Proposal: Improving Disabled Access at the Archaeological Sites of Egypt.

Joanne Stables and Jane Akshar.

Introduction.

An important part of improving the quality of the travel experience of disabled persons to the ancient Egyptian temples of Luxor is removing the physical barriers that impact upon access.

This proposal is aimed at informing the Ministry of Antiquities of the difficulties faced by visitors with physical disabilities and to provide workable solutions to enable these disabled persons to experience the magnificent historical sites of Luxor.

Background.

Worldwide it is estimated that more than one billion people, or one in seven of the world population, are living with some form of disability (World Health Organisation 2011: xi). While many of these people may not have the opportunity to travel, this large segment represents a significant and potential source of tourism income.

In 2015 the European accessible tourism market was valued at USD $168 billion (European Network for Accessible Tourism 2015). Furthermore, the accessible tourism markets of the United States of America and Australia are estimated to be worth USD $17.3 billion and USD $8 billion, respectively (Jamison 2016: 66). From this basic data, it is evident that accessible or disabled tourism is a growing market. Thus, taking into account these figures, there is a strong rational for targeted actions by the Ministry of Antiquities to adapt and build accessible infrastructure at archaeological site for visitors with specific access needs.

Types of Physical Disabilities.

Physical disabilities can range from mild to severe conditions that affect some aspect of a person’s physical functioning, most typically their mobility, dexterity or stamina. A person with a physical disability therefore is constrained by his or her ability to perform an activity independently such as walking.

- **Wheelchair or Mobility Scooter Users:** This category includes persons who are dependent upon or are regular users of a wheelchair or mobility scooter. Dependant users are persons who require a wheelchair or scooter for all mobility. Regular users include persons who have a limited mobility and require wheeled assistance to move around in their environment.
- **Ambulant Disabled or Mobility Impaired:** This category of disability includes persons who are not regular wheelchair or mobility scooter users. In this proposal these terms are used to describe people who may depend upon walking aid (such as a crutch, walking stick or walking frame), use a prosthesis, or have unstable or slow movements.
• Older Persons or Elderly: This group is often defined as people aged 60 and over. People within this group often experience changes in the functional abilities and mobility.

• Visually Impaired: This category includes persons with moderate to severe visual impairment (commonly referred to as low vision) and the blind. The World Health Organisation (WHO) estimated that in the world there are 246 million people with low vision and 39 million blind people (World Health Organisation 2012: 3). Depending on their vision loss, persons with a visual impairment may or may not use a long cane when negotiating around their environment.

Physical Barriers Encountered by the Disabled.

Physical barriers encountered by disabled people may be characterised as structural obstacles in the natural or manmade environment that impede or prevent accessibility.

• Wheelchair or Mobility Scooter Users: Access for users of wheelchair and mobility scooters can often be poorly designed or of a poor quality. People who use wheelchairs and mobility scooters are particularly impaired by uneven and unstable floor surfaces. For example, gaps between floor surfaces or paving slabs, poorly laid surfaces, broken or cracked paving, and irregular surfaces (such as cobblestones, loose earth and loose gravel/stones) significantly impede the movement of a wheelchair or scooter. Furthermore, travelling across a surface with an undulations or an adverse camber can result in the sideways instability and the loss of directional control of wheelchair or mobility scooter. Another common barrier to accessibility is poorly designed ramps. For instance, a ramp with a steep gradient or slope results in ramp being unusable by most wheelchair and mobility scooter users. Manual wheelchair users may lack the strength to push themselves up a steep slope and/or control their descent down a steep slope. Mobility scooters are also limited by having maximum slopes they can climb. Ramps may also be rendered inaccessible due to their being a lack of space to manoeuvre on to the ramp, or the ramp being too narrow to allow a wheelchair or mobility scooter user to use the ramp safely. Additional barriers that make access more difficult or impossible for wheelchair and mobility scooter users include: raised thresholds and sills, narrow pathways, stairways, and the lack of a ramped access.

• Ambulant Disabled or Mobility Impaired: For the ambulant disabled footways with uneven surfaces, unstable surfaces (such as gravel and loose stones), insufficient space to manoeuvre, broken or cracked paving, and/or sudden drops or unexpected changes in level are the most common form of barrier with regard to accessibility. Stepped approaches may also be hazardous due to poorly defined step edges, open risers, tapering treads, a narrow width, irregular profiles, or a steep slope/pitch. Many of the ambulant disabled who are unable to climb steps rely upon ramped approaches to provide access. In many instances however, the ramped approach is unsuitable for the mobility impaired as a steep gradient or the narrowness of the ramp result in it being difficult to use. The ambulant disabled however, may find accessibility equally difficult if there is no stepped and/or ramped access.

• Older Person or Elderly: In the built environment, the elderly encounter a wide range of physical barriers that limit and/or prevent access to heritage and tourism sites, and everyday services and facilities. Access routes are a regular problem encountered by older persons
owing to a number of potential hazards. For instance, footways with a loose or uneven surface, broken or cracked paving, or an unfavourable camber are particularly problematic. Other hazards that are equally frustrating and problematic for the elderly are: steep gradients (including steep ramps); steps that are too steep, have an insufficient width, have open risers, and/or have unequally sized riser and treads; and sudden drops in floor levels. The elderly may also find the lack of a ramp or the lack of steps limiting.

- Visually Impaired: For the visually impaired difficulties often arise due to a loss or significant decrease of visual acuity, contrast sensitivity, peripheral vision. In some instances, a visual impairment may result in the occurrence of central blind spots. Consequently, the visually impaired are often unable to distinguish everyday obstacles such as the edges of steps (especially steps with open risers and tapering treads), changes in floor levels, slight undulations or inclinations within a floor surface, uneven floor surfaces (such as gravel or loose stones), and broken or cracked paving. Additional hazards include: thresholds and sills, path edges or architectural features (such as a pillar or column) that are not clearly defined by a raised perimeter (kerb) or a contrasting hazard warning surface, narrow pathways, and ramps that are not identified by a warning surface.

**Case Study: Mortuary Temple of Seti I, Luxor.**

The purpose of this case study is to highlight the existing difficulties faced by people with mobility impairment (including wheelchair users and people with walking difficulties) when visiting a historic site in modern Luxor. It should be noted that the Mortuary Temple of Seti I in Qurna was chosen as a number of independent and disabled tourists to Luxor (as well as the co-author of this proposal, Jane Akshar) identified this site as the least problematic.

In total, this case study identified seven physical barriers/obstacles which prevent disabled visitors moving around and/or gaining access to areas of the temple. It should be acknowledged however, that the mortuary temple of Seti I, despite all of the issues presented below represents a relatively accessible environment. Ample evidence of this is provided by the temple's popularity with older and disabled people. It is likely that the size of the temple and the fairly gradual rise of the floor level towards the innermost parts of the temple, are a major contribution to this popularity.

It should also be noted that in consideration of balancing the needs of disabled persons with the ideals of site conservation, as well as maintaining the authenticity and integrity of the site, the most suitable building material for the proposed alterations and improvements is sundried mudbrick (for an explanation of the author’s choice of mudbrick see below).

**Current barriers to accessibility:**

1) **Ramps at the Visitors Entrance:** Firstly, design consideration should be made to the actual location of the ramps. At present, the ramps have been installed at the centre of the entrance steps, thereby impeding upon the access route of the ambulant disabled and non-
disabled. The best practice would be to relocate the ramps to one side. The current design of the ramps is also hazardous to wheelchair and mobility scooter users. The width of the ramps is a key factor. The narrow width of the ramps greatly impacts upon the ease with which a wheelchair or mobility scooter user can comfortably move up and down the ramp. At present, users of wheelchair and mobility scooters have to take particular care as there is a great risk of a wheel falling off the edge of the ramp resulting in the potential injuries, as well as damage to the wheelchair/scooter. The width of the ramps may not also be wide enough for all types of wheelchairs and mobility scooters. The slope (or gradient) of the ramps also makes it difficult for wheelchair and mobility scooter users to slow down their descent and to come to a safe stop at the base of the ramp. The gradient of the ramps also results in wheelchair and mobility scooter users encountering problems when ascending the ramps. For instance, many wheelchair users find themselves unable to propel themselves up the ramps, or where a person is pushing the wheelchair, the physical demands to propel the wheelchair is often too much. For users of mobility scooters, the vast majority of scooters do not have the power capabilities to ascend steep gradients resulting in the user having to dismount and having to experience the undignified situation of being carried whilst someone manually pushes the scooter to the top of the ramp. On the whole the appearance of the ramps may also evoke an emotional response that the ramps are unsafe and therefore, discourage or even prevent a disabled visitor from entering the temple complex. In light of these considerations, the most functional and long-term solution would be to build new entrance ramps that are suitable for all disabled visitors to use independently. It is recommended that the minimal width of the ramp be 1.50 metres to give sufficient space for a wheelchair user and a pedestrian to pass comfortably (Wolverhampton City Council 2009: 24). If this is unachievable due to space constraints, the ramp should be an absolute minimum width of 1m (Wolverhampton City Council 2009: 24). The ramps should also be provided with landings so that wheelchair and mobility users have sufficient space to manoeuvre safely onto the ramps, as well as allowing them to safely align themselves with the central axis of the ramps. Each landing should measure 1.20m deep and have a width equal to that of the ramp (United Nations 2003-04). The edge of the landing at the junction with the ramp should also be graded to create a safe and continuous plane for disabled users. A textural change in the floor surface of the landings would also help the visually impaired identify the location of the ramp. It is recommended that the warning markings be composed of recessed lines parallel to the direction of the ramp with a minimum depth of 400mm (Department of the Environment, Transport and the Regions 1998: 56). The recessed lines should also extend over the full width of ramp (Department of the Environment, Transport and the Regions 1998: 56).

2) Steps at the Visitors Entrance: The overall design of entrance for the mobility impaired is adequate, but at present cannot be considered ‘barrier free’. The main difficulty encountered by the ambulant disabled is the irregular height and depths of the risers and treads of the steps. To meet the needs of the ambulant disabled, the preferred solution is to rebuild the steps according to the follow criteria: the steps should have a minimum width of 1.50m to allow circulation of two-way foot traffic; step risers should measure between 75mm-120mm; and the tread of each step should measure between 280mm and 350mm (NHBC 2014; United Nations 2003-04). To conform to Section 1009.3.2 of the International Building Codes, the riser height and tread depth of each step on the same flight should be of
a uniform size; variances between the largest and smallest riser height or between the largest and smallest tread depth should not exceed 9.5mm (International Code Council 2014). The floor surface of the treads must also be level and even with minimal undulation to minimise the risk of people tripping. The access requirements of the visually impaired who experience great difficulty in detecting the edges of steps can also be easily met with the additional of tactile warning surfaces. Firstly, it is also proposed that each step edging (or nosing) will incorporate a textual contrast that extends the full width of the stair on both the tread and rising. The markings should be composed of recessed and crosshatched lines which extend over a depth of 50-60mm on the tread and 30-55mm on the riser (Gradus n/d: 135). It is also recommended that the steps be provided with landings to facilitate the safe descent/ascent of the mobility impaired. The landing should have a minimum depth of 1.20m and a minimum width equal to that of the steps (United National 2003-04). The landings at the top and bottom of the steps should also feature a textual change to alert the visually impaired to the location of the steps. These should differ from those used to indicate the step themselves. In this instance, it is proposed that the warning markings be composed of recessed horizontal lines running parallel to the nosings of the steps. The recessed horizontal lines should be set 400mm from the leading edge of the stair edging and be a minimum depth of 800mm (Gradus n/d: 123).

3) Modern pathway between the entrance and the first pylon: The existing floor surface of loose earth and accumulated dirt is very difficult for all disabled visitors to cross unimpeded. For wheelchair and mobility scooters user, loose and granular surfaces (such as dirt, sand and soil) are extremely difficult to transverse due to physical strength or mechanical power required to propel the wheelchair or scooter. In addition, the current surface has a tendency to be too soft causing the wheels to slip and become bogged down/stuck. For users of mobility scooters this can be highly dangerous as wheelspin¹ may result in an overheated motor or a flat battery. For the ambulant disabled and elderly this type of surface is difficult to walk upon as it can cause the feet to slide resulting the person becoming unbalanced and more likely to fall. Likewise, it can cause the mobility aid of an ambulant disabled visitor to slip out from under them and cause an otherwise avoidable fall and possible injury. For many ambulant and elderly visitors walking on an unstable surface can also result in pain and discomfort, especially when the muscles and tendons in the foot and ankle have to work harder to stabilise the foot on each step.

The proposed approach to meet the accessibility needs of the disabled visitor is to pave this area with mudbrick. The construction process for the new pavement would consist of four basic steps; these being: the removal of the excess dirt, compacting a layer of regular temple earth over the area to create a firm foundation, laying the mudbricks longitudinally in a standard stack bond pattern and with minimal joints, and filling the joints with a mud mortar. Furthermore, the existing mudbrick retaining walls on the east and west sides of the footway will serve as the edges of the new pavement. The walls will not only provide structural support to the edges of the mudbrick pavement, but they will also assist the visually impaired to find their way.

¹ Wheelspin is the rotation of a vehicle’s wheels without traction.
Footway between the first court and the portico: In its current state, the footway between the first court and portico of the temple is ineffective in providing barrier free access for disabled visitors. At present, a disabled visitor encounters an access route with a steep gradient, a surface of uneven pavement and thresholds without chamfered edges. For wheelchair and mobility scooter users, the steep slopes are difficult to ascend and descend safely (see the discussion above), whereas for the ambulant disabled and elderly the gradient and length of the slopes may be equally as difficult to ascend/descend due to reduced strength in the lower limbs and/or limited movement at the ankle joint. The haphazard placement of paving slabs and square edge thresholds are also especially hazardous for disabled people. For visitors in wheelchair and mobility scooter, the changes in the floor level make it unreasonably difficult to negotiate a relatively safe route without pain and discomfort. Additionally, the square edges of the paving slabs and thresholds that protrude into the path of travel are a collision hazard due to the risk of wheelchairs and mobility scooters being tipped over as the wheels hit the protruding edge, and the potential for mobility scooters become stuck or damaged as its underside strikes the edge of a paving slab or threshold. For the ambulant disabled, elderly and visually impaired the changes on the floor level (including the thresholds and exposed edges of the paving slabs) present a tripping hazard. It is therefore essential that the gradient of the existing slopes be made as gentle as possible and the thresholds be made flush or concealed. As removing the existing areas of concrete and pavement may cause damage to any underlying archaeology, and to limit the conflict between needs of the disabled and conservation principles, it is proposed that the most sensitive solution is to use mudbrick in order to construct a long continuous ramp with a large level section (or landing) within the length of the ramp. The level section will be aligned with the existing architectural feature of the second pylon gateway and will extend westwards to the point where the continuation of the ramp will ascend to the restored pavement of the portico (see below). The continuous ramp should ideally have a gradient between 1:20 and 1:12. The junction where the edges of the ramp meet the large level section and the paving of the portico should also be graded to create an obstacle free plane. The level section within the ramp should also be carefully built to ensure that it is level with no adverse camber and minimal undulation. Landings should also be installed at the lower and upper limits of the ramp. The size of the landings should measure 1.20m deep and have a width equal to the ramp (United National 2003-04). The junction between the ramp and landing edge will also need grading to create a continuous plane. It is recommended that each landing will also need a tactile warning surface for the visually impaired. These warning markings should be installed according to the same design specifications as those stipulate for the landings of the ramps at the entrance to the site (see above). The continuous ramp, large level section and landings should have a minimum width of 2m to allow wheelchair and/or mobility scooter users to pass one another safely and easily (Matthews et al. 2003: 39; Wolverhampton City Council 2009: 24). In this section of the temple however, there are walls and kerbs that form the edge of the access route, so in this instance, it is proposed that the original width of the route be maintained. The inclusion of the walls/kerbs of the existing pathway would also assist the visually impaired to

2 Highlighting the approach to a ramped surface in a consistent manner throughout the site will aid the visually impaired in navigating around the temple with more ease and confidence. The application of textual warning surface should also be standardised across all sites.
identify the edge of the footway, as well as serving as a kerb to prevent the lateral displacement of the mudbrick flooring.

5) The current condition of the stone paving of the portico, hypostyle hall and vestibule of the cult chapel of Ramesses I is hazardous to all disabled visitors, as well as non-disabled visitors. The most prominent obstacle to visitors, especially the disabled, is the uneven nature of the paving slabs as a result of poor maintenance. For instance, raised and dropped slabs (as well as cracked or broken slabs) are tripping hazards and are difficult to negotiate, especially for the ambulant disabled, visually impaired and older persons. In respect to elderly, falls are a major health concern as the consequence of a fall can result in severe physical impairment; for example, a study revealed that approximately 70% of falls amongst the elderly result in injury (Wijlhuizen et al. 2007). Uneven paving slabs are also considerably frustrating for wheelchair and mobility scooter users as reduces the ease with which they can negotiate the temple, but also can result in pain and discomfort. The gaps or spaces between the paving slabs also cause serious problems for disabled visitors. For wheelchair and mobility scooter users, gaps between paving slabs are a very common cause of injuries sustained from tips and falls as a consequence of a wheel becoming trapped. Whereas, for the ambulant disabled and visually impaired, spaces between paving slabs are a hindrance to movement as a result of the tips a walking aid (such as walking sticks, crutches) and support/probing cane becoming easily get trapped.

The proposed works to these areas of the mortuary temple would be the restoration and repairs to the existing stone pavement. This restoration process would consist of: dismantling and removing the current paving slabs; trimming or re-cutting damaged slabs for re-installation, or where absolutely necessary replacing heavily damaged slabs with new ones; spreading and compacting regular temple earth to create a firm base for the paving; dry setting and adjusting the slabs to ensure the pavement has tighter joints and is level with minimal undulation; and setting the paving slabs with a mudbrick mortar. To prevent any future sideward movement of the paving slabs, it is highly recommended that a 100mm thick mudbrick fillet or edging kerb be installed around the pavement. Furthermore, in consideration of the ongoing need to monitor and evaluate evidence of residual salt deposits and the impact of the West Bank Groundwater Lowering Project\(^3\), the area of loose stones between the edge of the pavement and walls and columns of the temple will also be restored. At present however, the area of loose stones present a hazard as it is not flush with the level of the pavement. The simplest solution is to increase the height of the loose stones by adding a layer small to medium sized cobblestones The Implementation of this solution is not believed to impact upon original conservation ideal that the areas of loose stones will facilitate in drying out of the foundation material\(^4\). Furthermore, an additional benefit of this solution is that it will enable visually impaired to more easily locate the edges of the pavement.

6) The innermost areas of the mortuary temple are inaccessible to wheelchair users and the mobility impaired as the access routes feature numerous steps, high thresholds, narrow doorways and uneven floor surfaces. Within these areas of the temple (the barque shrines and the rooms of the south-west corner), it is accepted that any interventions to facilitate

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\(^3\) For more information, see US Aid (2007) ‘Scoping Statement For City of Luxor Groundwater Lowering of Antiquities Sites on the West Bank’.

\(^4\) John Shearman (ARCE), personal communication 2017.
access will significantly impact upon the integrity and fabric of the historic architecture. An appropriate solution may be to install temporary ramps. Temporary ramps however, are only a short-term accessible solution. A better solution is an accessible circulation route that is designed to allow disabled visitors with views over the innermost areas of the temple. This informed solution would also require minimal intervention as the most suitable route would be along the south side of temple following the existing route from the southernmost doorway of the portico. At present, this route is hazardous to the disabled visitors; the floor surface of the pavement uneven, there are gaps between the paving slabs, and the route terminates with a step down onto an area of loose stones. To remove these barriers to access, proposed works include the restoration of the ancient paving slabs to create a level surface with minimal undulation, and replacing the loose stones with a new pavement of mudbricks.

7) At present it is not possible for wheelchair and mobility scooter users, as well as the mobility impaired to access the archaeological remains of the royal palace in the south-east corner of the mortuary complex. Given the importance of the royal palace as the earliest known structure of this type within a New Kingdom mortuary temple, providing access is essential. At present, disabled visitors must negotiate a large area of loose stones. Again, well-managed installation of a pavement composed of mudbrick is recommended to serve both accessibility and conservation needs.

Why Mudbrick?

The major advantage of utilising mudbrick as a paving material is its low cost. Mudbrick are fundamentally made from a mixture of mud, straw and water; all of which are locally available materials. Traditionally, the soil is dug from the ground from areas unaffected by modern fertilisers or other chemicals (see Dabaieh 2011: 57 & 174). Mudbrick however, can be produced from a wide variety of soil types. For example, the American Research Centre in Egypt (ARCE, Luxor branch) have successfully demonstrated that a range desert soils collected from their archaeological spoil heaps can be used to produce durable mudbrick (see Case Study; Appendix 1). Because of this, it is proposed that the mudbricks for this project be made onsite from surplus temple earth and soil from spoil heaps.

The other factor that contributes to the low cost of mudbrick is that the manufacturing process utilises traditional inherited technologies\(^5\), which can be easily grasped by a layperson with limited experience. The cost-benefits of this, is that no special equipment is required and the tools required (hoses, shovels and wooden or metal moulds) can be bought for a low cost from local hardware shops in Luxor. Furthermore, in an effort to further reduce costs, wooden moulds can be made from scraps of wood and without the need of an experienced carpenter. Metal moulds however, may prove to more cost-effective in the long-term as they are less likely to become damaged and break due to repetitive use. The disadvantage of metal moulds is that a local blacksmith would need to be commissioned to produce the moulds. The acquisition of the metal moulds, hoes and shovels is anticipated to be a one-off cost with irregular payments thereafter depending upon when repairs and/or replacements are required. In light of this, the main foreseeable cost in the production of

\(^5\) For more information, see Case Study; Appendix 1.
the mudbricks is labour. The cost of labour however, should not be seen as a disadvantage as it is proposed that workmen be employed from the local communities. The involvement of the local communities would not only be a catalyst for regenerating community cooperation, but more importantly, this project would provide a source of income for many families who have faced hardships and poverty since the economic crisis that followed the Egyptian revolution in 2011. Should it be preferable to buy the required number of mudbricks from a local merchant, the approximate cost for 1000 mudbricks is LE £400.

As a paving material, mudbrick has a number of other advantages when compared to conventional stone paving. For example, mudbrick is able to endure exposure to direct sunlight and high temperatures more than limestone and sandstone which are known to deteriorate with the increase of temperature (Lü et al. 2017: 573; Wu et al. 2011: 259). Furthermore, mudbrick is more resistant to cracking due to its ability to absorb movement.

Mudbrick has also been proven to have a much lower environmental impact than conventional building and paving materials which consume a huge amount of energy manufacture and transport. As mudbricks can be produced in the immediate vicinity of each archaeological site, the embodied energy consumed to manufacture and transport the mudbricks is negligible. Furthermore, as mudbricks are made from natural materials they are extremely sustainable, recyclable, and non-toxic form of building material.

Beyond its environmental friendly credentials, the use of mudbrick will have little impact upon the authenticity and visual integrity of a temple whilst accommodating the needs of disabled people who wish to visit the ancient sites. Furthermore, the installation of mudbrick paving will not cause any damage to the monument and can be easily removed should the need arise.

More Reasons to Improve Disabled Access.

It is more than reasonable to say that improving accessibility is good for all. The Heritage Lottery Fund acknowledges that improving accessibility for disabled people will also make a heritage site (such as a historic building) more accessible to the non-disabled, particularly families with ambulant young children or children in pushchairs, and persons accompanying disabled visitors (Heritage Lottery Fund 2012: 4-5). More accessible routes will also cater the increasing number of older persons in the world’s population; according to a United Nations report the number of older person is projected to increase from 901 billion in 2015 to 1.4 billion in 2030 (United Nations 2015: 2). The Heritage Lottery Fund also makes the very persuasive argument that if disabled people face physical barriers when accessing a heritage site, it is feasible that their non-disabled family members, friends and travel companions may not visit; thereby reducing potential visitor number and tourist revenues (Heritage Lottery Fund 2012: 5).

An inclusive approach to providing access to the temples of Luxor will also have a positive impact upon changing the international perception that Egypt is an unsafe destination for tourists. Beyond this, it will help change the international perception that people with disabilities in Egypt are

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6 Mahmoud Omar (Nubian Eco Village), personal communication 2017.

7 The largest dedicated provider of funds/grants to heritage projects in the UK.
marginalised and do not have the same opportunities as the non-disabled population. This view is strongly echoed in a news article written by Cam McGrath and titled ‘What Egypt Is Blind To’. In this article comments include: ‘children with special needs or disabilities in Egypt face formidable barriers that prevent them from participating in society’ and ‘Egyptian society’s attitude towards people with disabilities, [is] either ignoring their existence, or identifying them exclusively in terms of their disability’ (McGrath 2013).

Funding.

The main barrier for the Ministry of Antiquities to improve disabled access appears to be financial concerns (including the cost of investment and lack of financing). Internationally however, projects that improve the quality of life for persons with disabilities and/or improve the accessibility of historic buildings and places are extremely population with external sources of funding and grants.

Possible sources of external funding include:

1) American Research Center in Egypt (ARCE): The Antiquities Endowment Fund awards one year grants up to the value of US $100,000 for Conservation, Preservation and Presentation projects. For more information visit [http://www.arce.org/grants/aef](http://www.arce.org/grants/aef) and [http://www.arce.org/files/resource/we/2e/rsrch/AEF_Instructions__October_2016.pdf](http://www.arce.org/files/resource/we/2e/rsrch/AEF_Instructions__October_2016.pdf)

2) Ford Foundation: For more information visit ‘Our Grants’ at [https://www.fordfoundation.org/work/our-grants/](https://www.fordfoundation.org/work/our-grants/)


5) US Ambassadors Fund for Cultural Preservation (AFCP): For more information visit [https://eca.state.gov/cultural-heritage-center/ambassadors-fund-cultural-preservation](https://eca.state.gov/cultural-heritage-center/ambassadors-fund-cultural-preservation)


7) World Monuments Fund: For more information visit [https://www.wmf.org/](https://www.wmf.org/)

Conversely, any investment in the provision of disabled access by the Ministry of Antiquities will increase the attractiveness of Egypt and thereby will increase the potential revenues for the ministry itself as well as for the domestic tourism sector.

Conclusion.

There is a strong case that making the temples of Luxor more accessible will actually bring about long-term business benefits. By improving accessibility, the number of sites visited by disabled visitors would significantly increase, thereby improving the tourist economy and increasing the tourist revenue received by the Ministry of Antiquities. Sites that are properly accessible for disabled people also tend to be more accessible for other groups such as parents with young children,
pregnant women, and school groups. Making historic sites more accessible, more often than not, also produce benefits in terms of public perception, thereby increasing the attractiveness of Egypt as a disabled friendly holiday destination.

**Biographical Notes.**

Joanne Stables is an archaeologist, osteoarchaeologist, and archaeological illustrator. Joanne received a BA (Hons) in archaeology from the University of Liverpool in 2006 and an MSc Human Osteology and Funerary Archaeology (with distinction) from the University of Sheffield in 2007. From 2004 to 2008, she was employed as a field archaeologist, osteoarchaeologist and archaeological illustrator on archaeological projects on the North Coast of Peru, including the Huambacho Archaeological Project and Project El Purgatorio. Since 2008 she has worked on various archaeological sites in the United Kingdom as a field archaeologist/osteoarchaeologist, finds analyst and archivist. In 2010, Joanne first visited Egypt where she developed a strong interest in ancient Egypt which she has followed ever since. Joanne spends several months a year living in Luxor pursuing interests in Egyptology. In her life before archaeology, Joanne studied and had a successful career in the travel and tourism industry. During this time she worked as an exhibition assistant for National Museums Liverpool and as a volunteer English teacher for the British Council in Israel. In an unprecedented turn of events following a severe orthopaedic injury to a family member, Joanne received training in the specialist field of orthopaedic nursing for patients following limb reconstruction. Since this time, she has also been employed as a travel companion and carer for persons living with physical disabilities.

Jane Akshar first visited Egypt in 1979 and moved to Luxor in 2003. She is a keen student of Egyptology having studied with the University of Manchester. During her return visits to Luxor, Jane met and married her Egyptian husband with whom she has a business that provides rental accommodation to independent tourists and excavation teams. In 2012, she self-published a guide book called ‘Hidden Luxor’ that not only provides a broad itinerary of the monuments and tombs of ancient Thebes, but promotes Luxor as a safe tourist destination. In 2016 she self-published an updated version of ‘Hidden Luxor’ in which she provides tips for the disabled traveller on the accessibility of the ancient sites. To ensure that the updated guide included accurate information for the disabled, Jane as a disabled person and a user of a mobility scooter visited the monuments to make on-site observations of the barriers that limit accessibility. From 2003 to the present, she has written a regular blog (‘Luxor News’) promoting Luxor and beyond, reporting and discussing archaeological discoveries, and other topics that are of interest to the tourists. As a result of her efforts, she has generated a great deal of international interest on disabled access in Luxor across different media platforms including the global Egyptology magazines, namely ‘Ancient Egypt’ (see Appendix 2) and ‘Nile Magazine’.
Bibliography.


APPENDIX 1.

Case Study: The Production of Mudbrick in Luxor by the American Research Centre in Egypt.

Joanne Stables.

Introduction.
In May 2017, the Luxor office of the American Research Centre in Egypt (ARCE) granted me permission to visit a site of mudbrick production in the vicinity of the archaeological area known as Dra Abu el-Naga on the West Bank of modern Luxor. The site itself is located at the base of the ancient necropolis, adjacent to the modern road. At this site, a group of local workmen trained and employed by ARCE have been busily working away to produce more than 15,000 sundried mudbricks for a number of international archaeological missions. The impetus for the production of mudbricks forms part of ARCE’s current conservation work conducted under the project title of ‘Qurna Site Improvement project (QSI)’; for more information visit: http://www.arce.org/conservation/currentconservation/u27.

What is Mudbrick and How Is it Made?
Mudbrick (also known as adobe) is a composite material produced by mixing water with earth (sand, soil or alluvial silt) and an organic material such as manure or straw. The raw materials are mixed until the soil reaches its maximum plasticity; in other words, the mudbrick paste reaches a consistency that allows it to be kneaded or moulded into a shape several times. Once in a plastic state, the mixture is traditionally allowed to mellow for a period of one or two days. Following the mellowing process, the mixture is placed within a mould and is compacted by hand. The mould is then removed and the mudbrick is left on the ground to dry. During the drying process, the mudbrick is regularly turned to enable it to dry evenly to prevent cracking.

Definitions.

1. Mellowing is the period of time in which the cohesive mixture of earth and organic material is left undisturbed. A period of no less than 24 hours is recommended prior to the casting of the mudbrick.
2. Compaction: The process of compaction enables the workman to ensure the mixture has taken the full form of the mould. The process also has the advantage of removing air pockets from the mixture and thereby produces a stronger mudbrick.
Case Study: Mudbrick Production in Luxor by ARCE.

The method of mudbrick production by ARCE is very similar to that employed in the construction of traditional and modern mudbrick architecture in areas of Egypt. At the ARCE site, the soil being utilised is a desert soil formed from the varied geological terrains of the Theban Hills, located on the western bank of modern Luxor. The most commonly used soil by ARCE is a light brownish grey which has been collected from the spoil heaps of the nearby archaeological excavations. The composition of the desert soil nevertheless varies and results in many gradations in the colour of the sundried mudbricks. For instance, the gradations in colour of the sundried mudbricks seen by the author include a light grey, a light brownish grey, and a light olive brown.

On site, the desert soil is mixed with short fibres of straw and water in different proportions depending upon the soil type. Straw is traditionally added to the mixture of soil and water as it increases the malleability and impermeability of the mix (Dabaieh 2011: 174). The use of short fibres of straw however, is more desirable as they increase the resistance of the soil matrix to cracking during the drying process, as well as allowing the mudbrick to dry more evenly (Brown and Clifton 1978: 139; Dabaieh 2011: 174). This in turn creates a stronger mudbrick.

The mixing of the raw materials by the ARCE workmen is done by foot (pigeage à pied) and with the aid of an eye hoe (Figure 1). The workmen mix the raw materials until a mudbrick paste of a plastic state is achieved.

The basic proportions of the raw materials used by the ARCE team to create a dimensionally stable mudbrick are: 60% soil, 20% straw and 20% water. The ARCE team reject the use of modern materials such as cement or lime to produce a stabilised mudbrick for two main reasons: 1) the ARCE team recognises that mudbrick strengthens as it dries out; and 2) that raw materials used in the production of mudbrick intended to be used in conservation and/or restoration works should replicate the compositional characteristics of ancient mudbricks.

Once the mixture achieves its maximum plasticity, it is left to mellow for one or two days prior to being cast (Figure 2). Each mudbrick is produced by manually throwing the wet mixture into a dampened rectangular metal mould (without base or top) which is placed upon the ground (Figure 3). The consensus amongst the workmen is that a metal mould is preferable to the use of more traditional wooden moulds. The wet mixture is then compressed by hand into the mould until the workman is happy the mixture is stable and free from air pockets. A finishing trowel is then used to smooth the top of the mudbrick and remove any excess mixture (Figure 4). The mudbrick is then marked by an identifying metal stamp and the mould is removed. Following the removal of the mould, the mudbrick is left on the ground to dry in the sun (Figure 5). To complete the drying process, the bricks are rotated to ensure each side is dry. In optimal conditions, a mudbrick is allowed to dry for up to 48 hours before being turned for the first time. Under ideal drying conditions, the ARCE team reports that the complete drying process takes a minimum of seven days.

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8 See Correas-Amador n/d, Dabaieh 2011, and Fathy 2016 for more details on modern mudbrick architecture in Egypt.
9 Sayed Mamdouh (ARCE), personal communication 2017.
10 Sayed Mamdouh (ARCE), personal communication 2017.
and results in a mudbrick that is much harder and has a stronger structure than mudbrick are not allowed to dry evenly\textsuperscript{11}. Once fully dry, the mudbricks are stored onsite. To reduce the stresses upon the bricks during storage, the mudbricks are stacked and orientated as rowlock stretchers and stretchers bricks (Figure 6). The dimensions of the mudbricks currently being produced by ARCE are 56cm x 28cm x 14cm. Each fully dried mudbrick can weigh up to 27kg. The ARCE mudbricks also have a distinct shape, which may be classified as flat-rectangular with distinctive sharp-edges.

\textsuperscript{11} Sayed Mamdouh (ARCE), personal communication 2017.

Figure 1: Mixing of the raw materials.
Figure 2: The mixture after mellowing.

Figure 3: Metal mould and the process of casting mudbrick.
Figure 4: The process of casting mudbricks.

Figure 5: Mudbrick drying in the sun.
Figure 6: Fully sundried mudbricks.

Acknowledgments.

The author would like to thank John Shearman (Director of ARCE in Luxor) and Sayed Mamdouh (ARCE archaeologist and supervisor of mudbrick production) for their help and assistance during this study.

Bibliography.


APPENDIX 2.

readers’ letters

‘Egyptianising’ walks round London and various cemeteries. I also had to smile at the paragraph about the unveiling of the ‘Amarna Princess’ statue at Boden Museum now revealed as a fake – the benefit of hindsight!

I look forward to many more years of enjoying my birthday present and keep up the good work! With all best wishes to you and all the team,

Alison Marsay

Dear Editor,

I see that I’ve been around since Issue 30 – half the magazine’s lifetime. In those subsequent months AE® Magazine has brought into our home with each issue untold wonders of great beauty and valuable information and interpretation of finds in Egypt both old and new. Having been there four times and looking forward to more, I especially appreciate the news of events on the ground that is unavailable elsewhere. Thanks so much for the great efforts of yourself and your contributors in producing this outstanding publication.

Karl L.

Dear Editor,

Disabled Access in Luxor

There was a buzz about Luxor. Our plane was full. Tourists of all ages are trickling back, including wheelchair users. Thinking of a family member who may want to visit one day, we wondered what facilities would be available for people with mobility impairments. Luckily, we had the expertise available of our hostess, author Jane Akshar, who is something of a local celebrity on her electric mobility scooter (see below) – the first in Luxor. Disabled visitors are welcome in Luxor and plenty of help is available at a reasonable price, but Jane is campaigning for better access at the big sites, where the ramps are often better for wheelchair users than wheelchairs.

Janet and Paul Robinson

We saw the warm welcome first hand at the Ramesseum, where coaches were disgorging hundreds of disabled adults and their helpers from Cairo, who had all come to see their beautiful country for themselves. Local people are still managing to smile despite money being tight, just like the wonderful potato seller in the picture (above). His potatoes had been simmering in the oven all night and we picked up breakfast from him on our way to Gebel Sisiya with Christmas pudding and mince pies for the team there. Imagine our surprise when Swedish archaeologist Maria Nilsson and her partner John Ward told us about the discovery of big new finds on the other side of the Nael (see “News”, page 8).

Karl L.

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Dianne Stein

Dear Editor,

Scottish Egyptian Archaeological Trust

Grant Allocation

Jennifer Turner, currently a student at Birmingham University has successfully been granted funds to visit Egypt as part of her course studies. She intends to conduct a piece of research which considers various interactions of text and image in Egyptian statuary specifically within the Karnak cache, and to consider these examples in relation to the ancient culture and the ancient audience. Ultimately the study aims to encourage discussion and engagement with Egyptian text and statuary.

Dianne Stein

Celebrating 17 Years!

To celebrate our humbleth issue, we asked some of our contributors to tell us about what they have enjoyed most in the magazine and any discoveries or major developments in Egyptology since we first launched in May 2000 they felt have been particularly important. Here is a selection of some of the comments we’ve received:

Wolfram Grajetzki

For me, one of the most important developments in Egyptology since AE® Magazine began, was in 2001: the mission of the Metropolitan Museum of Art, New York, re-excavated at Dahshur the mastaba of the Twelfth Dynasty official...