

STUDIES OF ANCIENT EGYPTIAN FOOTWEAR. TECHNOLOGICAL ASPECTS.
PART XVIII. FIBRE COMPOSITE SANDALS

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1. *Introduction*

Fibre Composite Sandals are about the most often discussed and published among ancient Egyptian footwear, which is perhaps due to the fact that they usually are interpreted as ‘tomb sandals’, *i.e.* footwear specifically made for the burial. Based on the present analysis (for which 43 sandals have been studied in eight collections¹), however, this interpretation seems premature. Furthermore, the dating of these sandals needs re-evaluation: often Fibre Composite Sandals are dated to Roman times, but the manufacturing technique is much older, as indicated by finds that are dated to the Old Kingdom.

The present work is part of the Ancient Egyptian Footwear Project’s (AEFP) publication series on the technological aspects of ancient Egyptian footwear. It will focus on the manufacturing technology; other topics (iconography for example) will be dealt with only in passing as a detailed account will be presented in a later stage of the project.² The results of material identification are forthcoming (Cartwright & Veldmeijer). In the present article a preliminary typology of these sandals is established, which is based mainly on technological features. A concordance with other typologies will be provided for. Footwear terminology follows Goubitz *et al.* (2001) but with adjustments as explained by Veldmeijer (2010a).

2. *Typology*

The AEFP distinguishes three types of Fibre Composite Sandals (figure 1) on the basis of the shape of the sole: the ‘Wide Type’, the ‘Elongated Straight Type’ (with two variants) and the ‘Elongated Swayed Type’ (table 1). The reason of classification using the shape of the sole as the main defining trait is because the technological features are comparable in all cases, although some minor details might differ. Montembault’s typology (2000: 31) is not used (see also Veldmeijer, 2010a: 14-15), mainly because by the AEFP they are based on far more examples. An concordance, however, is partially possible as Montembault’s Type D, Variant 1 (*Ibidem*: 39-40) is the same as the AEFP Elongated Straight Type, Notched Variant, and Montembault’s Type D, Variant 2 (*Ibidem*: 40-43) is the same as AEFP’s Elongated Swayed Type.

¹ The large collection of Fibre Composite Sandals in the Egyptian Museum has recently been studied (2013). A quick assessment of these specimens convinced me that they will not markedly change the conclusions (although they might shed some more light on the possible dating). Thus, it was decided to finish this paper to avoid further delay. The remaining sandals will be added in a later phase of the AEFP.

² For a detailed explanation of the AEFP, see Veldmeijer (2010a) and www.leatherandshoes.nl.

The Elongated Straight Type is long and relatively narrow, but the sandals are symmetrical lengthwise and thus referred to as 'straight' rather than 'swayed'. There are two variants, the differentiation of which is based on whether or not the toe is notched (Variant Unnotched and Variant Notched). The Unnotched Variant has a mildly constricted waist and the width of the heel and front part is nearly equal. The tip of the sandal is at the centre of the width. The Notched Variant is comparable in shape, except for the notch in the front. Elongated Straight sandals do not have a notch at the medial edge — these only occur in the Elongated Swayed sandals. In all sandals in which the strap complex could be identified, it consists of a Y-shaped back/front strap *and* a heel strap; heel straps have not been registered for the other types and might therefore be seen as characteristic for the Elongated Straight Type, Unnotched Variant of the Fibre Composite Sandals.

3. Description

Fibre Composite Sandals are relatively simple from a constructional point of view: usually three sole layers (occasionally there are more layers, see table 1) that are made of strips of vegetable material (palm leaf, papyrus and/or reed³), are secured at the edge. A braid at the ventral surface of the treadsole reinforces the sole (not present in all specimens). In contrast to some other types of sandals, such as Sewn Sandals (Veldmeijer, 2009; 2010a), it is difficult to present a general description (table 1), but usually, the strips that make up the insole are orientated transversely, the strips of the midsole lengthwise and the strips of the treadsole again transversely (figure 2). However, there are several exceptions to this 'rule' that will be discussed below. The strips of the treadsole might slightly overlap each other in stair-step fashion, as is so often seen with the strips of the insole, but often they are not overlapping at all. This is not always clear in the examples discussed here.

The layers are secured at the sandal's edge by sewing with a narrow strip of palm leaf and including cores (figure 3A). This construction is comparable to the construction of the edges described for Sewn Sandals (Veldmeijer, 2009: 556-557; 2010a: 44-47) and Sewn-Edge Plaited Sandals (Veldmeijer, 2010b). However, usually the edge in these categories are made of two or three rows (figure 3B),⁴ in contrast to the edge in Fibre Composite Sandals, which always consists of one row — the core, however, might consist of several elements, resulting in a thick, strong edge (figure 3C).

Fibre Composite Sandals are elegantly designed and (elaborate) decoration can be seen, especially with the Elongated Swayed Type; the Notched Variant of the Elongated Straight Type might be decorated too, but usually far less elaborate.

Many of the sandals have braids at the ventral surface of the sandal that protects the treadsole from wear. These braids are secured with stitches that run lengthwise down the centre (although not present in all sandals). They are sewn in such a way that they include the edges of the transverse strips of the insole (arrow in figure 8C) and thus reinforce the sole construction.

³ See below.

⁴ There are several exceptions with Sewn-Edge Plaited Sandals (Veldmeijer, 2010b: table 1).

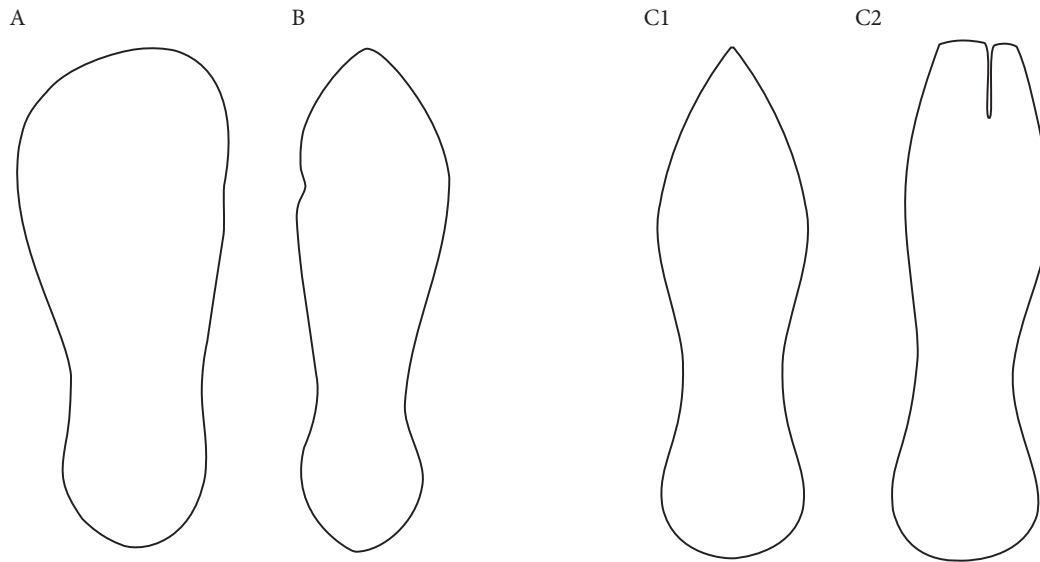


Fig. 1. Three types are distinguished within the Fibre Composite Sandals. A) Wide; B) Elongated Swayed and C) Elongated Straight, which are divided in two Variants (Unnotched, C1 and Notched, C2). Not to scale. Drawings by A.J. Veldmeijer.

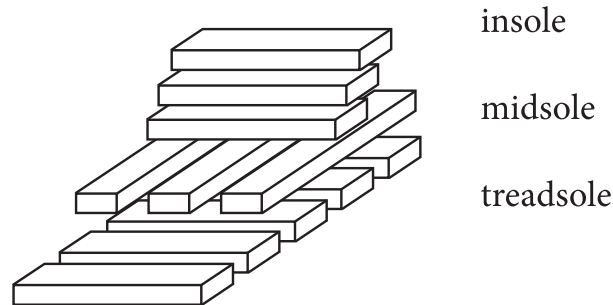


Fig. 2. The sole of Fibre Composite Sandals usually consists of three layers and a braid (not shown) at the ventral surface of the treadsole. Sometimes the strips of the treadsole overlap in a comparable fashion as seen with the insole. Drawing by E. Endenburg (adapted from Montembault, 2000: 29). Not to scale.



Fig. 3. The edge construction. A) Most common construction: the sole is sandwiched between cores that are secured by means of sewing with palm leaf strips; B) Most edges in sewn sandals are reinforced by adding cores to the sole's edge; C) In some Fibre Composite Sandals the edge is reinforced by using several elements together as a core (e.g. Petrie Museum of Egyptian Archaeology UC 28330i). Drawings by A.J. Veldmeijer/E. Endenburg. Not to scale.

The most frequently registered strap complex can be described as ‘V-shaped’ (figure 4A), running from either side of the heel diagonally towards the front, where both are inserted in one hole in the sole. Variants of this construction occur, however. Shortly before going through the sole, the straps are wrapped, thus forming a single element. These types of straps are referred to as ‘Y-shaped’ (figure 4B) and although less often registered as the V-strap complex, they are common nonetheless. The Y-shaped straps combined with a heel strap (figure 4C) are only seen in the Elongated Straight Type, Unnotched Variant. ‘T-shaped’ straps (figure 4D), common in amongst others Sewn Sandals, have not been registered.⁵ In all types of straps that are registered in Fibre Composite Sandals, the back straps are secured at the ventral surface of the treadsole by tying the terminal ends into a big, bulky overhand knot. The front strap might be secured in a comparable way or the terminal ends are stitched through the sole several times.

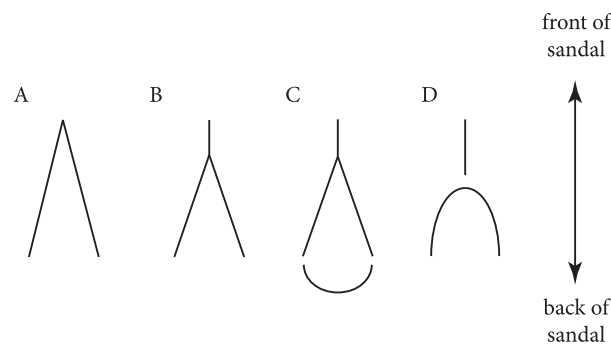


Fig. 4. Diagram of the strap complexes in Fibre Composite Sandals. Most are V-shaped (A) although the Y-shaped construction also occurs regularly (B). Only Elongated Straight, Unnotched sandals show Y-shaped straps combined with a heel strap (C). T-shaped straps, however, have not been registered (D) — these are common in other sandals, such as Sewn Sandals. Not to scale.

Drawing by A.J. Veldmeijer/E. Endenburg.

3.1. *Wide Type*

The Wide Type are sandals in which the front half is markedly wider than the back half, much more so than with the Elongated Swayed Type. It is especially the lateral edge that expands and therefore the sandal is asymmetrical lengthwise (swayed sole). The waist is only slightly constricted and the heel is somewhat wider (relative to the waist), whereas this distinction in the Elongated Swayed Type is much more pronounced. In all, the Wide Type is less narrow, and shorter, relative to the other types.

The Wide Type is represented by one pair of sandals (JE 92688; figure 5), which needs special attention, mainly because it seems to be dated to the Old Kingdom: well preserved footwear from this era of the Egyptian history is extremely rare. It was excavated, according to the Museum’s database, by Abd el-Salam from the Snefroe Pyramid Complex and entered

⁵ These straps consist of two parts: the back strap and the front strap, which are secured to each other more or less at the ankle (Veldmeijer, 2009: 557-559; 2010a: 45-46).

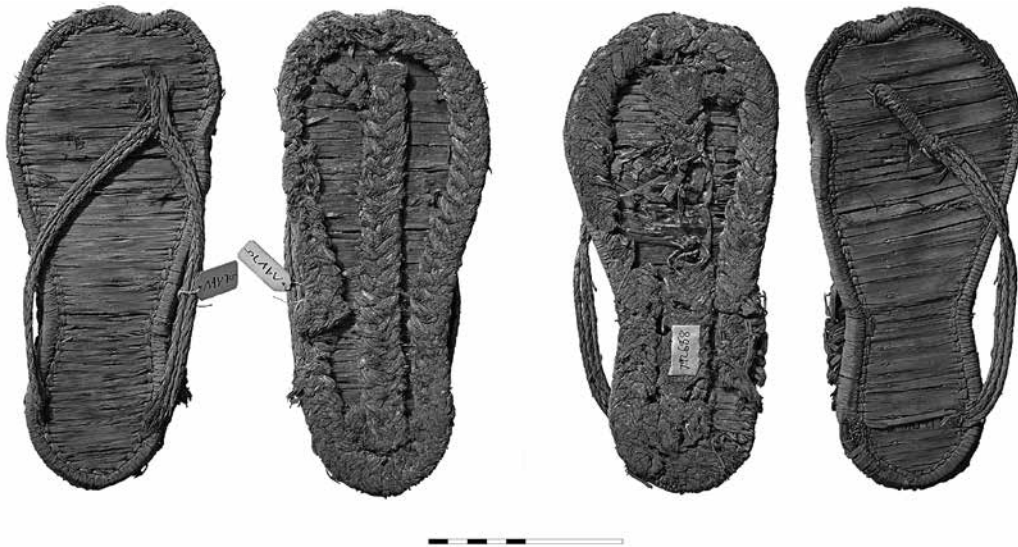


Fig. 5. Pair of sandals Egyptian Museum Cairo JE 92688. Left sandal in dorsal and ventral view; right sandal in ventral and dorsal view. Photography by A.J. Veldmeijer. Ministry of State for Antiquities/Egyptian Museum Authorities. Scale bar in cm.

the collection in 1973.⁶ However, the archaeology of Dashur includes levels of various periods (Old Kingdom through Middle Kingdom and Greco-Roman times; New Kingdom layers have not been found; for example Wildung, 1975: 986; De Morgan, 1895: 43-46). It is not certain at all if they should be dated to the Old Kingdom or to a later period (such as the Greco-Roman period). Another Fibre Composite Sandal was excavated from Gebelein and dates to the 4th Dynasty (Fiore Marochetti, 2003; see below).

The heel in the Dashur sandals is rounded and the waist is, relative to the heel, mildly constricted. From here, the width of the sandal quickly increases at both sides, but most distinct at the lateral side. The edge runs with a wide curve towards the front, the tip of which is turned upwards. The medial edge widens slightly but the curvature is far less distinct than the lateral edge, which results in an asymmetrical shape lengthwise. This asymmetry is accentuated by the slight notch at the medial edge at approximately the same height as the articulation of the toes to the foot. The sole layers, built up as explained in the introduction to the description, are made of woody material, which probably is a reed species. The exact identification has yet to be done, however. But if so, it differs from the Fibre Composite Sandals that are housed in the Louvre, Paris (see below).

The edge is very strong, the core of which consists, dorsally, of several elements, resulting in a rather square appearance. As explained above, the edge is secured with strips of palm leaf (identified by means of macroscopic investigations). Inside the edge there is a row of

⁶ Seemingly, there is no account of this find. More on this in Veldmeijer (In Preparation).

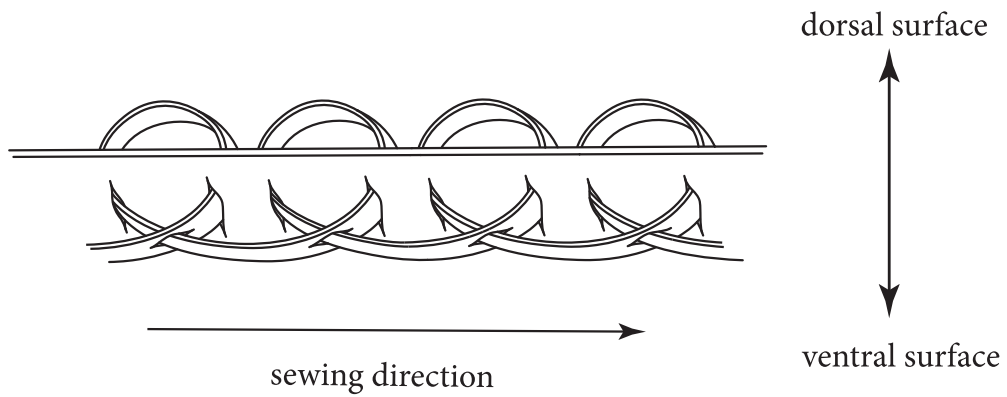


Fig. 6. Diagram of the continuous sewing inside the edge in Egyptian Museum Cairo JE 92688.
 Inset: the stitching that secures the braids at the ventral surface of the treadsole includes the transverse strips of the insole. Photography by A.J. Veldmeijer. Courtesy of the Ministry of State for Antiquities/Egyptian Museum Authorities. Scale bar is 10 mm. Drawing by E. Endenburg/A.J. Veldmeijer. Drawing not to scale.



Fig. 6. inset.

continuous stitching (figure 6), which reinforces the edge construction. Only an occasional stitch secures the braids at the ventral surface of the treadsole. A line of stitches lengthwise down the centre, appearing as short stitches at the dorsal surface of the insole, secures the central braid under the treadsole. Note that in the right sandal this row of stitches runs off centre (figure 6 inset). The braids, which are severely worn (especially at the right sandal), are made of a tough, woody material too. In this, it compares well with the material of the braids in other Fibre Composite sandals.

The strap complex consists of three parallel strands, each of which is made by plaiting six strands in ‘over one, under one’ pattern around a thin core (figure 7). At the heel, each of them is inserted in the sole between the edge proper and the continuous reinforcement stitching. Towards the front, however, the three medial and lateral elements come together and form one thick front strap by ‘tying’ them (exactly how could not be determined) in decorative plaiting. This front strap is inserted through the sole layers and is, as are the back straps, secured at the ventral surface of the sandal by tying the end into a knot.

3.2. *Elongated Swayed Type*

3.2.1. *Sole*

The Elongated Swayed Type is by far the biggest group and represented by 33 examples (table 1; figure 8). The sandals are long and narrow and because the lateral edge is curved more markedly from the waist towards the front than the medial edge, the sandals are referred to as swayed. However, since the degree of curvature differs, some are less clearly swayed than others (compare Egyptian Museum Cairo TR 9 1+ 26 19 with Ashmolean Museum Oxford 1888.805). All sandals have a notch at the medial edge except four entries.⁷

One pair of sandals⁸ consists of only two sole layers (strips lengthwise for the insole with added decoration in red, and transverse strips for the treadsole). The sole in one sandal⁹ consists of two sets of three layers with the usual sequence (*i.e.* strips transversely, lengthwise and transversely for treadsole, midsole and insole respectively), that is put together to form one, relatively thick, sole.¹⁰

The ventral surface of the treadsole has braids along the edge and lengthwise down the centre in all but three sandals.¹¹ Although they must have functioned as protection of the treadsole, in several sandals the braid lengthwise down the centre is substituted with a strip of vegetable material,¹² suggesting another function. Possibly, it serves as protection of the stitches that further secures the strips of the sole, in the same way as a ring protects the screw from being pulled through. In two sandals¹³ strips are attached to the ventral surface in a com-

⁷ Metropolitan Museum New York 25.3.224; Petrie Museum of Egyptian Archaeology UC 28306i, UC 28306ii and UC 28306iv.

⁸ Ashmolean Museum Oxford QL 163A & B.

⁹ Museum of Fine Arts Boston 1978.559a.

¹⁰ Possibly a comparable construction is seen in Petrie Museum of Egyptian Archaeology UC 28015, in which the two sets are secured with stitches at the edge.

¹¹ It is uncertain whether American Museum of Natural History New York 95/2343 has braids or not.

¹² National Museums Scotland 1956.121, 1956.121a; *Sammlung des Ägyptologischen Instituts der Universität Heidelberg* 700 172.

¹³ Petrie Museum of Egyptian Archaeology UC 28330ii, UC 28362i.

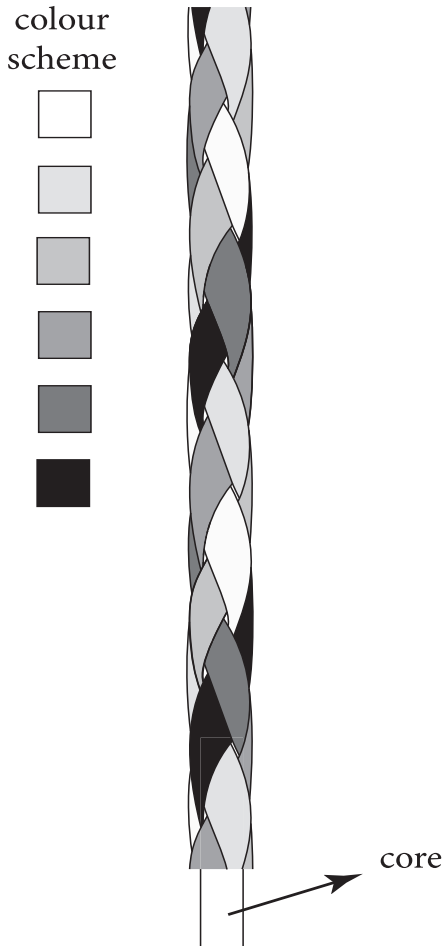


Fig. 7. The straps in Egyptian Museum Cairo JE 92688 are made of braiding six strands around a core. Drawing by A.J. Veldmeijer/E. Endenburg. Not to scale.

parable way as the braids. One sandal,¹⁴ however, is extraordinary because instead of braids, a complete treadssole of woven string is added. But there is another remarkable exception: a sandal has braids to the sole but ventral to this is added a leather treadssole (figure 8B).¹⁵

Although elaborate decoration of the insole is often seen with this type, not all of them are decorated.¹⁶ The decoration scheme is elaborate (table 1) and varies from an insole that is made of alternating red and light brown transverse strips,¹⁷ to decoration that is added on top of the insole, consisting of transverse, lengthwise and diagonal red strips.¹⁸ Red triangular decoration is also seen regularly,¹⁹ sometimes combined with transverse red strips.²⁰ There are two examples with beautiful, delicate openwork insoles including narrow diagonal strips in 'X' motifs²¹ and one sandal with a 'checkerboard' pattern — this is exceptional because the insole is plaited (over two, under two, shift one), rather than that it is made of the usual diagonal strips of palm leaf.²² But patterns with coloured strips of palm leaf are not the only means of decoration. In all sandals with a decorated insole, the strip that is used to secure the edge is coloured red. A coloured edge strip is the only coloured decoration of the sole in several sandals.²³

¹⁴ National Museums Scotland 1914.1039.

¹⁵ Ashmolean Museum Oxford 1888.805.

¹⁶ *Ägyptisches Museum und Papyrussammlung Berlin* AMZ 4311 (possibly); American Museum of Natural History New York 95/2343; Ashmolean Museum Oxford 1888.805; Museum of Fine Arts Boston 1978.559a, 1978.559b; National Museums Scotland 1914.1039; Petrie Museum of Egyptian Archaeology UC 28306iii, UC 28330ii.

¹⁷ Museum of Fine Arts Boston 1978.558a; National Museums Scotland 1956.121; Petrie Museum of Egyptian Archaeology UC 28306ii.

¹⁸ National Museums Scotland 1956.121a; Ashmolean Museum Oxford QL 163A & B; Petrie Museum of Egyptian Archaeology UC 28306i, UC 28306iv, UC 28362i, UC 28362ii, UC 34380i-iii; *Sammlung des Ägyptologischen Instituts der Universität Heidelberg* 700 172.

¹⁹ Ashmolean Museum Oxford 1888.804, 1924.19.

²⁰ *Ägyptisches Museum und Papyrussammlung Berlin* AM 20471; Egyptian Museum Cairo TR 9 1 + 26 17.

²¹ Museum of Fine Arts Boston 1978.558b; Egyptian Museum Cairo TR 9 1 + 26 18.

²² Metropolitan Museum New York 25.3.224.

²³ Only coloured edge: *Ägyptisches Museum und Papyrussammlung Berlin* AM 26588; Ashmolean Museum Oxford 1888.806, 1888.807; Egyptian Museum Cairo TR 9 1 + 26 19; Metropolitan Museum New York 02.4.201a & b; Museum of Fine Arts Boston 1978.560; Petrie Museum of Egyptian Archaeology UC 28304.

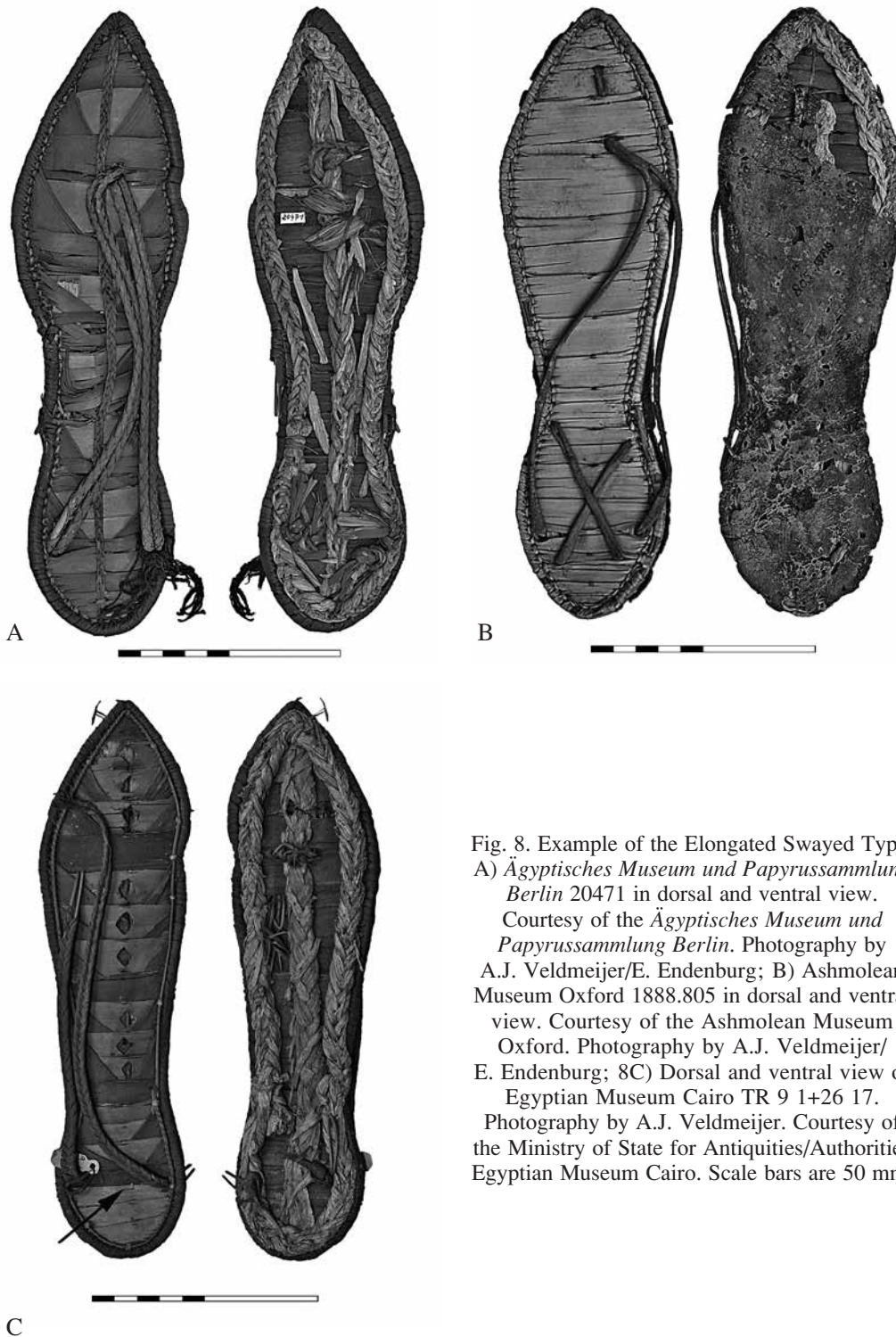


Fig. 8. Example of the Elongated Swayed Type.
 A) *Ägyptisches Museum und Papyrussammlung Berlin* 20471 in dorsal and ventral view. Courtesy of the *Ägyptisches Museum und Papyrussammlung Berlin*. Photography by A.J. Veldmeijer/E. Endenburg; B) Ashmolean Museum Oxford 1888.805 in dorsal and ventral view. Courtesy of the Ashmolean Museum Oxford. Photography by A.J. Veldmeijer/E. Endenburg; 8C) Dorsal and ventral view of Egyptian Museum Cairo TR 9 1+26 17. Photography by A.J. Veldmeijer. Courtesy of the Ministry of State for Antiquities/Authorities Egyptian Museum Cairo. Scale bars are 50 mm.

In some sandals — without any relation to the decoration — a thin rod is placed in the corner of the edge of the sandal and the insole (figure 8C).²⁴ In Egyptian Museum Cairo TR 9 1 + 26 19 this light brown (the 'original' colour of the material) rod is loosely wrapped with an extremely narrow red strip, but other rods lack this additional decoration. The rods are attached independently with several isolated stitches. This rod provides a pleasing aesthetic effect, but also protects, tiny as it is, the attachment of the insole strips by the edge sewing. In other sandals, this connection is further secured by stitching²⁵ but there are several without any reinforcement and/or aesthetic addition.²⁶

3.2.2. *Strap Complex*

Much care was given to the aesthetic effect of the strap complex. Most common are straps that are made by plaiting around a core (figure 7), either entirely made of red strips of palm leaf²⁷ or with one or more red-coloured strips combined with non-dyed strips. Several are made with two cores²⁸ but the majority are made with one core (these are usually much more bulky; the cores in the double-cored straps are much thinner). A small majority of the straps of the Elongated Swayed Type consists of two straps (*i.e.* the medial and lateral one) running in 'V' towards the front (figure 4A), but there are several sandals with a more elaborate strap complex: Metropolitan Museum of Art New York 02.4.201, for example, is made of 2 × 2 plaited straps (around a core) in 'V' and made with undyed strips of palm leaf. The straps in Museum of Fine Arts Boston 1978.559a are comparable to the ones described for the representative of the Wide Type (figure 4B & 5), but here are only two parallel straps on each side, rather than the three in the Dashur sandals. The Y-shaped straps are almost equally often represented.²⁹ One entry has straps that are made of narrow leather strips; this is the same sandal that has the leather treadsole (figure 8B).³⁰

²⁴ Ashmolean Museum Oxford QI 163A & B; Egyptian Museum Cairo TR 9 1 + 26 17, TR 9 1 + 26 18; Museum of Fine Arts Boston 1978.558b; National Museums Scotland 1956.121, 1956.121a; Petrie Museum of Egyptian Archaeology UC 28306i, UC 28306iv; *Sammlung des Ägyptologischen Instituts der Universität Heidelberg* 700 172.

²⁵ Ashmolean Museum Oxford 1888.804, 1888.805; Museum of Fine Arts Boston 1978.558a, 1978.559a, 1978.559b; Ashmolean Museum Oxford 1924.19; *Ägyptisches Museum und Papyrussammlung Berlin* AM 20471, AMZ 4311; Metropolitan Museum New York 02.4.201a & b; Petrie Museum of Egyptian Archaeology UC 28306ii.

²⁶ American Museum of Natural History 95/2343; *Ägyptisches Museum und Papyrussammlung Berlin* AM 26588; Ashmolean Museum Oxford 1888.806, 1888.807; Egyptian Museum Cairo TR 9 1 + 26 19; Metropolitan Museum New York 25.3.224a & b; Museum of Fine Arts Boston 1978.560; National Museums Scotland 1914.1039; Petrie Museum of Egyptian Archaeology UC 28304, UC 28306iii, UC 28330ii, UC 28362i, UC 28362ii, UC 34380i-iii.

²⁷ Ashmolean Museum Oxford 1888.804, QL 163A,B; Egyptian Museum Cairo TR 9 1 + 26 17, TR 9 1 + 26 18; Museum of Fine Arts Boston 1978.558a, 1978.558b; National Museums Scotland 1956.121a; Petrie Museum of Egyptian Archaeology UC 28306ii, UC 28362i, UC 28362ii, UC 34380i-iii (possibly).

²⁸ Egyptian Museum Cairo TR 9 1 + 26 17, TR 9 1 + 26 18; National Museums Scotland 1956.121a.

²⁹ Ashmolean Museum Oxford 1888.805; Egyptian Museum Cairo TR 9 1 + 26 19; Museum of Fine Arts Boston 1978.559a; National Museums Scotland 1956.121, 1956.121a; Petrie Museum of Egyptian Archaeology UC 28304, UC 28306i, UC 28306ii (possibly), UC 28306iii, UC 28330ii (possibly), UC 28362i, UC 28362ii; *Sammlung des Ägyptologischen Instituts der Universität Heidelberg* 700 172.

³⁰ Ashmolean Museum Oxford 1888.805.

3.3. Elongated Straight Type

3.3.1. Sole

There are two variants within this type: the Unnotched Variant and the Notched Variant. The Unnotched Variant is represented by five entries (figure 9), two of which are children's sandals. The sandals are symmetrical lengthwise and have a rounded, relatively wide heel and a constricted waist that is situated rather far towards the front — approximately halfway the length of the sandals. Towards the front, the width increases equally at both sides. The sandal has a pointed toe. In the Notched Variant (figure 10), the notch is placed at the front, separating the front edge in two small, more or less equal halves³¹ or into a 'big toe' and 'remaining toes' part.³² In these latter cases one would expect that the wider part is meant for the four remaining toes, but the straps in British Museum EA 26781 (figure 10B) are thus situated that the narrower part is meant for remaining toes, which can only be explained by assuming this is a mistake. Also the soles of some leather sandals have a comparable shape.³³



Fig. 9. Dorsal view of a pair of Elongated Straight, Unnotched Fibre Composite Sandals (Metropolitan Museum of Art, New York, Department Ratti 31.8.28a,b). Photography by A.J. Veldmeijer/E. Eendenburg. Courtesy of the Metropolitan Museum of Art New York. Scale bar is 50 mm.

³¹ *Ägyptisches Museum und Papyrussammlung Berlin* AM 3325.

³² British Museum EA 26781; Petrie Museum of Egyptian Archaeology UC 28010.

³³ A more extreme shape are those in which the shape of all toes are cut out of the sole (*e.g.* from Antinoé, see Montebault, 2000: 112-113; from Gebel Adda [ROM 973.24.2676, 973.24.2683; 973.24.2737] currently under study by the author).

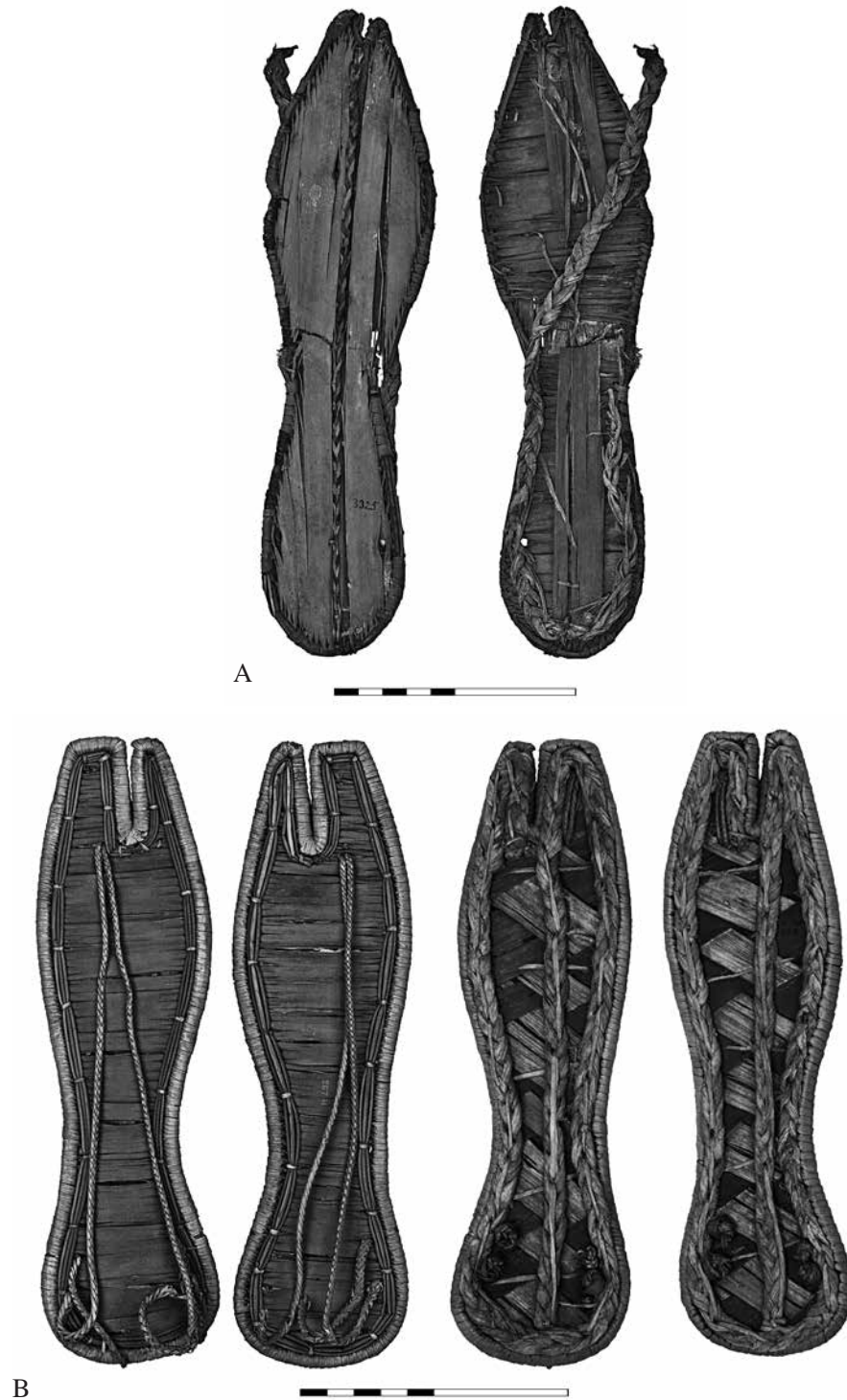


Fig. 10. Two examples of Elongated Straight, Notched Fibre, Composite Sandal. A) Dorsal and ventral view of right sandal *Ägyptisches Museum und Papyrussammlung Berlin* AM 3325. Photography by A.J. Veldmeijer/E. Eendenburg. Courtesy of *Ägyptisches Museum und Papyrussammlung Berlin*; B) Dorsal and ventral view of pair BM EA 26781. Photography by A. 't Hooft. Courtesy of the British Museum London. Scale bars are 50 mm.

3.3.2. *Strap Complex*

In all cases in which the strap complex is preserved, it shows a different layout than the most common one in Fibre Composite Sandals as it includes a heel strap (figure 10B). The pre-strap consists of the terminal ends of the back/front strap and the heel strap and inserts at two positions at each side of the sandal. In *Ägyptisches Museum und Papyrussammlung Berlin* AM 17081 this is not the case: here, the terminal ends are clad and thus inserted through the sole.

4. *Note on the Identification of Material and Colour*

The Fibre Composite Sandals in the Louvre collection (Montembault, 2000: 31, 39-43) are made of date palm leaf (*Phoenix dactylifera*) but it is not clear if all parts are from the date palm.

Only red is used to decorate the sandals with colour, but the sandal-maker has made clever use of the different shades of the natural colour of the materials themselves. It would be most interesting to chemically identify the red colour that was used and to see if this is the same as the red that was used in two-dimensional art and other coloured objects such as clothing and leather. A trial analysis was done some years ago on the reddish colour of several small fragments of fibre string that were excavated in Berenike (Dhaliwal, 1996: 259). However, the colour was rather faint and doubt was raised whether it was purposely added or a natural discoloration of the fibre due to post-depositional circumstances.

5. *Signs of Use*

Fibre Composite Sandals are often referred to as 'tomb sandals' and seen as too fragile to have been used. The construction of the Dashur sandals, although in technique comparable to the other types, is quite strong. The compressed appearance of the braids at the ventral surface of the treadsole, caused by the weight of the owner, as well as entirely worn away bit at the medial corner of the heel of the right sandal, clearly suggest that these sandals have been walked on. Probably, the damage of the edge of the sole and of the straps is caused by use too, although this could have occurred later too (post-depositional). The severe difference in wear between left and right and the fact that, at the right one, a small spot is entirely worn away, suggests that the owner had some sort of walking disability. However, nothing is visible at the dorsal surface of the insole, which seems strange if so much unequal force was applied to the sandal. In general, the wear of insole is surprisingly little compared to the wear of the braids at the treadsole.

Admittedly, most sandals show no wear that can be attributed to use with certainty, but there are several others that do. The braids in Museum of Fine Arts Boston 1978.559a shows a comparable condition as seen in the Dashur sandals (with only little wear of the insole), while dirt adheres to the ventral surface of the treadsole in Petrie Museum of Egyptian Archaeology UC 28015 and is also present, together with flattened braids in Petrie Museum of Egyptian Archaeology UC28010, indicating that the sandals have actually been used. Moreover, the reinforcement of the sole with a treadsole of woven palm fibre string and with a leather treadsole, suggests that the sandals were meant to be worn. The addition of a leather

treadsole is seen in other fibre sandals as well, such as Sewn Sandals (Veldmeijer, 2009a: 557). The addition of a cordage treadsole seems to have been largely limited to later periods, because most parallels date to Roman or even later times (*e.g.* Veldmeijer, 2010c). A large Sewn-Edge Plaited Sandal in the Egyptian Museum Cairo, however, is also reinforced with a cordage treadsole — this type of sandals is dated to the Pharaonic times (Veldmeijer, 2010b: 89). The mentioned types of reinforcement must have been due to the expected use of the sandals and/or the environment (including the composition of the ground) and adding an extra layer (be it leather or cordage) seems to have been a solution of all times to prevent rapid wear.

6. Discussion

Fibre Composite Sandals are, from a technological point of view, rather simple in concept, but nevertheless can be quite elaborate in construction, including many different elements besides the usual sole layers and straps (such as the rods at the dorsal surface of the insole). They all are, without exception, very well made, illustrating how simple technology can achieve high quality products with ease. The sole layers are secured with a sewn edge, but are often further secured with continuous sewing just inwards of the edge. Moreover, the braids at the ventral surface of the treadsole are added in such a way that the stitching also further secures the strips of vegetal matter that makes up the insole. In contrast, the straps seem rather fragile, despite the fact that much attention was given to them in terms of plaiting pattern and decorative effect. The fragility of most of these straps, however, might be far less than one would suppose and experiments carried out by wearing duplicated sandals are necessary to find answers to this supposition.

There are two examples that show a remarkable kind of decoration: openwork of the insole.³⁴ It is tempting to suggest that these were made in the same workshop, since this type of decoration is so different from all other insoles.

The biggest problem with Fibre Composite Sandals is the dating. Traditionally, the sandals are dated to post-Pharaonic times (Affholder-Gérard & Cornic, 1990: 158; Anonymous a, 1988: 69; Anonymous b, 1984: 15-16, 22-23; Anonymous c, 1997: 127; Fiore Marochetti *et al.*, 2003: 248; Galliano, 1997: 45; Petrie, 1899: 12-13; Weber, 1982: 28).³⁵ However, sometimes the context is very much disturbed, often due to looting, making the dating more complicated. Another problem is that often these ill-contexted pieces set the standard for the dating of the type, thus perpetuating the problem. If these dates are taken for granted, without any critical evaluation, it is not surprising that *all* comparable sandals are dated likewise, a pitfall notorious in archaeology. There is evidence that Fibre Composite Sandals are much older: the Dashur pair in the Cairo Museum might date to the reign of Snefru (4th Dynasty). Assuming this is correct, it shows that the technique was already known in Old Kingdom times, which also means that the sewn-edge was known much earlier than has been suggested thus far from the other types of sandals (Sewn-Edge Plaited and Sewn Sandals). This is confirmed by an undisturbed 4th Dynasty burial with a pair of Fibre Composite Sandals *in situ* in

³⁴ Egyptian Museum Cairo TR 9 1+26 18; Museum of Fine Arts Boston 1978.558b.

³⁵ The examples in the Louvre, Paris that are published by Montebault (2000: 39-43) are not dated.

the windings of the mummy (Fiore Marochetti *et al.*, 2003).³⁶ Thus, as Fiore Marochetti *et al.* (2003: 248) explains: *Il paraît nécessaire de reconsidérer l'ensemble des datations proposées jusqu'à présent pur ce type d'objets, rares à l'Ancien Empire, en accordant une plus grande attention au moment de la découverte.* This will be a focus of the final archaeological analysis of the AEFP.

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³⁶ I am indebted to Salima Ikram for confirmation of the dating of this particular burial.

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Summary of most important features and measurements of fibre composite sandals, showing collection and identification (first column), provenance (second column), date, according to the collection's archive (third column) and type/variant (fourth column). The details of the sole (orientation, measurements, number of sole layers, whether the insole is decorated or not and details of the treadsole) and the construction of the edge (reinforcement technique, notched or not and the presence/absence of decoration) is shown in the fifth, shared column. Details of the strap complex (including type, means of attachment, construction, presence/absence of decoration and if present, what kind of decoration and measurements) can be found in the sixth, shared column. Additional remarks are inserted in the last column. Measurements marked with * are approximate. In pairs, measurements are taken of the best preserved one. All measurements are 'as preserved'. D = diameter; L = length; T = thickness; W = width.

Collection/ Identification	Provenance	Date (collection's archive)	Type/Variant	Sole	Orientation	Measurements	No. Layers	Decorated?
Egyptian Museum, Cairo	JE 92688/SR 2/17918	Dashur (pyramid complex Snofroe)	Old Kingdom	broad	pair	L: 245. W heel: 72.2. W waist: 64.8. W front: 103.5-106.7. W strips insole: 17. W braid: 21.8. T: 15.8	3	no
Egyptian Museum, Cairo	9 1 + 26 19	?	?	elongated swayed	right	L: 255. W heel: 60.3. W waist: 40.5. W front: 84.5. W strips insole: 22.5. W braid: 11.2	3?	no
Museum of Fine Arts, Boston	1978.559b	?	Ptolemaic Period, 605- 30 BC	elongated swayed	left	L: 235. W heel: 63. W waist: 51. W front: 87. W strip insole: 9-20. W braid: 15.5. T: 14.5	3?	no
Museum of Fine Arts, Boston	1.978.560	?	Ptolemaic Period, 605- 30 BC	elongated swayed	left	L: 258. W heel: 60.5. W waist: 39.5. W front: 87. W strip insole: 14-18. W braid: 10-12. T: 12.2	3?	no
National Museum Scotland, Edinburgh	19.141.039	?	?	elongated swayed	right	L: 200. W heel: 52. W waist: 45*. W front: 67. W strips insole: 25	3?	no
American Museum of Natural History, New York	95/2343	?	Roman Period?	elongated swayed	left	L: 198. W: 73. T: 15	3?	no
Ashmolean Museum, Oxford	1888.804	Hawara	350-360 AD	elongated swayed	right	L: 255. W heel: 56.4. W waist: 42.2. W front: 68.8. W strips insole: 19. W braid: 11.5. T: 9.5	3	yes, red triangles
Ashmolean Museum, Oxford	1888.805	Hawara	350-360 AD	elongated swayed	left	L: 260. W heel: 64.4. W waist: 43.2. W front: 77. W strips insole: 29. W braid: 12. T: 10.6	4	no
Ashmolean Museum, Oxford	1888.806	Hawara	350-360 AD	elongated swayed	pair	L: 265. W heel: 66.6. W waist: 49.3. W front: 73.7. W strips insole: 21. W braid: 12.2. T: 11.7	3	no

Edge				Strap complex			Remarks		
Braids?	Reinforcement technique	Notched?	Decorated	Type	Attachment	Construction	Decoration	Measurements	
yes, secured with continuous stitching	Stitching inside edge	yes	no	Y-shaped, triple straps	Inserted through sole: knotted	Plaited (over 1, under 1) with core	no	W total: 19.4	Clearly worn. Note differences of front strap: due to wear?
yes, secured with single stitches	none	yes	red	Y-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	One red	D: 11.2	Front strap secured by stitching through sole the time. Note diagonal stitches at ventral surface.
yes, secured with continuous stitching	Stitching inside edge	yes, but slight	no	V-shaped	Inserted through sole: knotted	Braided with one core	No	W: 7.7. W one strip: 2.4	Registered as a pair, but not originally. Well made, but not decorated.
yes, secured with single stitches	none	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	Brown, beige and red strips; two different materials.	D: 5. W one strip: app. 2	-
no, string	none	yes	no	V-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	No	?	Wear and adhering dirt.
?	none	yes	no	V-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	One dark (black?) coloured strip.	?	Roughly made sandal (edge). Worn.
yes, secured with continuous stitching	Stitching inside edge	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 5.5	Front strap secured by stitching through sole twice.
yes, secured with continuous stitching	Stitching inside edge	yes	no	Y-shaped (see remarks)	Inserted through sole: stitched (see text)	Leather	No	W: 3.7	Leather partially deteriorated.
yes, secured with single stitches	none	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	One dark	D: 5.6. W strip: 2	Front strap secured by stitching through sole ones. Note finishing at medial heel in the left sandal.

Ashmolean Museum, Oxford	1888.807	Hawara	350-360 AD	elongated swayed	pair	L: 270. W heel: 61.3. W waist: 38.9. W front: 69.5. W strips insole: 17. W braid: 11.2. T: 11.8	3	no
Ashmolean Museum, Oxford	1924.19	?	?	elongated swayed	pair	L: 275. W heel: 61.7. W waist: 43.9. W front: 78.8. W strips insole: 19. W braid: 12. T: 12	3, possibly 4	yes, red triangles and narrow braid (over 1, under 1) lengthwise over centre
Ashmolean Museum, Oxford	QL 163A,B	?	?	elongated swayed	pair	L: 280. W heel: 67. W waist: 48*. W front: 78.3. W strips insole: ?. W braid: 10. T: 13	2, but see remarks	yes, red transverse and diagonal strips; one strip lengthwise
Egyptian Museum, Cairo	9 1 + 26 17	?	?	elongated swayed	left	L: 255. W heel: 58.4. W waist: 44.6. W front: 69.1. W strips insole: 17.7. W braid: 11.2. T: 10.6	3?	yes, red triangles and transverse strips
Egyptian Museum, Cairo	9 1 + 26 18	?	?	elongated swayed	left	L: 260. W heel: 55. W waist: 37. W front: 71.3. W strips insole: 17.5. W braid: 12.5. T: 9.9	3?	yes, red strips and openwork
	ÄM 20471	Garara?	?	elongated swayed	pair	L: 280. W heel: 67.5. W waist: 47. W front: 79.9. W strips insole: ?. W strips treadsole: ?. T: 11.3	3	yes, red strips and narrow braid (over one, under one)
Ägyptisches Museum und Papyrussammlung, Berlin	ÄM 26588	?	?	elongated swayed	left	L: 255. W heel: 63. W waist: 47.3. W front: 76.3. W strips insole: 18. W strips treadsole: 15?. T: 9.5	3	no

yes, secured with single stitches	none	yes	red from notch to front	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Two red	D: 4.8. W strip: 2	Front strap secured by stitching through sole ones.
yes, secured with continuous stitching	Stitching inside edge	yes, but slight	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Two(?) red	D: 6.5. W strip: 2	Front part of straps in both sandals broken off.
yes, secured with single stitches	Loosely wrapped rod	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 5.8. W strip: 2	Front strap secured by stitching through sole twice.
yes, secured with single stitches	Beige rod loosely wrapped with red	yes	red	V-shaped	Inserted through sole: knotted	Braid with two cores	Red	W: 5.8	Note the cut out diamonds in the insole.
yes, secured with single stitches	Beige rod loosely wrapped with red	yes	red	V-shaped	Inserted through sole: knotted	Braid with two cores	Red	W: 5.3	Front strap secured by stitching through sole.
yes, secured with continuous stitching	Stitching inside edge	yes	red	V-shaped, double straps	Inserted through sole: knotted	Plaited (over 1, under 1) with core	D: 8.6	Three sole layers if counting the decorative red strips as separate layer. Front strap secured by stitching through sole three times. Damage at heel right sandal.	
yes, secured with single stitches	none	yes	red	?	Inserted through sole	?	?	?	Consolidated.

Ägyptisches Museum und Papyrussammlung, Berlin	ÄMZ 4311	?	?	elongated swayed	right	L: 265. W heel: 3 60.6. W waist: 48. W front: 75.9. W strips in- and treadsole: too badly preserved. T: 10.2	?	
Metropolitan Museum of Art, New York	02.4.201a,b	Fayum	Late Ptolemaic- Roman Period	elongated swayed	pair	L: 270. W heel: 4 65.5. W waist: 49. W front: 82. W strips insole: 17.5. T: ?	no	
Metropolitan Museum of Art (Ratti Department), New York	25.3.224a,b	Deir el- Bahari, burial XXIV	Roman Period	elongated swayed	pair	L: 275. W heel: 3? 65.6. W waist: app. 42.3. W front: 83.7. W strips insole: 3. T: ?	yes, plaited insole (over 2, under 2, shift 1) with red and beige strips	
Museum of Fine Arts, Boston	1978.558a	?	Late Period, 664-332 BC	elongated swayed	left	L: 265. W heel: 3 61.8. W waist: 42.6. W front: 72.3. W strips insole: 16-24. T: 8.6	yes, red and beige strips insole	
Museum of Fine Arts, Boston	1978.558b	?	Late Period, 664-332 BC	elongated swayed	left	L: 270. W heel: 3 54.6. W waist: 38.1. W front: 74. W strips insole: 13.5. T: 10.8	yes, red strips and openwork	
Museum of Fine Arts, Boston	1978.559a	?	Ptolemaic Period, 605- 30 BC	elongated swayed	left	L: 295. W heel: 2x3 (see 61.8. W waist: remarks) 50. W front: 85. W strips insole: 18.5-24. W braid: app. 10.5. T: 13.	no	
National Museum Scotland, Edinburgh	1956.121	?	Late Period to Roman Times	elongated swayed	right	L: 270. W heel: 3 62.6. W waist: 48*. W front: 74.5. W strips insole: 20. W braids: 11.6. T: 12.	yes, red strips	

yes, secured with continuous stitching	Stitching inside edge	yes	?	V-shaped	Inserted through sole: stitched	Plaited (over 2, under 2, shift 1) with core	?	D: 7*	Front strap secured by stitching through sole twice. Worn but especially damaged due to (post-) depositional circumstances.
yes, secured with continuous stitching	Stitching inside edge	yes	red	V-shaped, double straps	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Two red	D: 5.3. W strip: 3.3	-
yes, secured with single stitches	none	no	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red and beige	D: 4*	Ventral surface could not be studied.
yes, secured with continuous stitching	Stitching inside edge	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 6. W strip: 2	Registered as pair, but not originally (both left ones). Front strap secured by stitching through sole twice.
yes, secured with single stitches	Beige rod loosely wrapped with red	yes	red	V-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 5.4. W strip: 2	Registered as pair, but not originally (both left ones). Front strap secured by stitching through sole twice?
yes, secured with continuous stitching	Stitching inside edge	yes	no	Y-shaped, double straps	Inserted through sole: knotted	Plaited (over 1, under 1) with core	No	D: 8.8	Worn (see text). Not decorated. Front strap secured by stitching through sole twice. Registered as a pair, but not originally. Unique construction.
yes, secured with single stitches	Beige rod loosely wrapped with red	yes	red	Y-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	Red and beige	D: 5.9. W strip: 3	Front strap secured by stitching through sole twice. Registered as pair with 121A but not originally.

National Museum Scotland, Edinburgh	1956.121a	?	Late Period to Roman Times	elongated swayed	left	L: 285. W heel: 40. W waist: 47*. W front: 77. W strips insole:?. W braid insole: 4. W braids treadsole: 10. T: 11	3	yes, red transverse and diagonal strips and narrow braid (over 1, under 1) lengthwise over centre
Petrie Museum of Egyptian Archaeology UCL, London	UC 28304	?	Late Roman Period? (395CE- 250CE)	elongated swayed	pair	(right one) L: 248. W heel: 60.4. W waist: 44.4. W front: 77.4. W strips insole: app. 15.5. W strips treadsole: 18.5. W braid: app. 13. T: 8.3	3	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28306i	?	?	elongated swayed	pair	(right one) L: 261. W heel: 65.6. W waist: 48.3. W front: 75.1. W strips insole: app. 25. W braid: app. 13. T: 11	3?	yes, red transverse and diagonal strips; one strip lengthwise
Petrie Museum of Egyptian Archaeology UCL, London	UC 28306ii	?	?	elongated swayed	right	L: 255. W heel:61.4. W waist: 46.9. W front: 77.8. W strips insole: app. 28. W braid: app. 6.3. T: app. 7.5	3	yes, red and beige strips insole
Petrie Museum of Egyptian Archaeology UCL, London	UC 28306iii	?	?	elongated swayed	right	L: 250 (incomplete). W heel: 50. W waist: 42.3. W front: 75.3. W strips insole: app. 18.5. W braid: app. 14.5. T: app. 8.7	3	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28306iv	?	?	elongated swayed	pair	(right one) L: 280. W heel: 58.3. W waist: 43.4. W front: 73.7. W strips insole:?. W braid: app. 15. T: app. 10.5	2	yes, red transverse and diagonal strips and narrow braid (over 1, under 1) lengthwise over centre

yes, secured with single stitches	Beige rod loosely wrapped with red	yes	red	Y-shaped	Inserted through sole: knotted	Braid with two cores	Red	W: 6.5-8. T: 3	Front strap secured by stitching through sole twice. Registered as pair with 121, but not originally.
yes, lengthwise down the centre and along edge	none	yes	yes, several red areas alternate with the beige, non-coloured strips	Y-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	Two red	D: 4.2	Front strap secured by stitching through sole twice. Left one rather damaged.
yes, along edge, partially down the centre. Small piece of braid down the centre too.	Beige rod loosely wrapped with red (mostly lost)	no	red	Y-shaped	Inserted through sole: stitched	Plaited (over 2, under 2, shift 1) with core	Two red	D: 4.9	Left sandal slightly damaged.
yes, secured with continuous stitching	Stitching inside edge	no	red	Y-shaped?	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	too little preserved.	Front strap secured by stitching through sole ones?
yes, lengthwise down the centre and along edge	none	yes	no	Y-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	Dark and light	D: appr. 5.5	Damaged.
yes, secured with single stitches	Beige rod loosely wrapped with red (mostly lost)	no	red	?	Inserted through sole	?	?	?	Relatively badly damaged, at least partially due to wear.

Petrie Museum of Egyptian Archaeology UCL, London	UC 28330ii	?	Roman Period? (395CE-30BCE)	elongated swayed	right	L: 170. W heel:?. W waist:?. W front: 72. W strips insole: 18	3	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28362i	?	Roman Period (395CE-30BCE)	elongated swayed	pair	L: 285. W heel: 69. W waist: 45*. W front: 84. W strips insole: 17. W strips treadsole: 19-28.5	2	yes, red transverse and diagonal strips and narrow braid (over 2, under 2) lengthwise over centre
Petrie Museum of Egyptian Archaeology UCL, London	UC 28362ii	?	?	elongated swayed	left	L: 270. W heel: 62. W waist: 40*. W front: 78. W strips insole: 18. W strips treadsole: 12	2	yes, red transverse and diagonal strips and narrow braid (over 2, under 2) lengthwise over centre
Petrie Museum of Egyptian Archaeology UCL, London	UC 34380i-iii	?	?	elongated swayed	?	Not measured: several fragments	4?	yes, red transverse and diagonal strips; one strip lengthwise
Sammlung des Ägyptologischen Instituts der Universität, Heidelberg	700 172	?	?	elongated swayed	pair	L: 275*. W heel: 65*. W waist: 50*. W front: 78*	3?	yes, red transverse and diagonal strips; one strip lengthwise
Ägyptisches Museum und Papyrussammlung, Berlin	ÄM 3325	?	?	elongated straight/notched	right	L: 268. W heel: 59.2. W waist: 38.2. W front: 70.2. W strips insole: 16.5. W braid insole: 3.6. W braids treadsole: 8.4. T: 10	3	yes, narrow braid (over 1, under 1) lengthwise over centre

no, strips	none	yes	no	Y-shaped?	Inserted through sole	Plaited (over 1, under 1) with core	No	W: 4*	Only front three quarters of length preserved.
no, strips	none	yes, but slight	red	Y-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 7.5*	Front strap secured by stitching through sole? Note the difference in preservation. Measurements of right sandal.
yes, secured with single stitches	none	yes	red	Y-shaped	Inserted through sole: knotted	Plaited (over 2, under 2, shift 1) with core	Red	D: 5*	Front strap secured by stitching through sole? Note hole in the front edge.
yes?	none	?	red	?	Inserted through sole	Plaited (over 2, under 2, shift 1) with core	Red?	Not measured	Fragments, assumed to belong to one sandal.
yes, secured with single stitches	Beige rod loosely wrapped with red	yes, but slight	red	Y-shaped	Inserted through sole: knotted	Plaited (over 1, under 1) with core	Two red	D: 6.5*	Front strap secured by stitching through sole twice. The treadsole has a thick strip lengthwise down the centre instead of a braid.
yes, secured with single stitches	none	yes	yes, several darkly coloured areas alternate with the beige, non-coloured strips	Y-shaped	Inserted through sole	?	?	?	The treadsole has a thick strip lengthwise down the centre instead of a braid.

British Museum, London	EA 26781	?	?	elongated straight/ notched	pair	L: 235. W heel: 65.5. W waist: 44.5. W front: 66.5. W strips insole: 20. W strips treadsole: 15. W braids: 7.7. T: 9.2	3	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28010	Hawara	Roman Period (395CE- 30BCE)	elongated straight/ notched	right	L: 235. W heel: 67. W waist: 45*. W front: 67. W strips insole: 23. W strips treadsole: 10-17. W braids: 10.5. T: 10	3?	no?
Petrie Museum of Egyptian Archaeology UCL, London	UC 28330i	Hawara?	Roman Period? (395CE- 30BCE)	elongated straight/ unnotched	right?	L: 245. W heel: 70. W waist: 50*. W front: 69. T: app. 6	3	no?
Ägyptisches Museum und Papyrussammlung, Berlin	ÄM 17081	Abusir el Meleg	?	elongated straight/ unnotched	pair	L: 145. W heel: 53.3. W waist: 36.3. W front: 51. W strips insole: 2.5-3. W strips treadsole: 16.5. T: 5.8	2	yes, plaited insole (over 2, under 2, shift 1) and red strip
Metropolitan Museum of Art (Ratti Department), New York	31.8.28a,b	Kharga, el-Bayawat, tomb XI	IVth c. AD	elongated straight/ unnotched	pair	L: 135. W heel: 47.6. W waist: app. 40. W front: 53.4. W strips insole: app. 15. T: ?	? (see remarks)	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28015	Hawara	Roman Period (395CE- 30BCE)	elongated straight/ unnotched	?	L: 225. W heel: 65. W front: app. 65. W strips insole: 10-15.	2x3? (see remarks)	no

yes, secured with single stitches	three rods inside edge	no	no	Y-shaped + heel strap	Inserted through sole: knotted	Plaited (over 1, under 1) with core	D: 3*	Front strap secured by stitching through sole, emerging again from insole. The rods are, at the ventral surface of the treadsole, secured from side to side (see text).
yes, secured with single stitches	none?	no	no	Y-shaped	Inserted through sole: knotted	Plaited with core	?	D: 2.7 Dirt adheres to braids at ventral surface, especially at the heel.
yes, secured with single stitches	?	no	no	Y-shaped + heel strap	Inserted through sole	?	?	-
no	Loosely wrapped rod	no	no	Y-shaped + heel strap	Inserted through sole: knotted	Twisted	no	D front: 4.2. D back: 2.8 Children's sandals.
no, entire treadsole of woven string	none	no	no	Y-shaped + heel strap	Inserted through sole: fastening uncertain (see remarks)	Plaited (over 2, under 2, shift 1)	No	D: 4.2 Establishing number of sole layers and study of ventral surface not possible.
no	none	no	no	?	Back straps inserted twice	Delicate braids	Red and beige	? Material identification forthcoming. No braids at treadsole. Adhering dirt. Note stitches at front.

Petrie Museum of Egyptian Archaeology UCL, London	UC 28305	?	Late Roman Period? (395CE- 250CE)	elongated straight/ unnotched	pair	(left one) L: 230. W heel: 64.3. W waist: 38.7. W front: 62.6. W strips insole: 27.3. W strips treadsole: 20. T: 5.6	3	no
Petrie Museum of Egyptian Archaeology UCL, London	UC 28330iii	?	Roman Period? (395CE- 30BCE)	elongated straight/ unnotched	?	L: app. 235. W heel: 66. W waist: 50*. W front: 67. W strips insole: 12- 16. T: 8	5	no

no	Beige rod loosely wrapped with red and dark coloured rod	no	no	Y-shaped + heel strap	Inserted through sole: knotted	Plaited (over 1, under 1) without core	yes, small gold(?) button with circular impression as junction of the two elements of the Y-strap (cf. Coils)	D: 2.5	Strong constructed edge. Front strap coming back from ventral surface and inserted again close to the front edge. Straps consists of two times two narrow braids.
no	rod inside edge	no	no	?	Inserted through sole	?	?	?	Strap complex probably compable to e.g. UC 28305.

