Studies of Ancient Egyptian Footwear. Technological Aspects. Part XVI: Additional Pair of Leather Open Shoes

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Abstract

The manufacturing technology of an extraordinary pair of leather open shoes in the Egyptian Museum, Cairo is described and discussed. A detailed comparison with previously described footwear shows that some technological features (especially the configuration of the pre-strap) as well as the shape indicate a close relationship with the leather composite sandals and the eared sandals. Other leather open shoes have several characters in common (sole/upper construction), although other details, such as the extra closing system on top of the upper, are unique. A date comparable to the aforementioned sandals is suggested for the pair of shoes, i.e., 18th and 19th Dynasty.

Introduction[1]

The pair of leather open shoes, housed in the Egyptian Museum Cairo (fig. 1), shows a varying degree of preservation. The right one (48363) is less complete, missing large part of the front of the medial upper. Moreover, the heel is damaged, allowing the study of the edge of the sole that would have been covered otherwise. The strap complex is largely missing. The remnant of the insole shows large holes; the sole in general is especially worn at the front due to post-depositional circumstances. The left one (48362) is in better condition and the upper is largely intact. However, the lateral part shows a large hole. The strap complex is much more intact but still not complete. The ventral surface of the treadsole in both is nearly without any damage at all. The terminology used by the Ancient Egyptian Footwear Project (AEFP) follows Goubitz et al.[2] but with modifications.[3]

[1] I am grateful to the Supreme Council of Antiquities, Dr. Zahi Hawass, and Dr. Wafaa el-Saddik for permission to access the footwear collection in the Egyptian Museum Cairo and to publish my photographs. I thank the authorities of the Egyptian Museum Cairo (M. Abdu, N. Abd El Fatah Azab, I. Abdel Gwad, S. Ahmed Ali, A. Elshamy, H. Hassan, N. Ismail, Z. Tawfik) for their kind help. I also thank the authorities of the various other collections, which allowed me to study the material under their care. The Netherlands-Flemish Institute Cairo (NVIC) is acknowledged for their invaluable help. I am indebted to many people for their kind help and collaboration in various ways: G. Bergamini, W. V. Davies, K. Finneiser, J. J. Janssen, F. Marohn, S. Quirke, A. J. Spencer, E. Vassilika, and H. Whitehouse. Furthermore, I thank E. Endenburg for photographing. E. Endenburg is also thanked for his technical drawings and assistance in the field. I am grateful to C. van Driel-Murray for useful discussions. Special thanks go to S. Winterbottom, whose comments and suggestion, as well as the corrections of the English greatly improved the work. The Netherlands Organization for Scientific Research (NWO) and Fam. J. Endenburg (Texel, The Netherlands) has partially funded this research. Study of the material in Egypt in fall 2008 has been made possible by a grant from the Michela Schiff Giorgini Foundation.

[2] Olaf Goubitz with Carol van Driel-Murray and Willy Groenman-van Waateringe, *Stepping Through Time* (Zwolle, 2001).

[3] André J. Veldmeijer, *Tutankhamun's Footwear* (Norg, 2010).



Fig. 1a. The pair of leather open shoes 48362/48363. Lateral, dorsal and medial view of the left shoe respectively and the dorsal view of the right shoe. All photographs by the author. Photographs 1a through 1g are by courtesy of the Supreme Council of Antiquities/Authorities Egyptian Museum Cairo.



Fig. 1b. Close up (dorsal view) of the heel area of the right shoe. Note the heel strap (arrow). Scale bar in cm. Photograph by the author.



Fig. 1c. Close up (dorsal view) of the toe area of the left shoe. Scale bar in cm. Photograph by the author.



Fig. 1d. Side view of the medial pre-strap of the left shoe. Note the differences in construction of the sole/upper at the heel and elsewhere (see text). Scale bar in cm. Photograph by the author.



Fig. 1e. Oblique view of the front terminal end of the left shoe, showing the inner side of the lateral part of the upper. Clearly visible is the construction of the sole/upper seam and the edge binding. Scale bar in cm. Photograph by the author.

Description

Sole

The sole (fig. 2a) has a rounded heel and a constricted waist from which the pre-straps emerge. From here, towards the front, the width increases but mainly at the lateral side of the shoe, displaying a distinct convex curvature. The medial edge has a very slight curvature. Both sides terminate in a distinctly pointed, slightly upwards curled toe.

The sole consists of three sole layers (figs. 1d, 2b, 2c). The insole has an additional, thick narrow strip of leather along its perimeter, which can be understood as a reinforcement of the seam: since it is placed on the upper's lower edge, it helps to secure the latter to the sole (figs. 1c, 2b, 2c). At the ventral surface of the treadsole, tiny, widely spaced running stitches of narrow leather thong secure the sole layers. Although it could not be observed which layers exactly, there can be little doubt that all sole layers *and* the strip at the dorsal surface of the insole, along the perimeter, were included, as



Fig. 1f. Dorsal view of the medial side, showing the back strap being pulled through slits in the upper's leather. Scale bar in cm. Photograph by the author.



Fig. 1g. Dorsal view of the closing system in the left shoe. The strip in the middle of the photograph is the front strap. At the lower left corner, just visible, is the double layer of the upper's leather. Scale bar in cm. Photograph by the author.

well as the edges of the outer attachment strip and upper (see below). A hole in the lower part of the upper of the right shoe (figs. 1a, 1b, 2b) shows leather thong whip stitches. They seem to secure the strip at the insole to the insole and might be a repair: this construction is not possible in the front part of the shoe, which differs from the heel (see below; cf. figs. 2b, 2c).

The sole/upper construction is extraordinary (figs. 2b, 2c). Focussing on the heel part (fig. 2b), seen from the outside, an attachment strip is sandwiched between the insole and midsole and is pulled tightly over the edge of the insole and of all the elements above it. It must have been included in the stitching of the sole, for, if it had not been, the sandwiched part would have been prone to popping out between the two sole layers: this is not observed. On the contrary, the attachment strip is still perfectly in place. The same can be assumed for the edge of the upper for the same reason: seen from the inside, the ventral edge of the upper is put between the strip at the insole and the insole itself. The dorsal edge of the attachment strip is secured to the upper with whip stitches of sinew (figs. 1c, 1e, 2b, 2c).

The front part, strangely enough, seems to be different (cf. figs. 2b, 2c), but due to the completeness of the shoes, there cannot be certainty on several features. Three sole layers can be seen from the side, while only two are visible at the heel (fig. 1d). Assuming that the number of sole layers were the same, as it would not make sense to add an extra layer to the front of the shoe (because that is the part that is less prone to wear relative to the heel), this means that the outer attachment strip was *not* folded over the insole's edge but only over the strip at the insole (fig. 2c). The change in construction must occur at the attachment of the pre-straps, but this could not be observed due to

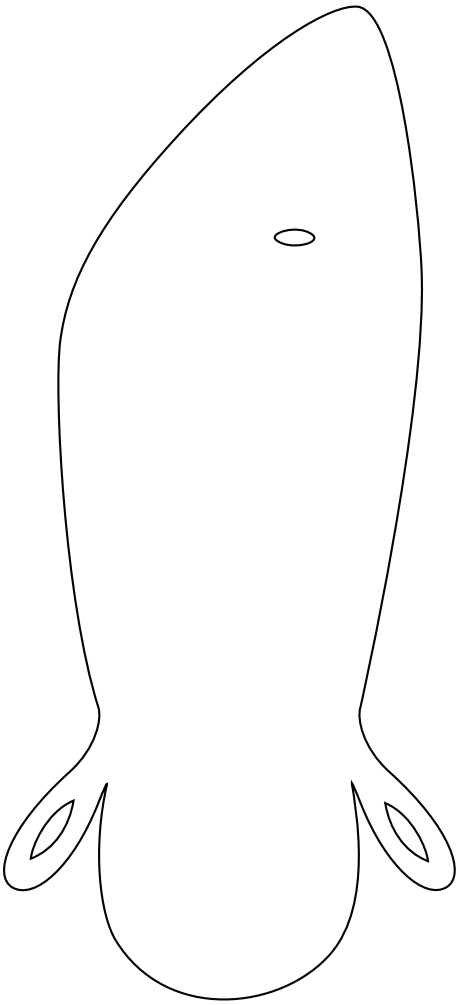


Fig. 2a. The shape of the sole. Not to scale. Drawing by E. Endenburg/A. J. Veldmeijer.

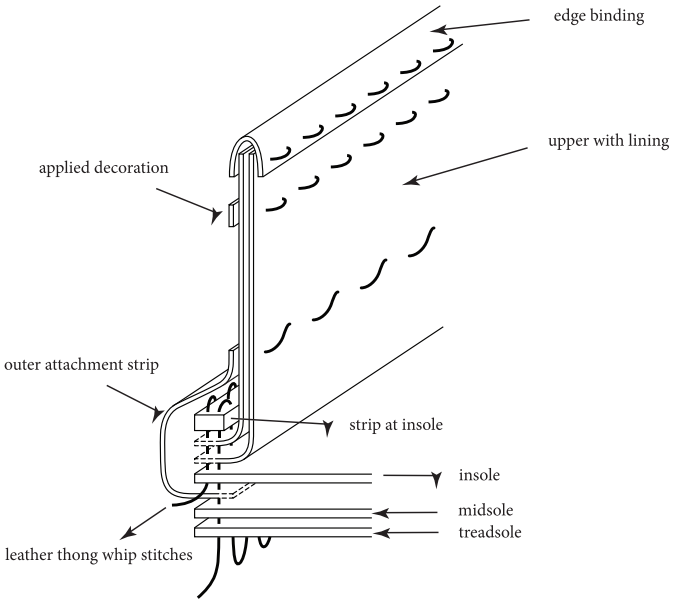


Fig. 2b. Sole/upper construction of the heel part. Not to scale. Drawing by E. Endenburg/A. J. Veldmeijer.

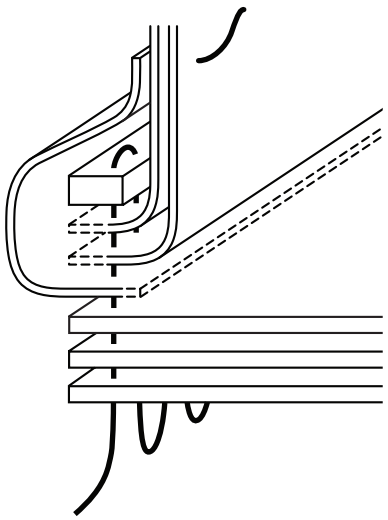


Fig. 2c. Sole/upper construction of the front part. Not to scale. Drawing by E. Endenburg/A. J. Veldmeijer.

the upper that obscures the view. However, as this is seen in both shoes, there can be no doubt that this is done deliberately and might have been done to provide a construction.

Upper

The upper consists of two thicknesses (fig. 1g). The dorsalmost edge is highest at the heel and decreases in height continuously towards the front (fig. 2d). It ends shortly before the point of the toe at either side, leaving an open space of about 1 cm wide (figs. 1c, 1d). The outer attachment strip, however, continues and both sides meet each other at the point of the sole proper.

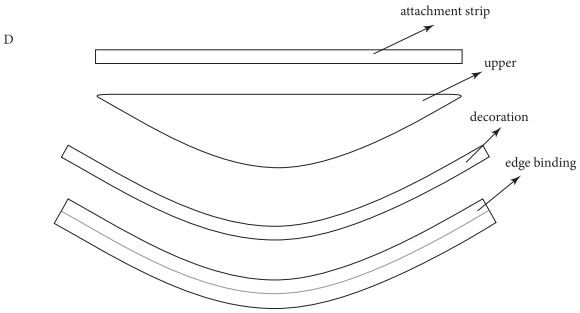


Fig. 2d. Cutting pattern (only one layer of the upper is drawn). Not to scale. Drawing by E. Endenburg/A. J. Veldmeijer.

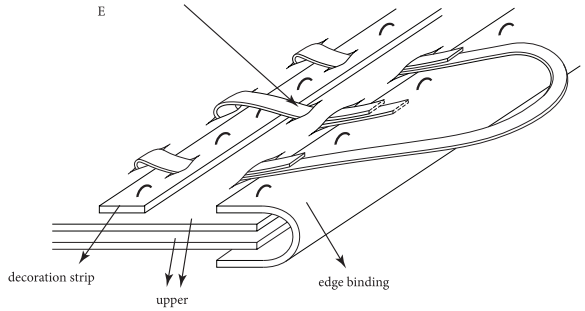


Fig. 2e. Closing system. Not to scale. Drawing by E. Endenburg/A. J. Veldmeijer.

Table 1. Measurements of the pair of leather open shoes in the Egyptian Museum, Cairo (in mm)

	left (48362)	right (48363)
L	300	298
W heel	79.0	77.3
W waist (includes overlapping upper)	91.5	98.5
W front	103.0	98.4
H upper (approximately, because folded)	54	41.9
T sole (lower two sole layers)	7.0	6.6
W decoration edge (binding, strip)	7.1, 4.5	12.8 (total)
Closing system (lateral)	15×17	(not preserved)

An edge binding, most likely in a bright colour (green or red) connects the two layers as it is folded over their edges (figs. 1e, 1f, 1g, 2b). Moreover, it provides a decorative finishing touch. It is secured at its edge with widely, but evenly spaced running stitches of probably sinew. Below the edge binding (approximately 3 mm) runs parallel to it a narrow decoration strip (width of about 3 mm), stitched lengthwise down the center to both layers of the upper with widely, but evenly spaced running stitches of probably sinew too (figs. 1f, 1g, 2b).

Strap complex/closing system

Emerging from the waist is a pre-strap that is integrally cut from the tread- and midsole (figs. 1d, 2a). The upper element, which is cut out from the midsole's leather, is clad in stair-step overlap with a strip of red leather. Note that there is a cladding lengthwise as well, which might have been green, as parallels suggest (see below). The lower element, which is cut out from the treadsole, however, is not clad. They are kept together by the attachment of the back strap. The pre-straps slightly taper and their terminal ends have a cut lengthwise for the reception of the back- and heel strap. A narrow strip of leather is simply wound once or twice around the edge of the slit and runs behind the heel (heel strap) of the upper and, coming from either side, towards the front (back strap). Here, it was attached

to a relatively long front strap consisting of a lengthwise folded strip of leather (figs. 1g, 2e) that is inserted in a hole in the sole and secured at the ventral surface of the treadsole by means of an enlarged terminal end. Exactly how the back strap was attached to the front strap cannot be determined as the straps in both shoes are incomplete. Before the attachment to the front strap, the back strap is led through two slits in the upper, close to where the pre-strap starts (fig. 1f). The heel strap is not pulled through slits (fig. 1b).

Approximately halfway between the waist and the front of the shoe is attached, at either side of the upper, a small semi-circular, closing system that served to hold the upper nearly closed (figs. 1g, 2e). It consists of a narrow, lengthwise folded strip of leather that is inserted at either side at the dorsal surface of the upper, just next to the edge of the upper's edge binding.[4] The ends emerge at the outer side of the decoration strip and is inserted again in the decoration strip, emerging again from the same slit as the first insertion mentioned. In the center of this semi-circular element is inserted an independent but comparable strip at right angles. It is inserted next to the edge binding too, but runs over the decoration strip and inserts shortly away from the edge rather than *through* the strip as with the outer two elements (fig. 2e, arrow). It is certain that this semi-circle-with-central-strip secured the two sides of the upper to the front strap, being inserted in a slit in the latter. Unfortunately exactly how cannot be identified anymore due to the incompleteness. In the left shoe, the lateral semi-circular element, however, has a discoloration which is of the same width as the center strip. This suggests that the strip somehow secured the two semi-circular elements.

Construction Sequence

The shoes allow a reconstruction of the manufacturing sequence (fig. 3). After having prepared the leather (this has not been investigated, but probably the thin upper's leather was oil cured, the most common procedure in Pharaonic Egypt) and cut to shape (and the cladding of the pre-straps, edge binding, decoration strip and probably also the closing system added), all elements (sole layers, outer attachment strip, inner strip and upper) were put flat on top of each other in proper sequence (fig. 3a). Note that it could not be established whether the edge of the outer attachment strip runs over the edge of the upper (thus sandwiched between them and the strip at the insole) or vice versa (as drawn in fig. 2c). Moreover, the extent of the edges of these two elements could not be observed either, hence the dashed lines in figures 2b, 2c. The outer attachment strip thus would stick out at the outer side of the sole and the upper would be lying more or less flat on top of the insole. The layers were then secured with the leather thong stitches. Next, the upper was put upright and the attachment strip pulled over the strip at the insole (and over the edge of the insole at the heel), after which the two were stitched together (fig. 3b). Finally, the strap complex would have been put in place.

Wear

The soles do not show much wear that indicate use. The damage of the heel in the right shoe might have been caused by walking on it. The damage to the strap complex might have been caused by its use, but breakage of the back strap could also have happened afterwards. The damage to the closing system is equally ambiguous although the aforementioned discoloration suggests that one part was tied on top of the other. The damage to the upper itself does not seem to have been due to having been worn (much). Thus, judging by the lack of major wear the shoes do not seem to have been worn intensively. However, they are well made pieces of footwear with thick soles, an upper with lining,

[4] The description is done from the inside (the edge of the upper)-outwards.

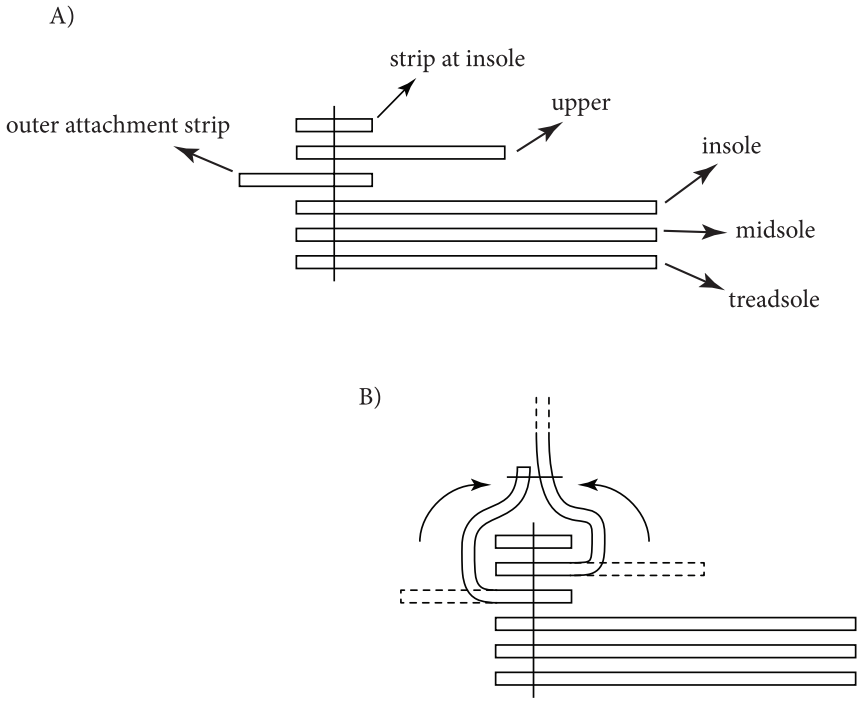


Fig. 3. Sequence of construction. Not to scale. Drawings by E. Endenburg/A. J. Veldmeijer.

folded straps and a strong sole/upper construction, resulting in a strong shoe that must have been able to last for a long time and without wearing quickly. The color of the cladding suggests the current color is the result of fading rather than original when the shoes were new. This is supported by the observation that much other Pharaonic leather footwear was brightly colored.

Comparison and Discussion

General

Due to the fact that already several types of footwear from ancient Egypt have been published by the AEFP, it is possible to present a comparison with several of these. The shape of the sole is common in the (later) New Kingdom in leather composite sandals,[5] but it differs from the less elaborate single sole sandals. Several types of fiber sandals and shoes, such as sewn sandals type C,[6] have a comparable sole shape, although the toe is less distinctly pointed and the lateral edge is far less curved.

The find from a New Kingdom cemetery, referred to as sandal, seems to be a badly preserved shoe as well, lacking the upper entirely. Wainwright reported another find from the same cemetery with

[5] André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part X. Leather Composite Sandals." *PJAEE* 6, 9 (2009).

[6] André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part VI. Sewn Sandals," in Salima Ikram and Aidan Dodson, eds., *Beyond the Horizon: Studies in Egyptian Art, Archaeology and History in Honor of Barry J. Kemp* (Cairo, 2009), 554–80.

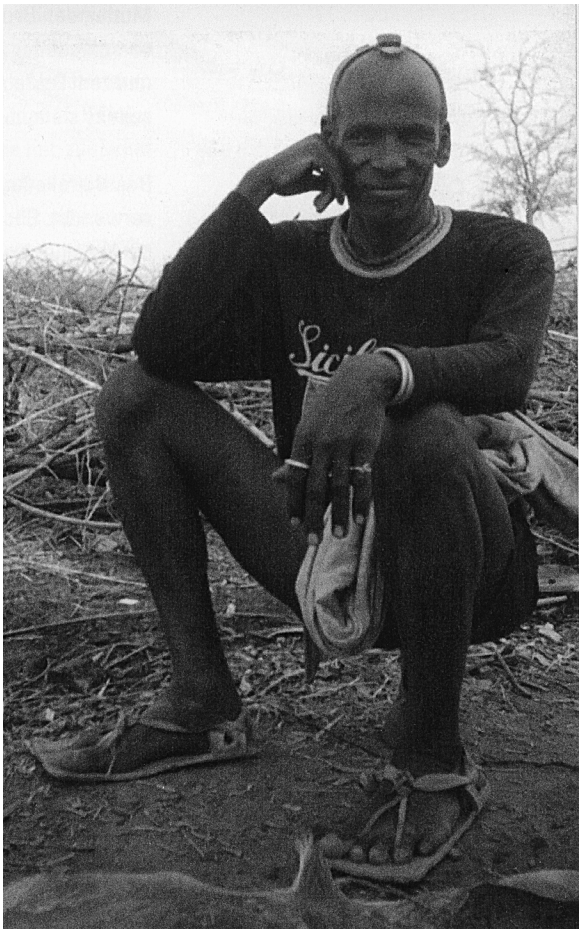


Fig. 4. In Ethiopia, simple leather sandals with pre-straps that are integrally cut from the sole layers are still being used. Note the double front strap, which has never been used by Egyptians and seems a Nubian or, more likely, African tradition. Copyright by Susanne Epple; used with permission.

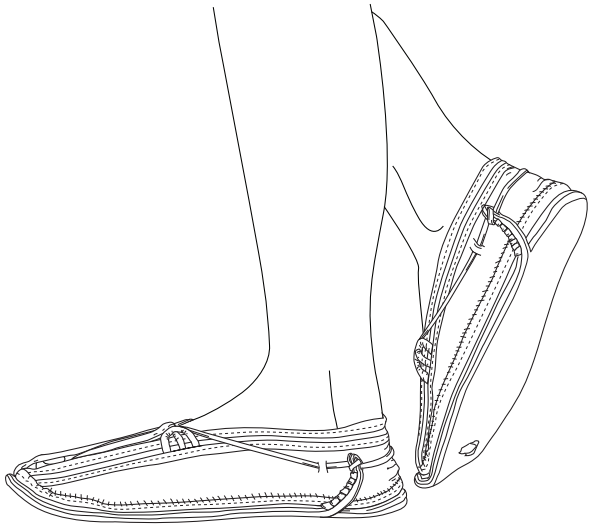


Fig. 5. Artist's impression. Drawing by M. H. Kriek.

large portions of the upper still present. Both closely resemble the Cairo shoes.[7] A sandal-like strap complex combined with an upper is seen in fiber as well as leather open shoes. The construction differs from shoes that might be dated to Ptolemaic times[8] in the fact that here the shoes are entirely closed. Moreover, the pre-strap is woven through the upper, vertical to the sole. As has been discussed elsewhere,[9] the origin of open shoes with sandal-like strap complexes is not clear yet, but might have been pre-New Kingdom. Although fiber open shoes apparently continued to be used well after Pharaonic times, thus far it seems that the leather shoes were not. Although the attachment of back- and front strap shows quite some variety,[10] leading several scholars to use it in typology,[11] there is no distinct variation between these elements in fiber open shoes. The two examples of leather open shoes that have been adequately studied show differences, which will be discussed below.

Pre-straps cut integrally from the sole layers "lasts the entire span of Pharaonic history"[12] and disappeared with the Roman occupation. Van Driel-Murray did not specify this, but makes note that

[7] Gerald A. Wainwright, *Balabish* (London, 1920), esp. 53, pl. 18.

[8] Carol van Driel-Murray, "Leatherwork and Skin Products," In Paul T. Nicholson with Ian Shaw, eds., *Ancient Egyptian Materials and Technology* (Cambridge, 2000), 299–319, esp. 316.

[9] André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part XVI. Leather Open Shoes," *BMSAES* 11 (2009), 1–10, esp. 4–6.

[10] Van Driel-Murray, "Leatherwork and Skin Products," esp. 314.

[11] For example, Carlo Alfano, *I Sandali: Moda e Rituale Nell' Antico Egitto* (Città di Castello, 1987) and Stephanie Schwarz, *Altägyptisches Lederhandwerk* (Frankfurt am Main, 2000).

[12] Van Driel-Murray, "Leatherwork and Skin Products," esp. 315.

they already occurred in the 5th Dynasty.[13] Currently, however, exactly when this construction was introduced is uncertain, but it is very well possible that it evolved in Predynastic times. Curiously, in the few examples of this kind of pre-strap in Pharaonic footwear, the back- and heel strap are simply wound around the edges of the slit[14]; hitching to pre-straps as seen in later footwear[15] has not been noted. Interestingly, as ethnographic studies show,[16] pre-straps cut from the sole to which the back- and heel straps are simply looped, continue to be used, for example, in present-day Ethiopia (fig. 4). Although the concept is comparable, the pre-straps are different in shape (square/rectangular as opposed to the tapering pre-straps in much of the Pharaonic footwear).

Van Driel-Murray describes, in general terms, the pre-strap: "Where two or more layers of leather were used, the lobes of each layer are twisted together to form thicker attachment points, and these may also be wound round with a strip of differently colored leather."[17] Indeed, such a construction is known but there are many differences in detail. Integrally cut pre-straps are not always clad. Moreover, sandals might have single pre-straps, i.e., cut out of only one sole layer in multi-sole layer sandals. Single-sole sandals with comparable straps occur as well. Interestingly, although not often, a lengthwise cladding under the transverse cladding is seen, but the pair of brightly colored sandals in Berlin (ÄMPB AM 20998[18]) has this too. The pre-strap itself, however, is cut out of only one sole layer. This sandal is dated to the 19th–20th Dynasty (Deir el-Medinah). The pre-straps of a sandal from Meir are cut out of the sole also, but these consists of two long tapering strips, one from each sole, that are clad independently and are only connected to each other at the terminal point (pers. obs. Cairo 2008). The ears mentioned by Van Driel-Murray (referred to as 'pre-strap' here, see quote above) and seen in for example BM EA 4396[19] and BM EA 4386[20] differs, but still shows a comparable concept. These are not abundant, however.

Detailed comparison of the sole/upper construction with the aforementioned possible Ptolemaic shoes and other constructional elements is awaiting forthcoming research. If the dating to Ptolemaic times of recently found leather closed shoes from the temple of Amenhotep II (currently under study by the author) is correct,[21] these differ in several respects such as the presence of a rand, an entirely closed upper that consists of a vamp and backpart and the closing system. Roman footwear is clearly distinct: most of the Roman footwear found in Egypt resembles that from Europe.[22]

Single decoration strips are used in all kinds of leatherwork, not only in footwear (e.g., the chariot leather from Amarna[23]), but is relatively rare. Usually, sets of several strips are used that alternate in colour and which slightly overlap in stair-step fashion; strips parallel next to each other might be

[13] Van Driel-Murray, "Leatherwork and Skin Products," esp. 312–13.

[14] See also ÄMPB AM 20998 in Veldmeijer, "Leather Composite Sandals," and BM EA 4378.

[15] For example, from Qasr Ibrim, but note that these pre-straps are not integrally cut out of the sole layers. André J. Veldmeijer, *Leatherwork from Qasr Ibrim. Volume I. Ottoman* (Norg, in preparation).

[16] Susanne Epple, "Weiche Fuße oder harte Sohlen? Fußbekleiding, Fußschmuck und barfuß laufen in Äthiopien," in Hartmut Roder, ed., *Schuhtick. Von kalten Fußen und heißen Sohlen* (Mainz am Rhein, 2008).

[17] Van Driel-Murray, "Leatherwork and Skin Products," esp. 314.

[18] Veldmeijer, "Leather Composite Sandals."

[19] But note that, although this part of the strap complex is comparable, it is only part of a unique strap complex that differs distinctly from 48362/48363 (see Veldmeijer, "Leather Composite Sandals").

[20] Each side of the pre-strap is clad separately: one with red and the other with green leather. The publication of this rare type of sandal is in preparation.

[21] Angelo Sesana, "Preliminary Report of the Seventh Italian Archaeological Mission-Temple of Amenhotep II at Western Thebes–Winter 2004/2005," *Memnonia* 16 (2005), 219–21, pls. 30–32, esp. 221.

[22] References are abundant, but see Sue Winterbottom, "Leather," in Valerie A. Maxfield, and David P. S. Peacock, eds., *Survey and Excavation Mons Claudianus. 1987–1993. Volume II. Excavations: Part I* (Cairo, 2001) and Martine Leguilloux, *Les objets en cuir de Didymoi. Praesidium de la route caravanière Coptos-Bérénice* (Cairo, 2006). On the possible native influences of sandals found in Didymoi, see André J. Veldmeijer with Erno Endenburg, "Footwear from Qasr Ibrim," *EA* 33 (2008), 18–20, esp. 20.

[23] André J. Veldmeijer, *Amarna's Leatherwork. Part I. Preliminary Analysis and Catalogue* (Norg, 2010).

of the same color (several examples of composite leather sandals[24]). The use of edge binding as described for 48362/48363 is well attested too in leatherwork (e.g., in the Amarna leatherwork[25]) as well as shoes[26] and usually differ in color from the leather to which it was applied. This, however, is not always the case, as the example of a comparable pair of shoes in the British Museum (see below) shows: the leather of the upper as well as the binding are green.[27] Edge bindings in the few shoes described thus far are stitched with running stitches, but in other leatherwork edge bindings could be fastened with whip stitches (chariot leather in the Egyptian Museum Cairo currently under study).

Leather curled-toe ankle shoes were either without edge binding at the upper or simply the edge was folded over without any stitching.[28] Complicated edge bindings, as for example seen in the much later Ottoman material from Qasr Ibrim,[29] did not occur in shoes.[30]

The use of both flax and sinew in leatherwork is well attested. It seems, despite the still relatively small amount of material studied thus far, that the combination of the two in one object, only became popular in later times (post-18th Dynasty). The BM shoes combine flax string of different thicknesses. Flax is not used in 48362/48363: the sole is stitched with leather thong and the remaining parts with sinew. In leather curled-toe ankle shoes, flax and sinew were sometimes used (e.g., MEgT 5149[31]). The aforementioned chariot leather in the Egyptian Museum Cairo clearly shows the use of sinew whenever a strong bond was required, but flax for the application of decoration and edge bindings (although in some parts also the decoration was secured with sinew). The study of additional, well dated and provenanced material should shed light on this hypothesis.

Other shoes

The comparison with the aforementioned pair of leather open shoes in the British Museum shows remarkable similarities as well as differences.[32] To start with the latter, the thick strip of leather at the insole's perimeter is not seen in the BM shoes. Both have, however, an attachment strip at the outer side of the shoe that connects the upper to the sole. In the BM pair, the upper is connected at the inner side of the strip and possibly sandwiched between it and the soles. The stitching includes the edge of the insole whereas in 48362/48363 an additional strip at the insole seems to have substituted this construction resulting in a much stronger construction. This development is, without date or provenance, difficult if not impossible to explain as yet. It might be a feature of different workshops, but the construction seen in the Cairo pair could also be a solution to the too easily(?) tearing of the construction in the BM pair. However, we should not ignore the possibility that the construction in 48362/48363 evolved from the perimeter strip in the, to certain extent comparable, composite leather sandals such as BM EA 4397/4398.[33] Here, besides being decorative, the strip secures the thin insole that included padding.

[24] Veldmeijer, "Leather Composite Sandals."

[25] Veldmeijer, *Amarna's Leatherwork.*

[26] Veldmeijer, "Leather Open Shoes."

[27] Note that the edge binding between the left and right shoe differ; in one it is as described for 48362/48363, in the other the edge of the upper's leather is folded.

[28] André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part XV. Leather Curled-Toe Ankle Shoes," *PJAEE* 6, 4 (2009).

[29] Veldmeijer, *Leatherwork from Qasr Ibrim. Volume I. Ottoman.*

[30] Edge bindings consisting of a lengthwise folded strip placed with the folded edge away from the edge sewn onto it are seen in chariot leather in the Egyptian Museum (currently under study as part of the AELP, see www.leatherandshoes.nl).

[31] Veldmeijer, "Leather Curled-Toe Ankle Shoes," esp. 9–11.

[32] Cf. Veldmeijer, "Leather Open Shoes."

[33] Veldmeijer, "Leather Composite Sandals."

The sole shape of the BM pair differs from the Cairo pair, the latter of which closely resembles and most likely is based on the shape of the sole of leather composite sandals. The construction of the pre-strap supports this. The BM pair has a strip (or complete sole) of which the edge is folded around the edge of the treadsole and attached by the sole stitching at the ventral surface. Folding edges towards the ventral surface of the treadsole is seen more often in shoes. Tutankhamun's shoes provide examples,[34] but also leather curled-toe ankle shoes show such a feature. This might suggest that the shoes were not meant to be used intensively as the stitches that secure these elements might wear due to friction with the ground and become loose. Additional support for this suggestion is the fact that in the specimens that allowed the study of the soles, wear is (nearly) absent.[35]

The sole/upper construction in leather curled-toe ankle shoes differ.[36] The upper can be attached to individual strips (EgCa 5174/5175) or to an additional midsole (which might have been added for the same purpose as the strip [MEgT 5149]). More comparable are those with an additional attachment strip at the outside to which the upper is attached at the inside (BM EA 4408/4409). In one example (EgCa JE 30607) the outer upper is attached to the lining, shortly dorsal to the sole seam (the lining being folded under the treadsole, the edge of which is covered with a narrow strip of leather in order to protect it).

Although rands and welts are elements positioned between the upper and the sole to reinforce the construction as well as to make a better closing seam, the attachment strip (as well as the thick strip at the insole's perimeter) served a comparable purpose. True rands and welts supposedly evolved much later, but here the reader is reminded of the lack of research (for various reasons) of footwear in antiquity. In other words, the precursor, if we might call the system presented here and described elsewhere[37] as such, might be much older.

The uppers of open shoes are comparable in shape, though the extent of the decrease in height might differ. In fiber open shoes, however, the upper could be different: either like the ones described for the leather open shoes or running along the entire perimeter of the sole, thus creating a sort of 'boat shoe', but still without the dorsal covering of the foot.[38] Pending the results of forthcoming research, 'boat shoes' that differ slightly from the ones known from Qasr Ibrim, might be post-Pharaonic in date.

Differences between the BM shoes and the Cairo shoes are especially seen in the strap complex: the BM pair combines a front strap with 'laces' that are inserted through slits in the upper, but is without pre- or back strap. The Cairo pair still has a sandal-like strap complex. Lacking in the BM shoes is a closing system separate from the strap complex. Consequently, the BM shoes would, when worn, be more open than the Cairo shoes, because the closing system held the two sides of the upper together. In contrast, the leather of the upper of the BM shoes is much thicker and therefore less flexible, possibly strong enough to stand more or less upright, whereas in the Cairo pair, the upper's leather is distinctly thinner and even with the lining would be very flexible.

[34] André J. Veldmeijer, with contributions by Alan J. Clapham, Erno Endenburg, Aude Gräzer, Fredrik Hagen, James A. Harrell, Mikko H. Kriek, Paul T. Nicholson, Jack M. Ogden, and Gillian Vogelsang-Eastwood, *Tutankhamun's Footwear* (Norg, 2010).

[35] Tutankhamun's shoes did not allow study of the treadsole. Moreover, the treadsole was made of leather/rawhide and nearly completely deteriorated.

[36] Cf. Veldmeijer, "Leather Curled-Toe Ankle Shoes."

[37] Veldmeijer, "Leather Open Shoes," esp. 4.

[38] André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part XI. Sewn-Edge Plaited Sandals," *JEOL* (submitted); cf. the much later shoes from, for example, Qasr Ibrim in André J. Veldmeijer, "Studies of Ancient Egyptian Footwear. Technological Aspects. Part V. Fibre Open Shoes from Qasr Ibrim," in W. Godlewski with A. Lajtar, eds., *Acts of the 11th Conference of Nubian Studies, Warsaw, 27 August–2 September 2006, Vol. II. Session Papers* (Warsaw, in press).

Interesting is a comparison between other open shoes, made of leather and a variety of other materials: those of Tutankhamun. Here, the upper runs less far anteriorly but is of the same general layout: highest point at the heel and decreasing in height anteriorly and consisting of one piece (with 'lining'). The sole/upper construction is different, which is due to the use of different materials (see above). Comparable with the BM open shoes, however, is the fact that the upper is secured at the ventral surface of the treadsole and hence prone to wear. In one pair (Carter's number 021k and l), the upper is 'closed' by means of semi-circular panels made of leather, lengthwise folded or slightly twisted strips of leather, alternately serving as a core of gold tubes or independent. These are inserted through slits in the upper's edge and included in the stitching that secures a decorative 'edge binding'. In this, there are parallels to the closing system of the Cairo pair. However, it does not have a sandal-like strap complex. This in contrast to another pair of open shoes (Carter's number 021f and g) that combines a traditional sewn sandal strap complex with an upper.

Final Considerations

The ongoing nature of the AEFP requires continuous evaluation of previously published studies. Although recognizability, as introduced in footwear studies by Goubitz et al.,[39] is an important character for classifying certain footwear and could certainly be applied here too, the differences between the shoes in construction of the sole/upper and the absence/presence of a sandal-like strap complex are essential and should therefore be given more weight. Hence, the Cairo pair warrants classification as different types. I propose to refer to the BM shoes as 'laced leather open shoes'; the Cairo specimen as 'leather open shoes with sandal-like strap complex and additional closing method.'

The pair 48362/48363 (fig. 5) is much comparable to composite leather sandals to such an extent that it is plausible that the open shoes are based on these. The edge binding, decorative strip, the shape of the sole (including the pre-strap and its cladding) as well as the sole/upper construction suggests a date well within Pharaonic times, probably the later New Kingdom (after the 18th Dynasty), but possibly earlier.[40] The sole construction in these sandals is not exactly the same as in 48362/48363, but certain elements are, which might suggest that the shoe makers were aware of the various models. These sandals are dated to the later New Kingdom as well and might therefore be seen as supporting a later New Kingdom date for 48362/48363. The dated finds from Balabish confirm such a date.[41]

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[39] Goubitz et al., *Stepping Through Time*, but see Veldmeijer, *Tutankhamun's Footwear.*
[40] Cf. Veldmeijer, "Leather Open Shoes."
[41] Wainwright, *Balabish.*