussed below, a brief examination of this ostracon is required. Among the marks in the upper line of the document are a flower-shaped mark  (henceforth represented by font type ) and mark  . It was pointed out above that in group B marks  , , and were all allomorphs of one mark. At the time of the group D ostraca, this equivalency is no longer valid and OL 6788 demonstrates that at this point is to be distinguished from . As a result, undated ostraca that display mark are difficult to interpret, because it cannot be ascertained in every case whether it represents an allomorph of or not. Mark is not attested on any of the ostraca from the area of the tomb of Amenhotep III, but a ceramic vessel fragment incised with mark from the same site indicates that it was still in use during this period.[86]

Mark  on O. WV 13 is an allomorph of mark on O. WV 11. The latter mark is the more frequent form and occurs in the sequence of OL 6788. On this ostracon, is adjacent to mark , as it is on O. WV 13. Mark is recorded on O. Stockholm MM 14130 in the same position as in the sequence of OL 6788. Mark is not attested in group B, but in group A we have discerned mark , which somewhat resembles , but there is no convincing evidence to support or object to an equivalency.

As an assemblage, the ostraca in group D contain at least 49 different marks. Of these marks, 23 or perhaps 24 are also found in group B, and 16 or perhaps 17 in group A (table 7). Remarkably, these 17 marks are not all the same as the 15 marks that are found both in groups A and B. Looking solely at the ostraca in groups A, B, and D, it appears that some marks were in use in group A, disappeared in group B, and reappeared in group D. On the basis of ostraca that are not securely dated, it can be argued that this is not true for all of these marks, and several such marks are in fact attributed to group B. One of the newly attested marks in group D is  , which is not found in groups A and B, and it is possible that the otherwise unique mark on O. Cairo CG 24106 is an allomorph of , because it is of a similar shape, but there is no supporting evidence.

84 O. WV 7 has also been described as an ostracon with workmen's marks, see Yoshimura (ed.) 2011, p. 81, but too few traces survive on it to include it in this study.

85 A drawing of the ostracon was published by Bruyère 1953, pl. XVIII [top left], and is referred to in earlier literature e.g. as an ostracon "published by Bernard Bruyère" (Haring 2009a, p. 153).

86 Yoshimura (ed.) 2011, p. 96, fig. 56, WV 447.

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O. WV 1	O. WV 2	O. WV 3	O. WV 4	O. WV 5	O. WV 6	O. WV 8	O. WV 9	O. WV 10	O. WV 11	O. WV 12	O. WV 13
											
											
											
											
											
											
											
											
											
											
											

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O. WV 1	O. WV 2	O. WV 3	O. WV 4	O. WV 5	O. WV 6	O. WV 8	O. WV 9	O. WV 10	O. WV 11	O. WV 12	O. WV 13

Table 5. Marks attested on the ostraca of group D.

3.4. A fourth group: group C

Whereas the three core groups A, B, and D are established primarily on account of their provenance, a fourth group of 18th Dynasty ostraca, henceforth called group C, can be established on the basis of other criteria. The ostraca in question are O. Cairo JE 96585, O. Cairo JE 96587, O. Cairo JE 96606, O. Cairo JE 96330.B (fig. 9) and .C, and O. Cairo JE 96331 (fig. 10). Despite their unknown provenance, all five ostraca were reportedly discovered together in the Valley of the Kings by the mission of Theodore M. Davis and Edward R. Ayrton in the 1905–1906 season.[87] They have a number of aspects in common. The first feature is the large size of the marks on these ostraca, *ca*. 5 by 5 cm on average, which is considerably larger than the marks on the ostraca in groups A, B, and D. The marks on the ostraca in group C were evidently drawn with a thick brush instead of the more typical pen or smaller brush. Furthermore, red ink was used to draw the marks on all ostraca in group C.[88] Another aspect of the ostraca is that their layout seems to be dictated by the shape of the ostracon itself, rather than by the scribe's desire to arrange marks in columns or lines. For example, the left half of

87 The provenance of these five ostraca, as well as the related ostraca O. Cairo JE 96590 and O. Cairo JE 96603, is indicated by the acronym "B.M." Because this site designation is otherwise not known, one wonders if it was perhaps misread for "P.M.," the designation given to one of the areas excavated by T.M. Davis and E.R. Ayrton in the 1905–1906 season. The location of this site is the branch leading to the tomb of Amenhotep II and the area of KV 53 in particular, see Reeves 1990, pp. 297, 303.

88 As an exception to the previous two statements, four marks on O. Cairo JE 96587 were not drawn with a thick brush, since they consist of very thin lines, and they were inscribed in a darker shade of red. The other six marks on the ostracon do conform to the criteria of brush size and red paint.

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O. Cairo JE 96606.B is higher than the right half, and therefore several marks are arranged vertically on the left end, with only a single mark on the right end. Another common characteristic is that the marks seem to have been drawn with quick, steady lines, and it is plausible that the ostraca were made by a single individual. It is difficult to compare the palaeography of the marks, as they are mostly simple geometric shapes, but  (present in O. Cairo JE 96606.B, O. Cairo JE 96587 and O. Cairo JE 96631) lends itself better for such purposes. Especially in O. Cairo JE 96606.B and O. Cairo JE 96631, this mark is very similar: the beak of the bird is very short, the body of the bird is slim and slants to the left, and the legs are long.

All these features strongly suggest that the five ostraca form a single group, an assumption that is supported by the repertory of the marks (table 6). The majority of the marks in this group can be identified without any problems because they occur on the ostraca from groups A, B, and D. O. Cairo JE 96585 seems to be complete and displays a total of nine marks, of which  appears here for the first time. It closely resembles  , but O. Cairo JE 96591, attributed to group C, is inscribed with both and , demonstrating that the two need to be differentiated. Mark  is probably an allomorph of  turned upside down.

O. Cairo JE 96587 is completely preserved too and displays 10 marks. In the left upper corner, one encounters a new mark,  . O. Cairo JE 96606.B displays a total of five marks, all encountered elsewhere. O. Cairo JE 96606.C displays three incompletely preserved marks. The top mark is not securely identified but is probably an allomorph of , rotated 180 degrees. The mark left of it is damaged, but can be identified when comparing it to O. Cairo JE 96630. This ostracon appears to be complete and displays 10 marks. It displays  at the bottom, which is not attested in groups A, B, and D, but is probably the same as the damaged mark on O. Cairo JE 96606.C. The final ostracon, O. Cairo JE 96631, also preserved in its entirety, displays 21 different marks. Mark  at the lower half of the ostracon appears to be an allomorph of . A damaged mark  , which somewhat resembles it, is situated at the top of the ostracon. The traverse stroke through the middle of the horizontal element suggests that it is to be distinguished from all allomorphs of , which lack such a vertical stroke. The mark perhaps represents Gardiner Y1,  , but it is not attested as such elsewhere in the 18th Dynasty.

Together, the ostraca in group C contain 29 unique marks. Each of the five ostraca displays a similar repertory of marks (table 6).

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JE 96585	JE 96587	JE 96606	JE 96630	JE 96631
○			⊙	○
𓈖				𓈖
𓌙		𓌙		𓌙
𓌡		𓌡	𓌡	𓌡
𓁐			𓁐	𓁐
𓊪		𓊪		𓊪
𓋴			𓋴	
𓇋				
𓄿				
	𓃀	𓃀		𓃀
	𓇋			𓇋
	𓈙	𓈙	𓈙	𓈙
	𓏏		𓏏	𓏏
	𓅓	𓅓		𓅓
	𓍿		𓍿	𓍿
	𓆑			𓆑

JE 96585	JE 96587	JE 96606	JE 96630	JE 96631
	𓈖			𓈖
	𓀁			
	𓎛			
	𓐍			
		𓋴		𓋴
		𓈖		𓈖
		𓃒	𓃒	
		𓄿	𓄿	
				𓎛
				𓉔
				𓆑
				𓊪
				𓏏
				𓍿
				𓆑

Table 6. Marks attested on the ostraca of group C.

Chronologically, group C is best situated between groups B and D. As mentioned, several of the marks of group C occur also in groups A, B, and D (table 7): 𓇋, 𓎛, ○, 𓋴, 𓄿, 𓏏, and 𓉔 occur in groups A, B, and D; 𓆑 appears in groups A and B; 𓋴 is found in groups A and D;[89] 𓀁, 𓐍, 𓋴, 𓏏, 𓁐, and 𓀀 are found in groups B and D; 𓍿 is found only in group B; 𓈖, 𓃒, 𓅓, 𓎛, 𓃀, and 𓄿 are attested in group D exclusively. The five marks 𓈙, 𓁐, 𓃒, 𓊪, and 𓈖 are not attested in any of the core groups. This observation supports the treatment of the five ostraca under discussion here as a separate group. In absolute numbers, the marks in group C are most closely related to group D, but in percentages the marks are most strongly associated with group B.[90] Although the group C ostraca are clearly related to group D, they include two marks, 𓍿 and 𓆑, which no longer occur in group D, but do feature on ostraca from groups A and B. Hence, group C is best situated between groups B and D.

Before moving on, it is necessary to return to 𓀁. In the discussion of the group D ostraca, it was pointed out that the interpretation of 𓀁 can be problematic. The mark occurs in group C as well, and it is assumed that it represents an allomorph of 𓌙, as in group B. There is no way of determining if this assumption is correct, but since the flower-shaped mark 𓌙 was in use in groups B and D, one would expect it to appear in the intermediate group C as well. This would mean that during the time of the group D ostraca, 𓀁 began to be used as a mark on its own, to be differentiated from 𓌙, which was still functional.

89 The mark is also attested on O. KV 10004, attributed to group B.

90 Relation to group A: 10 common marks = 41.7% of all marks in that group; relation to group B: 17 common marks = 46.0% of all marks in that group; relation to group D: 22 common marks = 44.9% of all marks in that group.

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A	B	C	D
			
			
			
			
			
			
			
			
			
			
			
			
			
			

A	B	C	D

Table 7. Marks attested on the ostraca of groups A–D.

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3.5. A relative date for the other 18th Dynasty ostraca with identity marks

Although the majority of 18th Dynasty ostraca is of an uncertain date, the four core groups A–D constitute useful points of reference. By comparing the marks on an undated ostracon to the marks within groups A, B, C, and D, one is able to determine the degree of association to each of these groups in terms of shared marks. In order to approximate the degree of association between an undated ostracon and each of the four core groups, it is necessary to take into account both the marks that are attested in the core groups as well as those that are not. To arrive at a figure that expresses the degree of association for an undated ostracon, the percentage of marks attested in each core group is calculated, as well as the percentage of marks that are unattested in a core group. The difference between these two percentages represents the degree of association. When this degree is calculated for each of the four core groups, the group with the highest degree of association should be an indication of the date of the ostracon.

The assumption behind this dating method is that the greater the number of shared marks between two ostraca, the closer together they must date. It should however be a constant reminder that this assumption is not necessarily true. It could have happened that a scribe recorded particular events in which workmen were involved and divided into two groups, creating two contemporary, but very different ostraca for each group. Caution is therefore required, because two ostraca with only a few common marks do not necessarily date far apart. Neither is a high degree of similarity in terms of shared marks an indication of contemporaneity *per se*. A group of workmen may have employed a set of identity marks at a certain time, and two generations later their grandsons may have found the inspiration for their own identity marks in those of their grandfathers.

The dating method used for the ostraca is however more reliable, as it does not compare the marks on one ostracon to the marks on another, but the marks of one ostracon to the marks attested within *a group* of ostraca that are relatively well dated. Nevertheless, there is no way of determining to what extent the ostraca in each core group are representative of the complete set of marks that were in use during the period to which they date. The calculation of the degree of association may therefore serve only as a guideline. The attribution of an undated ostracon to a specific period is also based on other significant factors. In some instances, particularly in the case of fragmentary ostraca, the absolute number of marks that occurs in one of the core groups is more revealing than is the calculated degree of association. Furthermore, much weight has been given to marks that are ordered in a specific sequence that also occurs on better dated ostraca. The style of the marks and occasionally the provenance of the ostracon have also been taken into consideration. Collectively, these aspects provide an indication of the date of 18th Dynasty ostraca.

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The distribution of the 18th Dynasty ostraca is as follows:

Group	Date	Number of ostraca
A	*ca*. Thutmosis III	14 (of which 10 attributed)
A–B	*ca*. Thutmosis III–Amenhotep II	2 (attributed)
B	*ca*. Amenhotep II	16 (of which 11 attributed)
B–C	*ca*. Amenhotep II–Amenhotep III	5 (attributed)
C	*ca*. Amenhotep II–Amenhotep III	14 (of which 9 attributed)
C–D	*ca*. Amenhotep II–Amenhotep III	12 (attributed)
D	*ca*. Amenhotep III (and later?)	60 (of which 48 attributed)
–	Undated	14

3.6. Identity marks from the end of the 18th Dynasty

It is evident that the group of ostraca attributed to group D is larger than the other groups. This can be explained in different ways that need not be mutually exclusive. First of all, the higher figure may be the result of a bias in the archaeological material, as older material generally has a smaller chance of surviving than younger material. Secondly, the high number may be seen as evidence that later in the 18th Dynasty the need for administrative documents, or rather the wish to create them, had increased. Another explanation is that some of the ostraca in group D do not date to the reign of Amenhotep III, but to a somewhat later period. There are no anchor points for the time after the reign of Amenhotep III, and there are no clear indications that any ostracon should date to the time of Amenhotep IV / Akhenaten or one of his successors, with perhaps the exception of ostracon O. KV 63, which bears mark  . Reportedly, this limestone ostracon was found in the shaft of O. KV 63.[91] This rock-cut space in the central area of the Valley of the Kings may have been cut already in the reign of Amenhotep III,[92] and seems to have been used as an embalmers' cache at some point in or near the reign of Tutankhamun.[93] The piece lends some credence to the idea that identity marks were still employed after the reign of Amenhotep III, and that ostraca with marks continued to be created.[94] That is also suggested by the pottery that was apparently found within the embalmers' cache of KV 63. Seven of the published ceramic vessels[95] display signs that are recognisable as 18th Dynasty workmen's marks:  (inscribed twice on the same vessel),  ,

91 Lorlelei Corcoran in private communication with Ben Haring, 27 March 2006.

92 Dziobek, Höveler-Müller, Loeben (eds.) 2009, p. 63.

93 Schaden 2008, p. 237; Dziobek, Höveler-Müller, Loeben (eds.) 2009, p. 64.

94 The date of the ostracon remains nevertheless hypothetical because KV 63 was clearly disturbed, presumably during the Ramesside period, see Schaden 2008, p. 232.

95 Schaden 2008, pp. 231–254, fig. 23. Another flower-shaped mark is visible on a blue painted jar from the tomb (a drawing and a photo are available at www.kv-63.com/photos2010.html), but it is not clear if the mark was added before or after the firing of the jar. It may therefore be a potters' mark rather than a workmen's mark.

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 , ,  (or), and finally (attested on two vessels), which is unattested on ostraca but occurs on a ceramic jar from the tomb of Kha.[96] Mark is attested on O. BTdK 832, the date of which is very uncertain, and on O. MMA 09.184.700 (fig. 11), attributed to group B. The mark is quite rare and it is not attested in group D. However, if is in fact an allomorph of , attested on pottery near the tomb of Amenhotep III, its presence in KV 63 is not surprising. The other marks are all present in group D. It should thus be borne in mind that ostraca ascribed to group D, associated with the reign of Amenhotep III, may in fact date to a somewhat later period.

4. ANALYSIS AND INTERPRETATION

4.1. Ostraca with ordered lists of identity marks

The group A sequence

O. Cairo JE 72490 (fig. 1) is one of the few completely preserved ostraca in group A, and it is plausible that the marks on this piece are listed in an ordered list because O. Cairo CG 25321 (fig. 2) and ONL 6371 (fig. 12) display similar groupings of marks. These series of marks on the three ostraca are never exactly the same, suggesting that the sequence went through changes. Moreover, each of the three documents records marks that are not included on the other two pieces. Based on evidence from the Ramesside period, such alterations may have been caused by workmen who retired from the crew or who were promoted or demoted to other positions. Indeed, the sequences of O. Cairo CG 25321 and ONL 6371 do not appear to be random. O. Cairo CG 25321 lists marks that occur in the first half of the sequence of O. Cairo JE 72490: the marks occur in positions 3, 4, 5, 7, 8, 9 and 10, with marks (3), (4), (5), (9) and (10) in the same relative ordering.

It is not clear if any marks are missing on ONL 6371, which displays a boustrophedonically written sequence of marks, assumed to begin with and to end with .[97] The latter mark is not attested elsewhere and is tentatively interpreted as a double instance of . Similarly, mark could represent a double instance of , since the latter mark is duplicated on O. Cairo JE 72490. ONL 6371 records marks that are found in the second half of the sequence of O. Cairo JE 72490: marks in positions 9, 11–12, 13, 14, 15, 17, 19 and 21, with marks (9), (11–12), (14), (15), (17) and (19) in the same relative ordering.

O. Cairo JE 72490

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

96 Turin S. 8436 RCGE 19788, see SCHIAPARELLI 1927, fig. 121 [3].

97 In addition, the ostracon is inscribed with what is perhaps a depiction of a spike, see section 4.2 below.

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O. Cairo CG 25321

…					…				…			…	…								
	3	8	4			5	9	10		7											

ONL 6371

21	9			11–12		14	15	17	13	19											

The group B sequence

As mentioned in section 3.2, the series of marks of O. Cairo CG 24105 and CG 24107 are unmistakably similar. Still, the absolute sequences are different, as the series of marks on O. Cairo CG 24105 begins with mark M17 (position 14 on O. Cairo CG 24107), and ends with H6 (position 12) and L1 (absent on O. Cairo CG 24107). Presumably, the differing beginning and ending are related with the way in which the sequences were copied or dictated.

Vestiges of the sequence of marks found on O. Cairo CG 24105 and CG 24107 (fig. 4) exist on other ostraca attributed to group B. The best example is O. Louvre E 32940, an incompletely preserved document with a total of 16 different marks, some of which are repeated. The ostracon is essentially written in two lines of marks, the second line having been added after the ostracon was turned 180 degrees. The first line of the ostracon is read from right to left, beginning with A1 followed by D21 and D28, after which A1 appears again. The line ends with I9 and H6, and the sequence continues on the second line with I9, I9, M17, etc.

O. Cairo CG 24107

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

O. Cairo CG 24105

1	2	3	4	5	6	7	8	9	10	12		14	15	16	17	18	19			22			26	25	

O. Louvre E 32940

3	2		3	6		10	12	10	9	14	15	16	17	18	19	20	21

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There are obvious differences between the sequences of O. Louvre E 32940 and O. Cairo CG 24105 and CG 24107, but it is evident that the former document was created with a very similarly ordered list in mind. This is also true for ONL 6302 (fig. 13), O. UC 45708, and ONL 6405 (fig. 14).[98] ONL 6302 is not written in neat lines and therefore it is not clear how the series of marks should be read exactly, but the connection to the ordered sequence is clear. The marks included occur mostly at the middle and end of the sequence of O. Cairo CG 24107. In light of the similarity, it becomes very tempting to interpret mark , attested in group B exclusively in this exact shape, as an allomorph of , as it proceeds with and on ONL 6302.

ONL 6302

															
		2	8		12	13	5	9	16	17	18	23	21		

O. UC 45708 is inscribed with a single line of six marks, which apart from occur towards the end of the sequences of O. Cairo CG 24107 and CG 24105:

O. UC 45708

20	21	22	10	19	

ONL 6405 also lists marks from the end of the sequence, but, like the previous ostraca, it diverts from the ordered list. Mark is taken to be an allomorph of mark .

ONL 6405

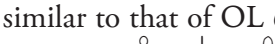
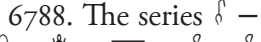
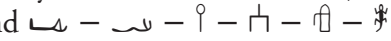
	13	16		20	14	18	19		22

The group D sequence

Among the ostraca attributed to group D, there are several pieces that record a particularly long sequence. Two key ostraca are OL 6788 (fig. 8) and O. Stockholm MM 14130, both firmly situated in group D. The former document is complete, and records a better preserved version of the sequence of O. WV 3 (fig. 6), be it with minor variations. The sequence of O. Stockholm MM 14130 is closely related to that of OL 6788, but the ostracon is inscribed in a different way. Whereas OL 6788 starts with mark and continues in a left to right direction, continuing

98 O. Parker H 5, attributed to the groups A–B, should perhaps be considered as well. It is only available as a hand-copy, and its present whereabouts are unknown. The upper line features marks – – , situated in slots 8, 10, and 12 of O. Cairo CG 24107.

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at the left end of each new line, the sequence of O. Stockholm MM 14130 is composed in *boustrophedon*. Once this is understood, the sequence of marks on the Stockholm ostracon is very similar to that of OL 6788. The series  ,  , and  on O. WV 3 are entirely in accord with the sequence on OL 6788. The sequence  is found on O. Stockholm MM 14130, while the two marks after that,  and  , are found in that exact order on OL 6788, as indicated below. Parts of the same sequence are found on other ostraca of group C as well. On O. WV 10 (fig. 7), the first line, read from right to left, displays a series of marks similar to that of OL 6788:

							
17	18	19	20	25	27	29	30

Another sequence is more similar to the order of O. Stockholm MM 14130:

			
29	30	15	14

O. WV 4 is perhaps also related to the sequence of OL 6788. The marks themselves are not written in the correct sequence, but apart from  the marks all belong to the beginning of the list of OL 6788:

										
1	3	5	6	10	11	12	13	15	16	17

The influence of the fixed order also occurs in O. WV 1, where several marks that are situated in adjacent positions in the sequence of OL 6788 are clustered together:

														
7	20	21	34	32	35	28	16	18	37	31	38	13	24	43

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Sequence																																												
Sequence of OL 6788:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Sequence of O. Stockholm MM 14130:					5	6	7	1		10		12	29	14	15	13	16	18	19	20	21	22	23	45	24						31	32		34	35	36	37	38	39	…	41			44
Sequence of O. WV 3:										10	11	12	13	14	…	16	17	18	19	20	…			45	24	26	27	…	29	30	31	32	33	34	35		37	38	39	40	41	…		44
Sequence of ONL 6298 + ONL 6577:		4	3	5	6	7	1			12	29	14	15	13		16	17	18	19	25	21	22	23	45	24	11	26	27	28	30	31	32	33	36	35	37	38				41		43	44

Table 8. Sequence of marks on OL 6788, O. Stockholm MM 14130, O. WV 3 and ONL 6298 + ONL 6577.

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A fourth pivotal document is ONL 6298 + ONL 6577 (fig. 15), a nearly intact ceramic bowl with a diameter of *ca*. 28 cm with 39 preserved marks inscribed on its outer face. The marks are arranged in a line that spirals around the bowl in a sequence that bears many similarities to that of OL 6788, O. Stockholm MM 14130, and O. WV 3. With the exception of three or four marks, all other 36 marks occur on OL 6788.[99]

The six recognisable marks on O. UC 45709 perfectly follow the sequence of OL 6788 and O. Stockholm MM 14130. The traces of the mark after  on O. UC 45709 would indeed agree with  . In the second line of O. UC 45709, we see  , which is absent on OL 6788, but present on O. WV 3 and O. Stockholm MM 14130, where it is followed by  , as on O. UC 45709.

O. UC 45709

				…		
1	2	3	4	…	45	24

O. Ashmolean HO 1114 (fig. 16) is written in two lines in which some marks are repeated, suggesting that each line is an individual entry. The marks occur in a sequence that is much in agreement with their position in the ordered sequence found on ostraca such as O. WV 3 and O. Stockholm MM 14130. This is particularly true for the marks in the second line, when read from right to left.

O. Ashmolean HO 1114, line 2

1	45	37	38	39	41	43

The order of marks in the first line, when read from right to left, agrees better with O. WV 3 and OL 6788, with the exception of the second instance of , which is written above . Given its position, as well as the indiscernible sign below it, this is perhaps an instance of mark , situated at the end of the sequence on ONL 6298 + ONL 6577.

O. Ashmolean HO 1114, line 1

14	24	26	39	41		44	43

99 ONL 6298 + ONL 6577 includes mark , which is rare on ostraca, but which does occur on O. Cairo JE 96603 (attributed to group D), as well as on ceramic sherds found near the tomb of Amenhotep III, see Yoshimura (ed.) 2011, p. 97, fig. 54 [313], [315], pl. 34 [313], [315]. On ONL 6298 + ONL 6577, mark is situated in a slot that suggests it is an allomorph of mark , but this is unlikely because both marks are recorded on O. WV 12. Mark is not attested on any of the core ostraca of group C and is to be differentiated from , which is found higher up in the sequence of ONL 6298 + ONL 6577. The first mark, , is that of the foreman Kha, see below, section 4.5.

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In its current state, O. MMA 09.184.700 (fig. 11) displays 15 marks. One of the marks,  , has been erased but is still visible. Mark  is not entirely clear, but is here interpreted as  . The mark at the right end of the third line is probably  . Comparing the order of the marks, it becomes clear that it partially resembles the sequence of ostraca from group C, such as OL 6788. The marks in the upper line correspond to positions 3, 5, and 6; the superimposed marks  and  correspond to positions 7 and 8;  right of this group and to the left are positions 11 and 14 respectively; the remaining marks are mostly found in the third quarter of the sequence of OL 6788 (positions 21–22, 24, 27–30, 44) and are inscribed in almost the same sequence.

O. UC 31988 is completely preserved, but unfortunately it is very weathered. It displays a total of 23 marks, of which several are unclear and the reading of some marks is uncertain, but the sequence of marks is evidently related to the group C ostraca. Other marks do not adhere to the same sequence, but the influence of the sequence can be detected. The tentatively identified marks are situated in the following positions on OL 6788:

O. UC 31988, obv. line 1

					
13	3	4	14	6	7

O. UC 31988, obv. line 2

					
16	18	19	20	21	22

O. UC 31988, obv. line 3

				
28	31	32	35	23

The sequences of OL 6788 can be recognised on several ostraca that are attributed to group C, sometimes only in clusters of marks which are not neatly arranged in lines:

O. KV 10010

16	17	18	19

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ONL 6354

16	17		30	31

ONL 6372 (fig. 17)

27	28		30	31	32		34	35	36

ONL 6342

13	14	16	19	21

ONL 6444, rev.

13	16	18	19	17

ON 6465 (fig. 18)

11	12		15		19	19		17	18	16		22	23	24

O. Turin CG 57310

3	4		11	26		41	43	44

ONL 6203

14	16		18	19		36	37		41	42

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Six of the marks on ONL 6600 adhere to the sequence of O. Stockholm MM 14130 ( – – –  –), while some of the marks on ONL 6400 ( –  –  – ), ONL 6514 ( –  –  –  –  –), and ONL 6266 ( –  ;  –  –) are more in keeping with the sequence of ONL 6298 + ONL 6577.

4.2. The meaning of the 18th Dynasty ostraca with identity marks

The majority of the ostraca with identity marks are of an administrative nature, as are those of the Ramesside period. The latter documents can to some extent be interpreted thanks to contemporary hieratic material produced by the necropolis workmen, but as such records are missing for the 18th Dynasty, the ostraca with marks from that period remain difficult to understand. Nevertheless, a closer look at the ways in which the marks are arranged on ostraca reveals aspects of the administration of labour during the 18th Dynasty and of the individuals who were involved in this process.

Colour use

The 18th Dynasty ostraca were evidently made by individuals who had access to scribal material such as pens, brushes, and ink. The marks are written in red and/or in black ink, as generally used in Egyptian administrative texts. The use of exclusively black ink is slightly more frequent than the use of exclusively red ink, but the choice for a particular colour is not bound to a specific provenance or a specific document type. Some ostraca are inscribed with two colours of ink.[100] The use of a second colour can mostly be explained as later additions to an older record, or as different sections on an ostracon that were inscribed at different moments.

Ostraca with rows of marks without tally marks

There are 66 ostraca, discovered both in Deir el-Medina and the Valley of the Kings, which are inscribed with rows of marks without additional signs. The majority are inscribed with black ink, while there are 23 ostraca with marks in red ink, and one ostracon with marks inscribed both in black and red.[101] Most of the ostraca in this category (44 instances) do not display a sequence that is known from other documents. On the remaining 22 ostraca, the marks are at least partly in keeping with a fixed, longer sequence.

Close examination leads to some interesting insights into the organisation of the workforce. Two ostraca, ONL 6371 (fig. 12) and O. UC 45683, are also inscribed with what is tentatively explained as a depiction of a metal spike, referred to in the Ramesside administration of the royal necropolis as a *ḫꜣ*.[102] In both cases, the sign for the presumed spike is slightly larger than

100 O. Cairo CG 24106; O. Cairo JE 96590; O. MMA 09.184.700; ONL 6354; and O. WV 10; use of different colours for different sides of an ostracon: ONL 6214 and ONL 6348.

101 In four instances, no details are known about the use of colour.

102 A heavy spike without a handle made of copper or bronze used to break stone. During the Ramesside period, such valuable tools were distributed to the workmen by higher authorities, see Janssen 1975, pp. 312–313; for examples from the 18th Dynasty found in the tomb of Kha, see Schiaparelli 1927, p. 83, fig. 50.

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the marks, and it is respectively drawn above and below the marks. If the interpretation of this depiction is correct, the two ostraca could be records of the distribution of metal spikes to a group of workmen (11 in both cases) by a supervisor.

There is a possibility that O. Cairo JE 96285 (fig. 19) is inscribed with the word *ỉrp* "wine." Whereas the right section of the ostracon contains two lines of workmen's marks, the left section, separated from the other section by a vertical line, contains a short column of three signs, the first one being  , and the last one  . The middle sign is  , which is not securely attested as a workman's mark on ostraca, pottery, or other objects. It is therefore possible to read the signs in the column as cursive hieroglyphic signs, together spelling the word *ỉrp* "wine." This reading is debatable, because signs and certainly are attested as workmen's marks. Moreover, the word would then have been written in a column instead of horizontally, as New Kingdom scribes were wont to do in documentary texts, and the word would be lacking a determinative. More notably, it would represent a unique instance in the 18th Dynasty of the use of marks in combination with formal script. Nevertheless, the sole mention of wine without any further information, written with two hieroglyphic signs and one hieratic sign, would not be completely unexpected in the context of an ostracon with marks. Ostraca with marks from the 18th Dynasty are everything but explicit about the content of the documents. In addition, the hieratic writing for "wine" is ubiquitously found on jar dockets from the proximity of the tomb of Amenhotep III,[103] and amphorae with wine labels are attested in 18th Dynasty tombs at Deir el-Medina.[104] The document could therefore be a record of the delivery of wine to or by a group of workmen.

The meaning of the other ostraca with rows of marks is not clear. Some may be explained in the same way as ONL 6371, O. UC 45683, and O. Cairo JE 96285. An administrative purpose is particularly plausible for ostraca with marks that are arranged in accordance with a sequence attested elsewhere. They may be lists of workmen that were present at the worksite on a particular day.

Ostraca with identity marks and tally marks

There are 55 ostraca with tally marks in the form of strokes or dots. Such ostraca have been found both at the Valley of the Kings as well as the settlement of Deir el-Medina. Some include marks to which both dots as well as strokes were added, indicating there is no real difference between them. This is well illustrated by ONL 6298 + ONL 6577 (fig. 15). On this ostracon, the dots and strokes function as tallies that represent a quantity that is connected with a specific workman. This quantity can be conveyed with dots or vertical, horizontal, and even diagonal strokes. In fact, it is often difficult to distinguish dots from a very short stroke, indicating that the scribe did not make an effort to differentiate between dots and strokes. Each mark is connected with a minimum of two and a maximum of six tallies, regardless of their shape, and the number of tallies in a particular colour is never greater than three. The marks are all written in black ink and seem to have been inscribed at the same time, and it is probable that the black dots and strokes were added to the marks at the same moment. The

103 Yoshimura (ed.) 2011, pp. 68–72, figs. 43–47, pl. 29–31, nos. 280+281–283, 285–290, 404–406.
104 E.g. tomb DM 1156, see Bruyère 1929, p. 34.

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red strokes may have been added at a later point when the document was perhaps reused for another administrative round.

Tally marks occur on ostraca with marks that are arranged in rows or in columns, but also on pieces on which the marks are not neatly arranged. The position of the tally marks appears to be of no significance, but is mostly below the identity marks to which they were added. The identity marks are most often accompanied by only one or two tally marks. Because the 18th Dynasty ostraca with marks are typically implicit about their content, it is unclear what the meaning of the tallies is. There are documents such as OL 6788 and O. WV 3, that record the entire crew of workmen in ordered lists, which suggest that they are notes pertaining to the collective tomb administration. It is possible that these ostraca are accounts of the individual output of a workman during a day's work, records of individual presence or absence during a specific timeframe, or accounts of the distribution of rations to the workmen.

The inscriptions on O. Stockholm MM 14130 and O. WV 10 (fig. 7) are a more complicated matter. The latter ostracon contains both a series of red marks and a series of black marks. The black marks are accompanied exclusively by black dots, and the red marks by both red and black dots. It would therefore appear that the red marks with red dots were inscribed at an earlier phase, and the black marks with black dots at a second stage, when black dots may have been added to the red marks as well. A similar scenario may be proposed for O. Stockholm MM 14130, inscribed exclusively with black marks. The black dots added to the marks are fine points made with the tip of a pen, perhaps added at the same moment the marks were inscribed. The red dots on the other hand are mostly thicker, and many are evidently produced over one or two earlier black dots and could therefore either be check marks or corrections.

As mentioned earlier, the sequence of ONL 6298 + ONL 6577 (fig. 15) is an ordered list of workmen, which begins with  , identified as the mark of foreman Kha. His mark is accompanied by a total of six strokes, while the other individuals recorded in the list of ONL 6298 + ONL 6577 are associated with a smaller quantity. The figures connected with the marks in positions 2–6 are relatively high as well (three or four). The ostracon could thus be interpreted as a record of the distribution of goods, in which the senior workmen receive higher quantities than their younger colleagues. Yet, such an explanation is not possible in the case of the ordered list of O. Cairo CG 24105. Here, there is no proof of an arrangement according to rank, because tallies connected with the workmen at the beginning of the sequence do not record the largest amounts:  (position 1) is connected with seven strokes,  (position 2) is connected with perhaps six dots, but  (position 6) is connected with 14 dots.

O. Cairo CG 24106 (fig. 3) is preserved in its entirety and deserves further attention. Some marks are accompanied exclusively by dots, others only by strokes, and three marks by both dots and strokes, although it is sometimes difficult to differentiate a dot from a small stroke. In the case of marks and  , where dots are added inside of the contours of the mark, it seems that the scribe chose dots because of the limited space, and it seems again that dots and strokes were both used as tally marks. The dots and strokes combined record rather high quantities per mark, ranging from one to 29. There are smudges of red ink around some of the marks that indicate reuse in the form of deliberate erasure of strokes or dots. The ostracon would therefore seem to have been adjusted on at least one occasion. This may explain to some extent the difference in the colour of the marks, and of the dots and strokes added to them: there are 15 black marks and 11 red marks, and three marks that were redone in a different colour of ink.

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As there are more black marks than red marks, it may be assumed that the ostracon was first inscribed with black marks, to which red marks were added at a later stage. The colour of the strokes that accompany the marks suggests the same. There are five, perhaps six marks which have both red and black strokes added to them ( ,  ,  , ,  ,  , and maybe). In the case of , , , , and , the black strokes are situated at the centre of the group of strokes flanked on both ends by red strokes, suggesting that the red strokes were added around the black strokes at a later stage.[105] By association, the red marks may have been inscribed at the same stage. It could have been at that moment that some of the originally black marks and strokes were traced in red ink because the original black ink had faded. If this reconstruction is correct, the document records an accumulation of data. Since more workmen's marks seem to have been added, we may be dealing with a record of different workdays, and the workmen who were added later may not have been present at the worksite during the first stage of the record. As such, O. Cairo CG 24106 could document the individual progress made by the workmen over the course of some days. This remains highly tentative, because it would then be very odd that some tally marks were erased. Such tallies would consequently have to be explained as scribal mistakes or as the remnants of an even older phase of the document.

Ostraca with a single mark

There are 26 ostraca that are completely preserved and display nothing more than a single mark, or a double instance of the same mark.[106] Apart from O. KV 63, which could date to the 18th Dynasty, they were all discovered at Deir el-Medina and, except for O. IFAO C 3271,[107] were all inscribed on limestone sherds. The ostraca are similar to so-called name stones from the Ramesside period, which are essentially pieces of limestone inscribed with a single name. The exact purpose of the Ramesside name stones is unclear, but they have been tentatively explained as countermarks that were to be handed over to the directors of the workforce in exchange for rations or tools.[108] Although the evidence for an interpretation of these pieces as countermarks is meagre, the theory cannot be refuted, but it seems equally plausible that these stones were used in the private domain. Frustratingly, the exact find-spot in the village has not been recorded for any of the 18th Dynasty ostraca bearing a single mark. The stones may have been placed in houses or storerooms to designate its owner. It is also possible that the stones were used as ex-votos in (the construction of) private tombs, religious chapels, or domestic shrines. Ostracon O. OIM 19206 is of a different nature, as its mark is accompanied by 10 vertical strokes, suggesting it is of a documentary nature, perhaps indicating an individual's output over the course of a workday.

105 However, one red stroke below mark seems to have been squeezed in between two black strokes.

106 O. IFAO C 1443 (); O. IFAO C 2503 (); O. IFAO C 3271 (); O. IFAO C 7635 (); O. KV 63 (); ONL 6198 (); ONL 6202 (); ONL 6206 (); ONL 6326 (); ONL 6330 (); ONL 6332 (, see fig. 20); ONL 6333 (); ONL 6334 (); ONL 6335 (); ONL 6336 (); ONL 6343 (); ONL 6345 (, twice); ONL 6352 (); ONL 6353 (); ONL 6357 (); ONL 6363 (, twice); ONL 6368 (); ONL 6369 (); ONL 6390 (); ONL 6398 (); and ONL 6403 (, twice).

107 It is uncertain if O. IFAO C 3271 is preserved in its entirety and it may be an ostracon of a different type.

108 Grandet 2000, pp. viii, 4.

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4.3. The size of the workforce

Complete and nearly complete ostraca with lists of workmen of the entire crew, such as OL 6788 and ONL 6298 + ONL 6577, demonstrate that during the reign of Amenhotep III the workforce comprised about 44 workmen, including a foreman.[109] The total number of different marks that is attested in the core ostraca of groups A, B, and C is smaller than 40, and prior to the reign of Amenhotep III there are no ostraca with a total number of marks that comes close to the figure 40. If one lets the ostraca from the core groups A–D speak for themselves, the following picture emerges:

Group A	Thutmosis III	24 different marks
Group B	Amenhotep II	37 different marks
Group C	Amenhotep II–Amenhotep III	29 different marks
Group D	Amenhotep III	49 different marks

The available data suggest that the workforce at the time of Amenhotep III (*ca*. 44 workmen) had doubled in size compared to the crew at the time of Thutmosis III (*ca*. 22 workmen). The growth in the number of workmen is paralleled by the total number of workmen—not the total number of different marks—recorded on some of the completely preserved ostraca. These figures are comparable to the total of different marks attested in each core group. O. Cairo JE 72490 for example, a completely preserved ostracon in group A, is inscribed with 22 marks, which is close to the total of 24 different marks attested in group A as a whole. Hence, the ostracon could be a list of the workforce in its entirety.

While 37 different marks are attested in group B from the time of Amenhotep II, completely preserved ostraca point to a crew of 26 (O. Cairo CG 24105; O. Cairo CG 24107) to 30 workmen (O. Cairo CG 24106). The damaged ostracon O. KV 10004 (24 marks are preserved) supports this estimate. Whether the size of the crew was actually brought back to around 22 workmen during the time of group C is open to debate. The total number of 29 different marks attested in this less well defined group is larger than that of group A but smaller than that of group B. Indeed, ostraca such as O. Cairo JE 96631 (group C; 21 workmen), O. Cairo JE 96590, and O. Cairo JE 96603 (both attributed to group C, respectively 19 and 22 workmen), all of which are preserved in their entirety, suggest a crew that was of about the same size as that during the time of Thutmosis III.

109 Cf. Haring 2014, p. 95.

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4.4. The transference of identity marks

There are ostraca such as O. Cairo JE 72490, which feature the same mark twice. Double marks are not exclusively, but most frequently, written in adjacent positions, such as the twin marks in the upper line and the twin marks in the third line of OL 6788.[110] The many instances of the pairing of and in ordered lists demonstrate that the repetition is purposeful. Both marks have their own dots added to them, indicating that they represent two different individuals who held adjacent positions in the fixed order of workmen. The twin marks are not only found next to each other in the ordered sequence, but also on other ostraca, and the individuals thus seem to be closely related. Perhaps a family connection existed between the two men represented by the same mark, such as a father who had transferred his own identity mark to his son. There is abundant evidence for this practice among the necropolis workmen from the Ramesside period,[111] and the twin marks on 18th Dynasty ostraca could therefore represent a father and his son, or a senior workman and his apprentice, who operated as a pair on a regular basis and were therefore noted down together on ostraca with marks. Indeed, there is evidence of fathers and sons who were both active as necropolis workmen during the 18th Dynasty.[112] The interpretation of twin marks as a father and a son would also explain the "name stones" with a double mark.[113] If the marks on these ostraca do refer to two family members or two close colleagues, these could have been placed in a living space they shared, or near objects that were in their possession.

4.5. The organisation of the workforce

A possible division of the 18th Dynasty workforce into two halves is not reflected in the ostraca with marks. Ostraca such as OL 6788 and ONL 6298 + ONL 6577 record around 40 marks each, which seems to represent the entire workforce. There certainly are completely preserved ostraca that record around 20 marks, which could embody one half of the crew, but this is no proof of an organisational division of the crew into two sides.[114] Neither do the ostraca suggest that there were two foremen. The identity mark of the foreman Kha, , is recognisable in a number of ostraca.[115] Kha's tomb inventory included objects with several other marks, and

110 Cf. twin marks on O. Stockholm MM 14130, ONL 6298 + ONL 6577, O. WV 3, and close to each other on O. WV 1; cf. سب on O. Ashmolean HO 892; ⊙ on ONL 6465; on O. WV 4; perhaps also on ONL 6371.

111 Haring 2000, p. 51; Aston 2009, p. 55; Collier 2018. Evidence for close working relations between fathers and their sons during the 20th Dynasty is found at the workmen's huts in the Valley of the Kings, which were often shared by a father and one or two sons, see Dorn 2011a, pp. 71–72.

112 The aforementioned Kha and his son Amenemope; Minhotep and his son Nakhtmin; perhaps also Amenemope and his son Tener; Amenhotep and his son Wadjetshemes.

113 ONL 6345 (); ONL 6403 (); ONL 6363 ().

114 Nuancing preliminary observations in Soliman 2013, p. 165.

115 O. Cairo JE 72490; ONL 6298 + ONL 6577; ONL 6330; ONL 6369; and ONL 6424. ONL 6330 and ONL 6369, both discovered at Deir el-Medina, appear to be name stones, here interpreted as objects that may have been placed in a particular space to represent its owner or inhabitant. If this assumption is correct, and if these particular pieces indeed refer to Kha and not to a family member of his, it would seem likely that Kha had lived at the village after all; compare earlier doubts about this question in Haring 2006, p. 109; Haring 2014, p. 89.

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they lead to an interesting hypothesis. The marks that are reportedly attested in the tomb[116] are almost all found on ostraca from group D:  (attested twice),  ,  ,  ,  , and  . The latter mark is not found on ostraca, but it is attested twice on pottery vessels discovered near KV 63,[117] and presumably is an allomorph of mark . The other five marks are all present in the sequence of OL 6788: is found in position 43, in position 32, in position 24, in position 3, and in positions 1 and 2. The latter two marks are thus positioned at the beginning of the sequence, and this is perhaps not coincidental. It has been demonstrated that Kha's mark is not recorded on OL 6788. It is present on ONL 6298 + ONL 6577, where Kha's mark is situated at the head of the sequence, probably in the capacity of the foreman of the crew, in analogy with ordered name lists from the Ramesside period that are often headed by the captains of the crew. Because Kha's mark is absent on OL 6788, this ostracon could be later than ONL 6298 + ONL 6577, dating to a time when Kha had retired from his position as foreman.[118] Comparing the first 16 marks in the sequence of OL 6788 to that of ONL 6298 + ONL 6577 provides supporting evidence for this hypothesis: was probably situated in the seventh slot of the sequence of ONL 6298 + ONL 6577, but on OL 6788 it has moved higher in the sequence to fill the position that became available when Kha left his office. The workman with mark may thus have been Kha's successor as foreman of the crew.

OL 6788															
															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ONL 6298 + ONL 6577															
						[]	…	…							
	4	3	5	6	7	1				12	29	14	15	13	16

Table 9. Beginning of the sequences on OL 6788 and ONL 6298 + ONL 6577.

These observations are important for two reasons. Firstly, it could explain why is attested twice in the tomb of Kha. The two objects with this mark, one of which was a very valuable bronze bowl,[119] would appear to be funerary gifts offered by a close colleague and inheritor of Kha's position, and therefore a man of considerable social standing. Secondly, the assumed upward movement of in the sequence of workmen suggests that ostraca ONL 6298 + ONL 6577 and OL 6788 are truly ordered and to some extent hierarchical lists, in that the position of a mark within this list was related to the workman's rank. If in slot 1 on OL 6788 does belong to the foreman of the crew, one may speculate that its twin mark in slot 2 represented a son of the foreman, who perhaps carried out the duties of the deputy of the crew, in analogy with the Ramesside administrative model.

116 Overview in Soliman 2015, pp. 110–111.
117 Schaden 2008, pp. 231–254, fig. 23, [7], [14].
118 Indeed, the inclusion of mark on ONL 6298 + ONL 6577 may suggest a date for this ostracon closer to group C.
119 Turin S. 8218 RCGE 19799, see Schiaparelli 1927, fig. 118 [4].

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As OL 6788 is an ordered list, 𓌳 too must have referred to a man of a high social status, because his mark is positioned very close to the head of the list in position 3. His seniority may have made him a close colleague of Kha as well, and therefore he too may have wanted to donate a small gift to Kha's funeral. Of course, none of this proves that the individuals who gifted objects to the funerary equipment of Kha were exclusively workmen of a high social standing. Neither does it follow that high-ranking, senior workmen were listed *only* at the beginning of the list. Still, there are indications that the majority of younger workmen are listed in the second half of the sequence. The marks that occur only in group D and not in groups A, B, and C could belong to young workmen who were new to the crew at the time of the group D ostraca, and indeed these marks are all found in the second half of the sequence of OL 6788, with the sole exception of 𓀀 (position 9):

Position in OL 6788									
𓀀	𓀠	𓁐	𓁛	𓂋	𓂝	𓂻	𓃀	𓃭	𓄿
9	20	22	27	29	33	34	40	41	43

4.6. Scribes and scribal competence

A cursory study of the palaeography of the 18th Dynasty ostraca indicates that they were created by different individuals. It is evident that during the reign of Amenhotep III there were at least three roughly contemporaneous persons who created ostraca with marks. A single hand was probably responsible for O. WV 3 (fig. 6) and OL 6788 (fig. 8), but two distinctly different hands can be detected on O. Stockholm MM 14130 and ONL 6298 + ON 6577 (fig. 15), which show a very similar sequence of marks. In support of the assumption of multiple contemporaneous "scribes" is O. WV 10 (fig. 7), which displays two lines of marks that must have been written by two different persons. The handwriting of the marks in the upper line is refined, and the marks borrowed from hieroglyphic script are elegant and well balanced. Although written in a few quick strokes, they display fine details, such as the hand in 𓂝 and the horns of the viper in 𓃭. The marks, all more or less horizontally aligned, are approximately of the same height and width, and the strokes were made in a steady hand. Two flat, broad signs, 𓂝 and 𓃭, are written one above the other to create an evenly spaced square, as would have been done by a hieroglyphic scribe. The inscription is characteristic of someone who was trained in drawing hieroglyphs. In contrast, the marks in the second line appear to be the work of a different man who was not professionally trained as a scribe. His marks are larger, drawn in thicker, clumsy strokes. The marks themselves are less well aligned and of an uneven size. The ductus and shape of 𓁛 is not evidently hieroglyphic. This contrast demonstrates that two different men had used the ostracon, seemingly to create a single document.[120]

120 O. MMA 09.184.700 was inscribed by two different individuals as well, perhaps by the same two men who created O. WV 10.

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Several contemporaneous individuals thus occasionally produced ostraca with marks, but some men may have done this more often than others. The shape of marks on other ostraca suggest that the author of O. WV 3 and OL 6788 is the same individual that made O. WV 1, O. WV 8, the red marks on O. MMA 09.184.700 (fig. 11), and perhaps the upper line of marks in O. WV 10. Likewise, it seems probable that O. Cairo JE 24105–24108 (figs. 3–5) were created by the same man. O. Cairo JE 96630 and O. Cairo JE 96631 (figs. 9–10) also seem to have been made by a single hand. Additionally, it is plausible that O. Cairo JE 72490 and O. Cairo JE 72494 were made by one individual, and it seems likely that O. Strasbourg H 193, ONL 6302 (fig. 13), and O. Cairo JE 96285 (fig. 19) can be assigned to yet another scribe.

The fact that nothing in the layout, style, and content of the ostraca is reminiscent of hieratic script suggests that scribes trained in hieratic script were not involved in the composition of documents with marks. Whereas ostraca from the Ramesside period occasionally combine marks with hieratic numerals and other hieratic signs, no hieratic is found in the available documents. Similarly, no hieratic ductus is evident in any of the marks on the 18th Dynasty ostraca. The only exception is perhaps  and its allomorph  , which may or may not have been a hieratic variant of mark  , interpreted as Gardiner sign Q3 with the phonetic value *p*.[121] Yet, even the potentially textual inscription on O. Cairo JE 96285 is written predominantly with hieroglyphic signs.

If the 18th Dynasty ostraca were not made by professional hieratic scribes, the question arises as to what extent the individuals that produced these documents were literate. Evidently the layout of several ostraca is of such a disorganised nature that one would not expect them to have been made by someone thoroughly familiar with scribal practices. Others are inscribed along the contours of the ostracon, or in *boustrophedon*, both methods that are far removed from formal Egyptian writing practices and are unlikely the work of a trained scribe. The heterogeneity of the layout of the ostraca is paralleled by the seemingly arbitrary usage of dots and strokes as tally marks. Moreover, the many differences in the orientation of marks, as well as the great variability in the exact shape of marks, give the impression that the authors of such ostraca had not been instructed in scribal practices.

Conversely, individuals such as the man who inscribed the upper line on O. WV 10, as well as several other ostraca, appear to have been better acquainted with hieroglyphic script. This point has already been deduced from his neat handwriting and from the hieroglyphic appearance of his marks, but it is also supported by the unidirectional nature of his marks. Even though the marks in OL 6788 are orientated to the right but were written from left to right, one observes a uniformity in the marks—not only in the horizontal sense, but also in the vertical sense as none of the marks are written upside down. This homogeneity is also noticeable in the upper line of O. WV 10, where the marks all face the right side and none are inverted. In contrast, the lower line of this ostracon, written by a second person, contains a mark on its side (), an inverted mark (), and a diagonally inscribed mark (). Returning to the scribe who created OL 6788 and other pieces, there are clear indications that he was familiar with the visual conventions of hieroglyphic script, possessed a stronger sense of the orientation of the marks, and had an affinity for the aesthetic grouping of marks. On these grounds, this necropolis workman may well have been a draughtsman.

121 Perhaps on ONL 6461 and ONL 6465.

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This man was undoubtedly not the only draughtsman to have created ostraca with marks. We can probably identify the producer of O. Cairo JE 72490 and O. Cairo JE 72494 as a draughtsman based on the appearance of his marks, which are written in a fine, well-balanced hand. The scribe had an eye for detail, and his rendering of with short thin lateral branches is elegant. He is also the only scribe that added two thin horizontal lines within the contours of the basket in mark  . Nevertheless, O. Cairo JE 72490 was composed in *boustrophedon*, and  is upside down,[122] suggesting that his familiarity with scribal practices was limited.

An extensive palaeographic analysis may be able to identify more traits of the draughtsmen who composed ostraca with marks during the 18th Dynasty, but here it must suffice to say that, based on the considerations described above, there are 23 ostraca[123] and perhaps seven more[124] in which one may detect the hand of someone who had been trained to draw hieroglyphs. Out of a total of 137 ostraca, this group represents *ca*. 20% of all available 18th Dynasty ostraca. Although this figure is an estimate, it indicates that the greater majority of ostraca were made by workmen who were not trained in writing hieroglyphic or hieratic signs.

5. CONCLUSIONS

It is likely that the village of Deir el-Medina was founded under Thutmosis I to accommodate the workmen, perhaps sent from temples of Amun at Thebes, who constructed tombs in the Valley of the Queens and later in the Valley of the Kings. Yet, the earliest identifiable ostraca with identity marks date to the reign of Thutmosis III. From this reign onwards, there is evidence for permanent occupation of the settlement by the workmen, and their identity marks reveal their presence in the tombs of the Western and Eastern Cemeteries of Deir el-Medina, as well as their activities in the Valley of the Kings, the Valley of the Queens, and the Wadi Gabbanat el-Qurud. Despite the lack of hieratic documentation, the names of some 18th Dynasty workmen are known. However, apart from Kha and perhaps Heqanakht and Nekhunefer, currently, no workmen can be securely identified in the marking system.

The ostraca with ordered lists of workmen from the time of Amenhotep III, headed by a foreman and perhaps a deputy, indicate that there was a clear hierarchy within the crew. New recruits mostly occur at the bottom of the lists, while the upward movement of marks in the ordered list suggests that workmen could climb the social ladder of the community. Double marks in such lists may be seen as evidence of the transference of marks from one generation to the other. Still, the differences between the repertoires of marks on the ostraca from the core groups A, B, and D indicate that completely new identity marks could be introduced.

The exact meaning of the ostraca with marks remains obscure, but most should be interpreted in the context of the collective administration of labour at the worksite and the provision of the

122 The mark is not recognisable as a hieroglyph and therefore it is not clear what its top and bottom are, but, because the mark is most frequently attested as , it seems that this would be its correct orientation.

123 O. Ashmolean HO 892; O. Cairo JE 72490; O. Cairo JE 72492; O. Cairo JE 72494; O. Cairo JE 96285; O. MMA 09.184.700; O. MMA 09.184.786; OL 6788; ONL 6194; ONL 6210; ONL 6266; ONL 6302; ONL 6410; ONL 6423; ONL 6461; ONL 6565; ONL 6588; ONL 6601; O. Strasbourg H 193; O. WV 1; O. WV 3; O. WV 8; and O. WV 10.

124 O. IFAO C 7635; O. KV 10004; ONL 6333; ONL 6335; ONL 6410; ONL 6646; and O. UC 45709.

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workforce, as suggested by the use of dots and strokes, which most likely are evidence of simple forms of bookkeeping. Numerous ostraca appear to record the absence or presence of individual workmen, the output of the labour of individual workmen, and perhaps the distribution of rations or the consumption of certain commodities. One ostracon might deal with the transport, production, or distribution of wine, and two ostraca might record the distribution of chiselling tools.

The diversity in the layout of the ostraca suggests that they were not created according to a particular system. Instead, the authors of the ostraca seem to have devised personal methods for recording information with marks. That is, during the 18th Dynasty the practice of inscribing ostraca with marks was to some extent systemic, but the ways to do so were not. The use of a second colour can mostly be explained as a later addition to an existing record. Several ostraca have check marks and traces of corrections and revisions, giving the impression that an effort was made to guarantee that the documents were accurate to some extent. Most instances of erasure, however, are evidence of the reuse of ostraca, as is best exemplified by ordered lists of workmen to which dots and strokes were added and later erased so that the list could be recycled for a subsequent administrative round. There are no indications that ostraca were produced as part of private bookkeeping to record transactions or inventories, but this possibility cannot be excluded. A distinct subcategory is ostraca with marks with one or two tally marks. Another clearly distinguishable category are the limestone sherds inscribed with a single mark. They were not necessarily used for administrative practices, but may have served as markers of individual property or living spaces, or as ex-votos. Some of the ostraca with marks without tally marks may also have been of a votive nature. This is particularly likely in the case of O. KV 63, O. Cairo JE 72490, O. Cairo JE 72494, and pottery with workmen's marks from the tomb of the foreign wives of Thutmosis III, which have been found in or close to foundation deposits and an embalmers' cache.

Although ostraca with marks were evidently not produced on a daily basis, the majority represents a part of the administrative record of the 18th Dynasty royal necropolis workmen. An extensive hieratic administration pertaining to work of this crew is not attested at Western Thebes, and professional scribes do not seem to have been permanently present with the workmen during the period. Nevertheless, professional scribes are attested in Deir el-Medina during the 18th Dynasty, and the brief hieratic datelines in the royal tombs could be indications that they were occasionally present at the worksites as well.[125] The hypothesis may thus be advanced that work at the royal tombs was monitored and administrated by one or more professional scribes who were not inhabitants of Deir el-Medina, but occasionally visited the workmen to report back to officials such as the Mayor of Thebes or the overseer of all construction works of the king.[126] Perhaps the work on the royal tomb was deemed so important that a more notable scribe from Thebes was sent to check on the progress of the preparation of the tomb. Apparently, such scribes left no traces of their documentation at the Valley of the Kings or the workmen's village, and it may be assumed that they recorded their texts directly onto a sheet of papyrus, which was taken to an office in Thebes. During such audits, the scribe may have

125 This is also suggested by a papyrus fragment of a hieratic letter dating to the middle of the 18th Dynasty that was discovered in the Valley of the Queens, see Gabler, Soliman 2018.

126 Similarly, there is no hard proof that the necropolis scribes of the very beginning of the 19th Dynasty lived at the village, see Haring 2006, pp. 109–110, although the fact that documentary ostraca from this period have been found at Deir el-Medina and in the Valley of the Kings renders that possibility quite plausible.

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demanded a report on the advancement of the work from the foreman, and he may have inquired about the crew's necessity for supplies, tools, and commodities. This transmission of information between the scribe and the directors of the crew was most likely an oral exchange, but it is plausible that the foreman or another member of the workforce may have partly relied at such moments on the ostraca with marks, created as *aide-mémoires*.

The general dearth of hieratic texts from the 18th Dynasty fits well with B.J.J. Haring's observation of the growth in the number of hieratic ostraca from Deir el-Medina during the Ramesside period. Dividing this period into quarters, there are few hieratic documentary texts from the first half of the 19th Dynasty, far more from the second half of the 19th Dynasty, and even more from the first half of the 20th Dynasty.[127] This increase has been argued to be a reflection of the development of scribal practices in the community during the Ramesside period.[128] B.J.J. Haring demonstrated moreover that the village community evolved from a predominantly oral society to one in which texts played an important role as supplements to oral practices. As a consequence, more documentary texts were produced, which became increasingly more standardised with fixed formulas and scribal conventions.[129] Data from the 18th Dynasty supports this view. The increase in the local production of hieratic texts at Deir el-Medina from the early 19th Dynasty onwards is preceded by a period during which such documents were not composed locally. Whereas the growing importance of scribal practices eventually led to standardisation of texts and to the development of fixed formulae, the opposite is true for the 18th Dynasty. During this period, the absence of a local scribal tradition did not contribute to the standardisation of nomenclature for particular occupations, as evidenced by the rare use of titles and their relatively wide variety.

Despite the absence of a scribal tradition, 18th Dynasty necropolis workmen still attempted to create hieroglyphic inscriptions to decorate tombs and funerary objects. The practice of using series of identity marks to produce records on ostraca seems appropriate in this environment, because this method approaches the use of script. As such, the ostraca with marks parallel the erroneous 18th Dynasty hieroglyphic inscriptions from Deir el-Medina: in some ways, the marks function as script, but like the incorrectly written hieroglyphic texts they are part of an informal, non-standardised practise. Indeed, the usage of identity marks at Deir el-Medina is not entirely surprising, as the practice is well attested in the context of labour and production in 18th Dynasty Egypt. The phenomenon of utilising the marks to compose administrative ostraca, however, seems to be unique to the crew of royal necropolis workmen, and is difficult to explain. One factor must have been the workmen's exposure to hieroglyphs and scribal culture, which must certainly have been greater than that of the average quarryman, as the crew would have been in contact with notable scribes from Thebes. Apart from the fact that they laboured inside tombs decorated with hieroglyphs, it is possible that the workmen were involved in the royal burial itself, as can be surmised from the identity marks that were found in the embalmers' cache of KV 63. Whatever the precise role of the workmen in the burial of the king might have been, it is conceivable that they came into contact with hieroglyphs in that capacity as well. The presence of skilful, professional draughtsmen may have contributed to this practice, and some draughtsmen must have been responsible for a small percentage of the ostraca with marks.

127 Haring 2003, pp. 254–255.
128 Haring 2003, p. 255.
129 Haring 2003, pp. 256–267.

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Fig. 3. O. Cairo CG 24106.



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Fig. 5. O. Cairo CG 24108.

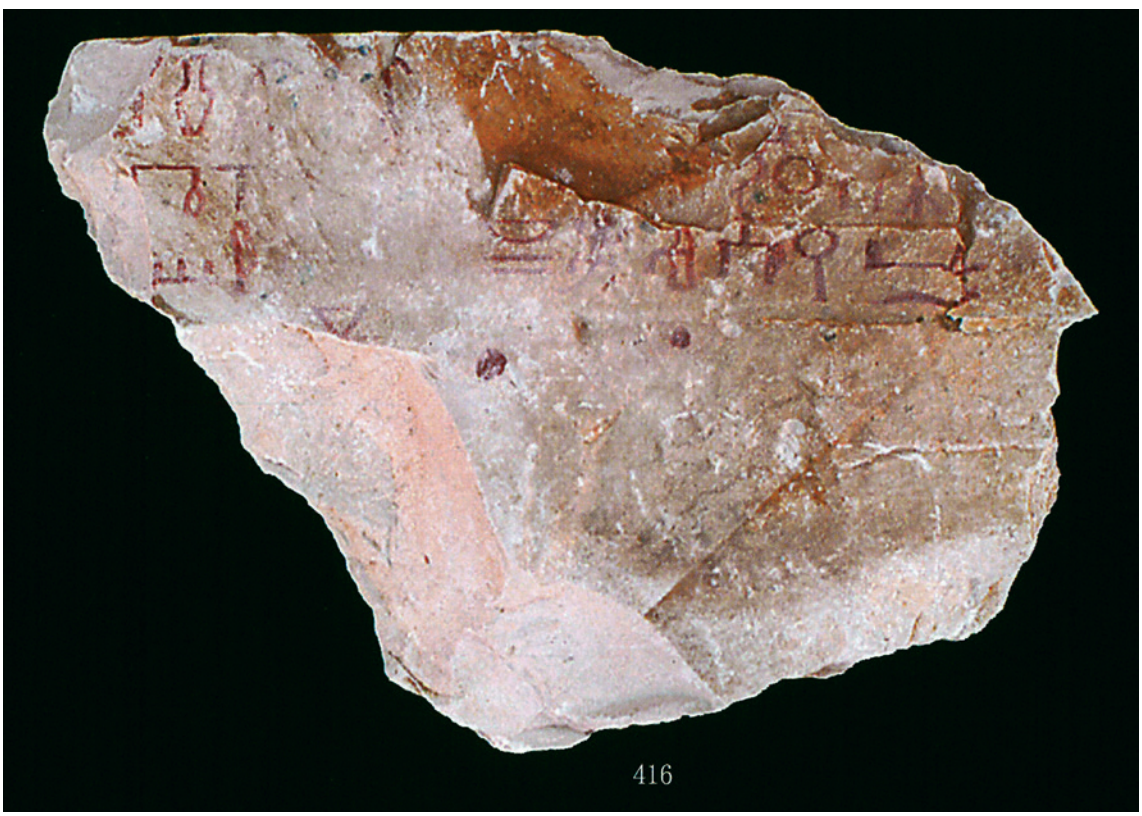


Fig. 6. O. WV 3. After Yoshimura 2011, pl. 11.

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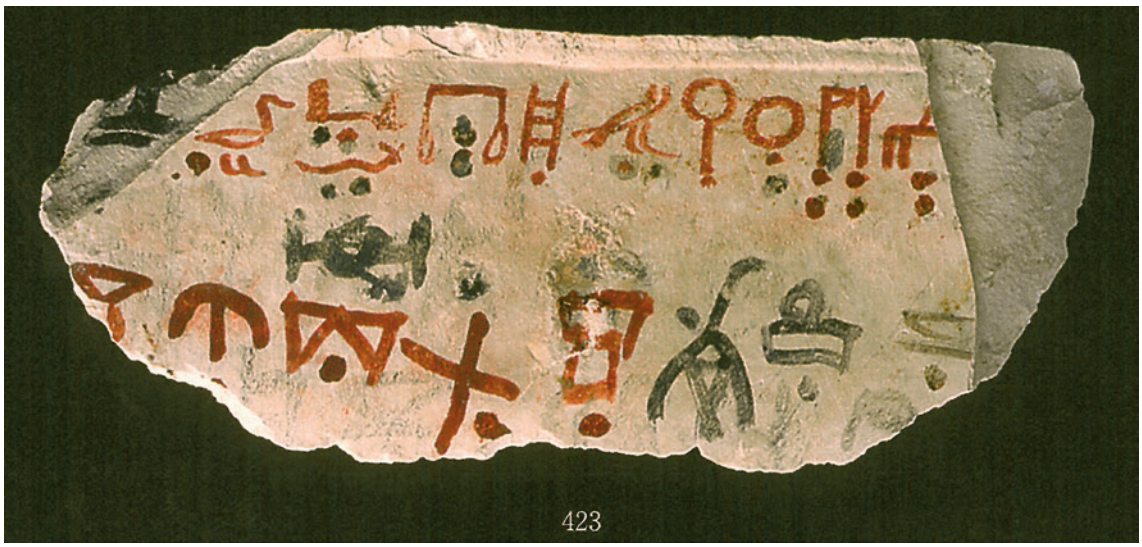
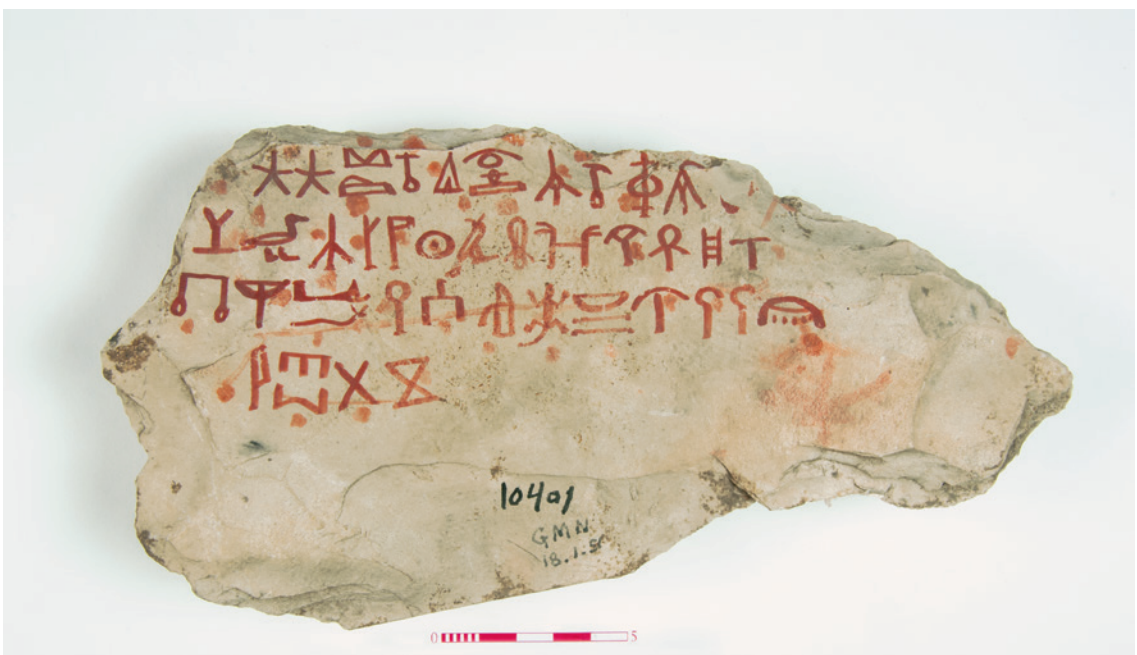


Fig. 7. O. WV 10. After Yoshimura 2011, pl. 12.



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Fig. 11. O. MMA 09.184.700. Gift of Theodore M. Davis, 1909.



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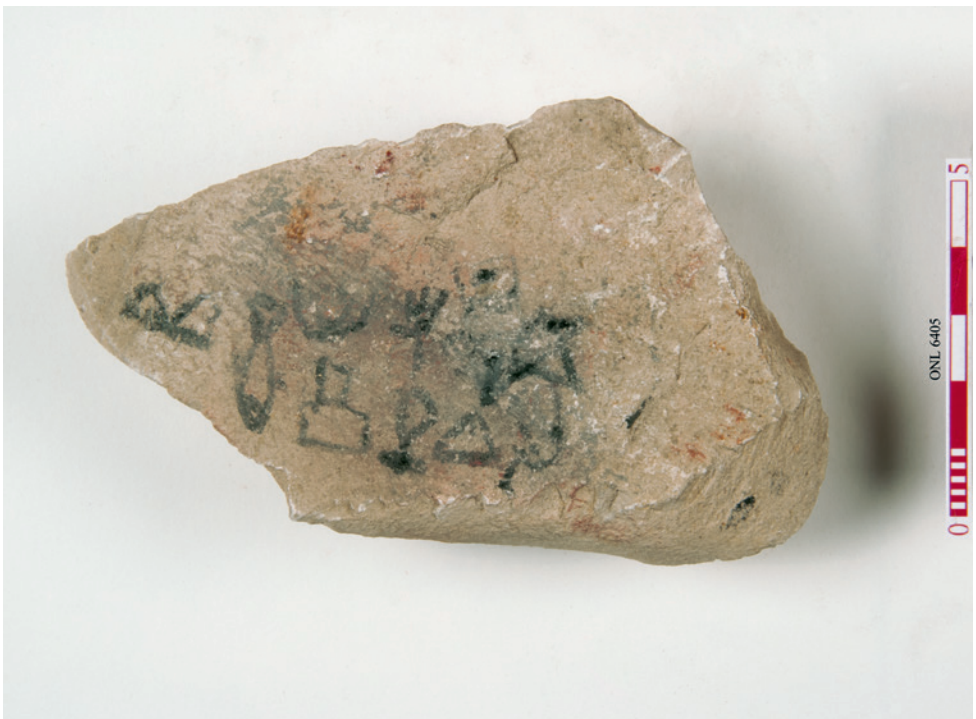
Fig. 12. ONL 6371.

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