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Protection and Promotion of the Archaeological Site of al-Lāhūn: A Technical Study

One of the most attractive sites of the ancient kingdom of Moab is al-Lāhūn, located 82km south of 'Ammān, 7km south-east of Dhībān near the Kings' Highway and 3.5km south-west of Umm ar-Raṣāṣ. The site has been occupied from prehistoric to modern times. Its strategic location overlooking the ancient Arnon, modern Wādī al-Mūjib, and mild climate may have contributed to its prosperity in antiquity.

A generous grant from the European Commission to the Jordanian Ministry of Tourism and Antiquities, aimed at promoting the cultural heritage of Jordan, has allowed the transformation of al-Lāhūn's 66 hectares of ancient remains[1] into an attractive tourist attraction which provides an excellent synthesis of the history of central Jordan. The Belgian Committee of Excavations in Jordan produced an exhaustive report[2] of more than 100 pages describing the infrastructure needed to transform the site into a geo-archaeological park for tourists. This included both archaeological and folklore museums, as well as a 'handicraft house' where villagers could sell their products to tourists visiting the site. This article describes some of the technical problems encountered.

During the 9th ICHAJ Conference, three illustrated posters (60x90cm) summarised the efforts made to promote al-Lāhūn (FIGS. 1 - 3). As similar problems may be encountered at other archaeological sites newly opened for tourism, we hope that this technical study will help with the promotion and opening of new sites to the public.

In this article we will focus on the first poster (FIG. 1), which is devoted to the transformation of the archaeological remains[3]. It is based on the 24 much larger panels (90x120cm) placed at different locations on the site.

Bilingual Arabic-English text (FIG. 4), maps, drawings, sketches and pictures explain the most important ancient remains in each of the different sectors (A-E) of al-Lāhūn. At the top and bottom of each poster, the timescale is indicated in a different way according to the age of the visitor[4]. Each panel describes aspects of the nearby excavation. The backs of the panels display a global map of the site and all practical information needed for an easy visit, *viz.* roads, paths, parking, time required etc.

Design of the Panels

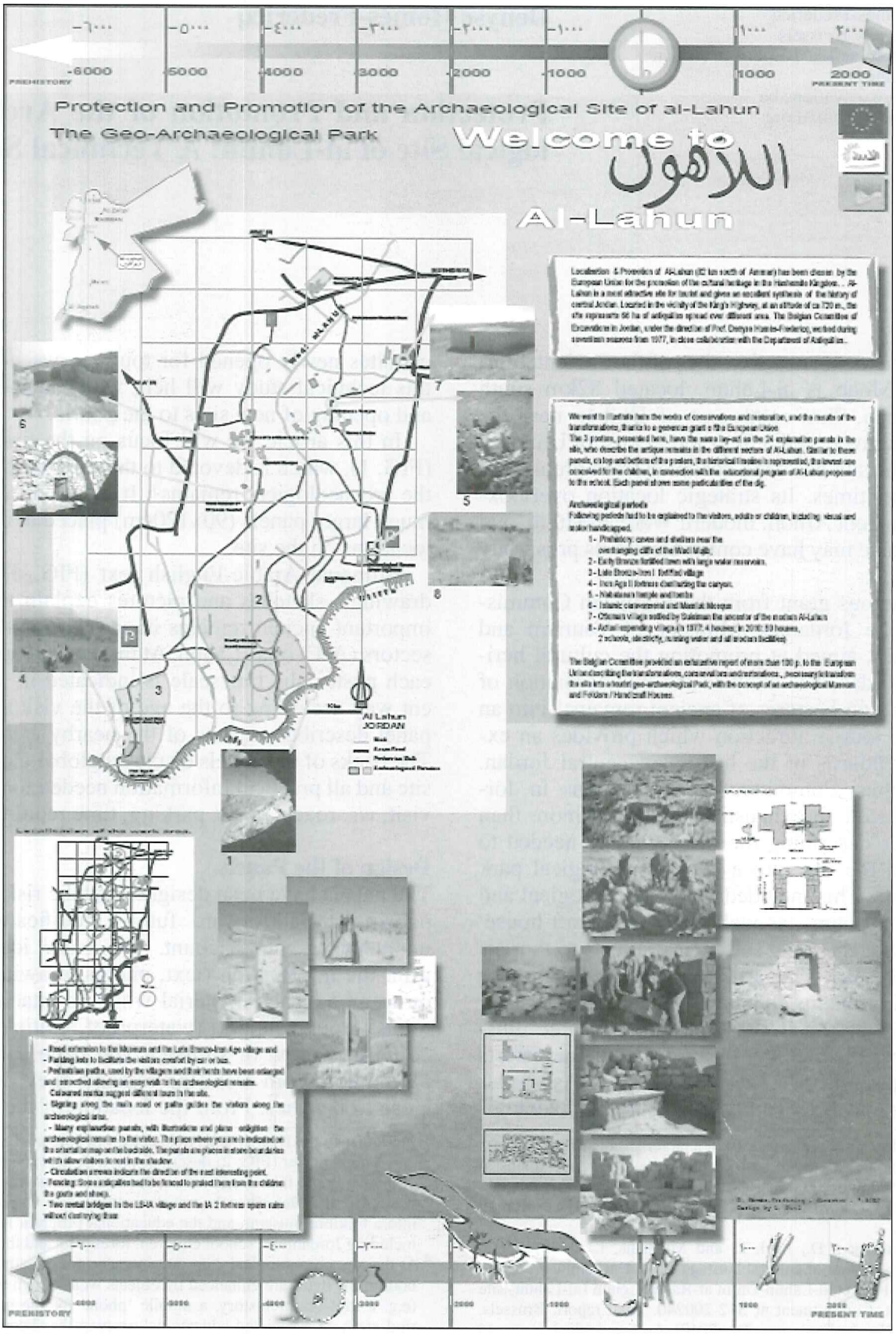
The panels have been designed to take risk of vandalism, straightforward future modification and maintenance into account. The basic idea is to print the information (text, photos, drawings etc.) on to an adhesive material which is attached to a robust ground support (waterproof multiplex, *Alu-co-bond*, *Trespa* or similar). The large panels are placed some 6m from the remains they describe, close to benches. From the location of the panels,

[1] The al-Lāhūn pilot project is part of a larger Umm ar-Raṣāṣ-Lāhūn project, the aim of which is to promote the historical remains of the al-Lāhūn and Umm ar-Raṣāṣ regions. Much work went into creation of the infrastructure needed for future tourists to enjoy their visit.

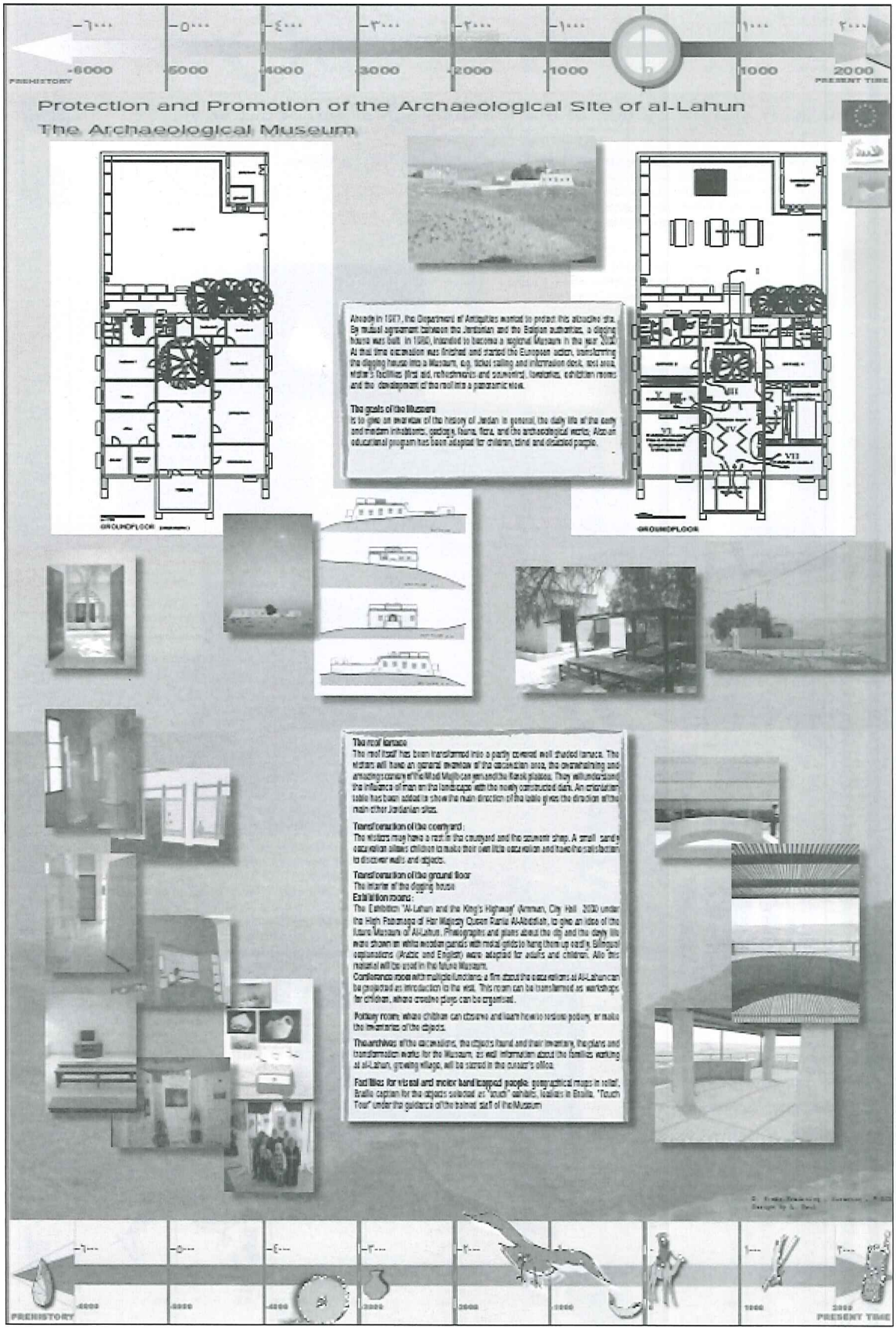
[2] Homès-Fredericq, D., Paul, L. and Moelants, L. (2002) Protection and promotion of cultural heritage in the Hashemite Kingdom of Jordan. Project al-Lāhūn-Umm ar-Raṣāṣ. Lehun (al-Lāhūn) site sub-project. Commitment nr S12-200240. Final report. Brussels. See also Homès-Fredericq, D. (2010) Archaeological past and tourist future of al-Lāhūn: a geo-archaeological park and museums. In Studies in the History and Archaeology of Jordan 10: 795-804.

[3] The second poster (FIG. 2) describes the technical transformation of the dig house into a regional archaeological museum. The third poster (FIG. 3) describes the transformation of an Ottoman house into a folklore museum and the educational program for visitors, including Jordanians, school children, foreigners and the disabled.

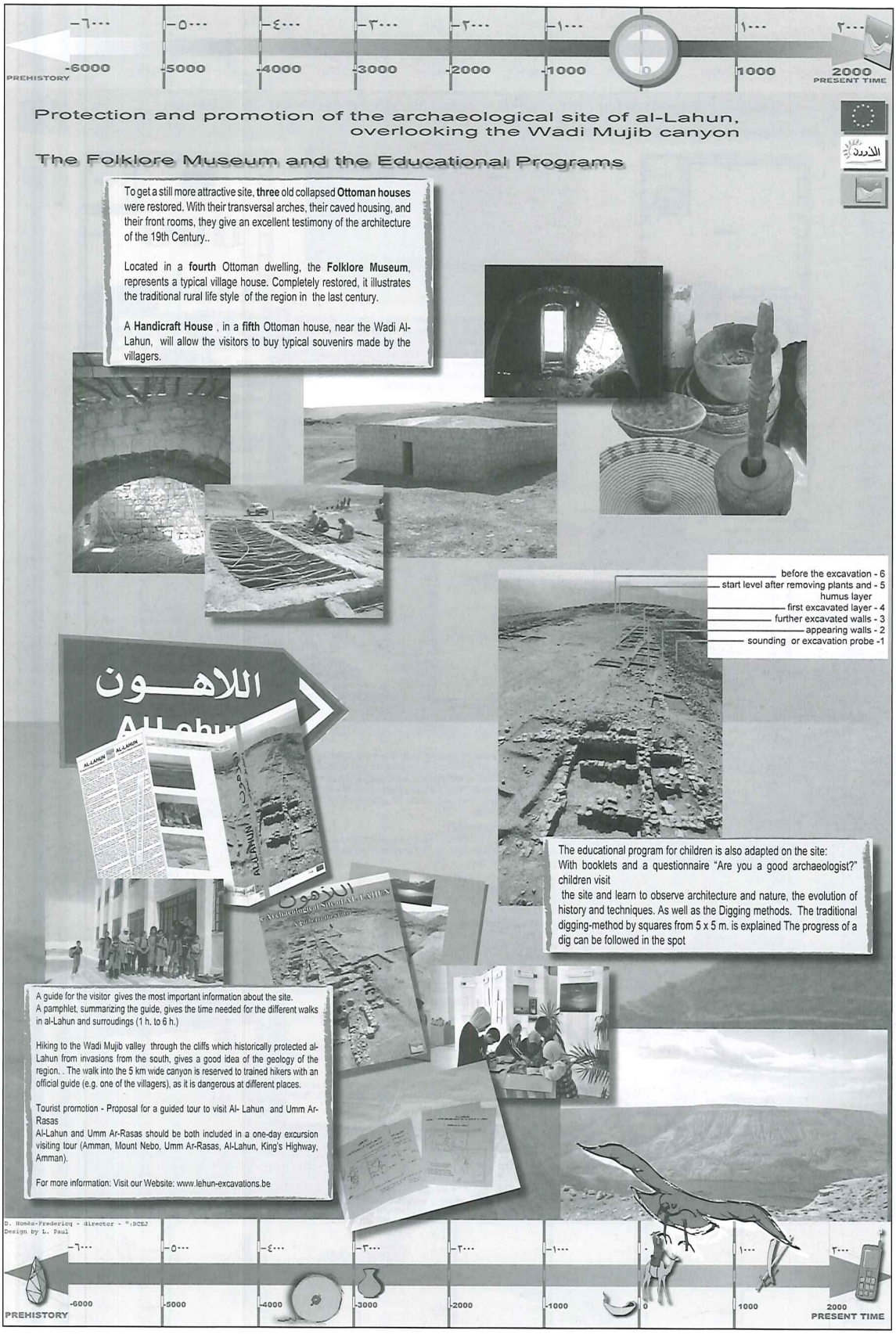
[4] At the top, chronological dates are intended for the adults. At the bottom the dates are enhanced by objects well-known to children (e.g. a flint for prehistory, a mobile 'phone for the modern period etc.); an associated educational program has been proposed to schools.



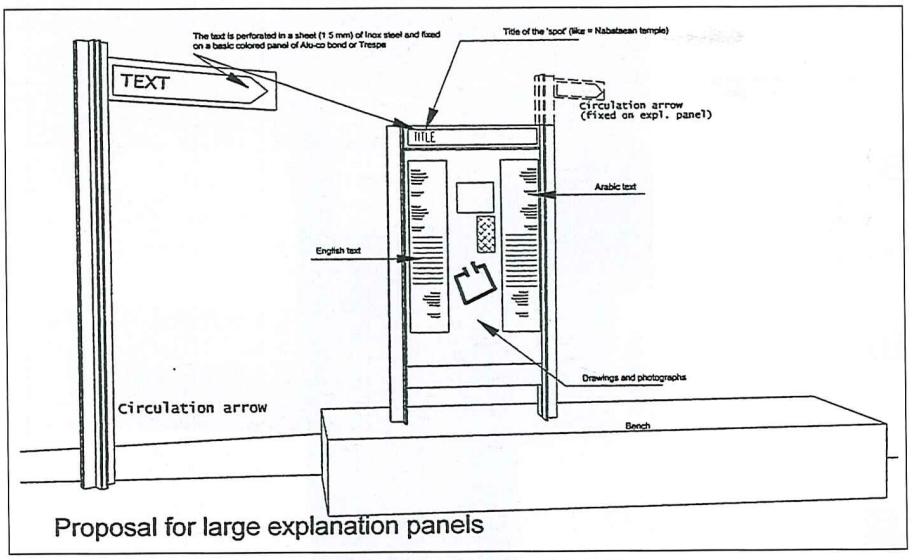
1. Poster 1- Conservation work at the geo-archaeological park of al-Lāhūn.



2. Poster 2- Transformation of the dig-house into an archaeological museum.



3. Poster 3- Folklore musume and educational program.



4. Panel conception as proposed in the report (p. 27, fig. 12) for the European Commission.

it is possible for guides to explain different aspects and sectors of the site (FIG. 5): (1) the geology of the region (C1, D), (2) prehistoric caves and shelters near the overhanging cliffs of Wādī al-Mūjib (C1, D), (3) the impressive Early Bronze I-II fortified town with large water reservoirs and tombs (C1, B3), (4) the well-protected village of the Late Bronze Age-Iron Age I (D), (5) the Iron Age II fortress dominating the canyon (D), (6) the Nabataean temple and small channel (B1, B2), (7) the early Islamic caravanserai and Mamluk mosque (A1, A2), (8) the Ottoman village settled by Suleiman (C2, B1) and (9) the expanding modern village[5].

All these remains, as well as the Belgian dig-house (B3) and an Ottoman dwelling (B1) are now part of the geo-archaeological park.

The Archaeological Park (FIG. 6)

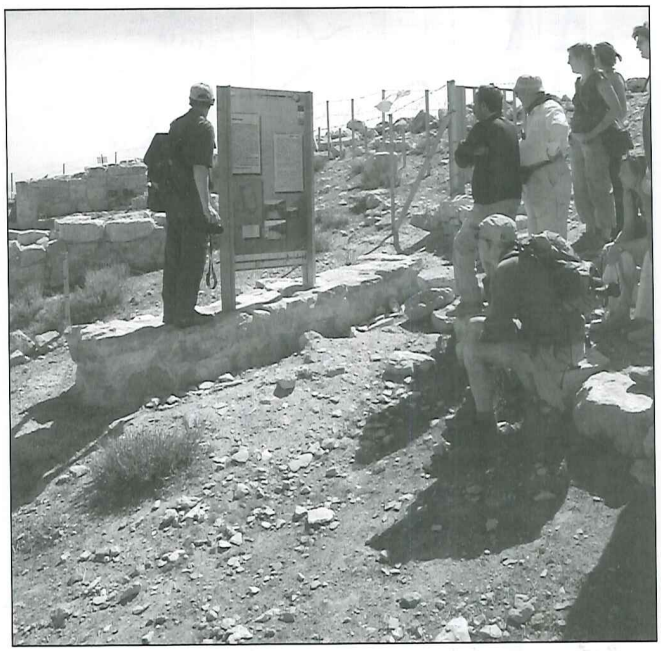
Here, we will try to summarise some of the issues to be taken in consideration when transforming an archaeological excavation into a tourist attraction.

Access

Easy access to al-Lāhūn must be provided, including signs on highways and the main road leading to the site itself. The signs must take local climatic conditions into consideration, as well as risk of vandalism, need for maintenance and ease of future modification.

Roads

Existing tracks on the site have been repaired and



5. Visitors in Sector B2, near the Nabataean temple.

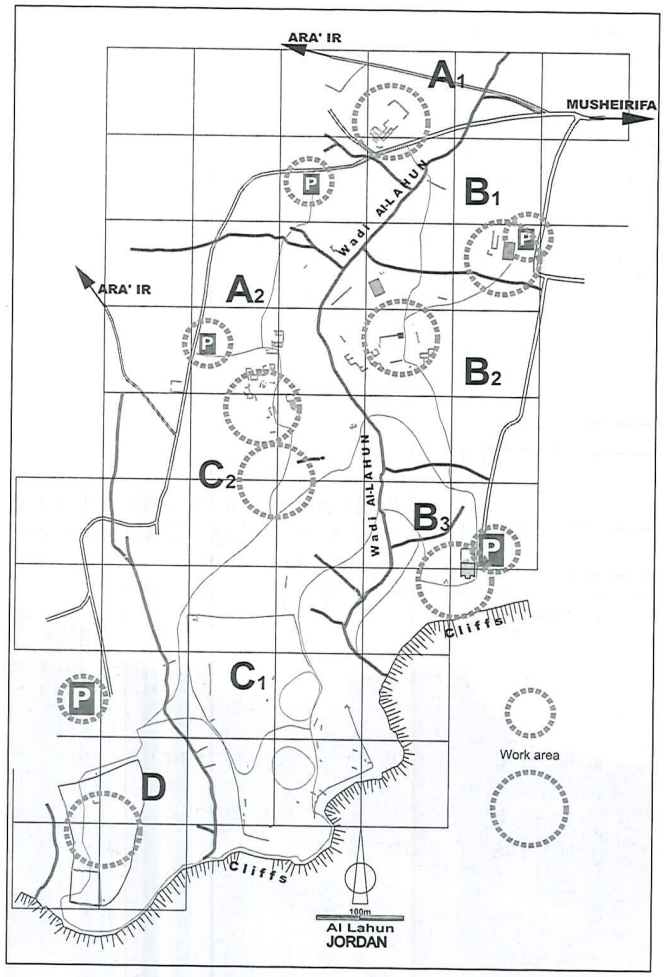
two have been extended, one leading to the future archaeological museum (B3) and the other to the Late Bronze Age-Iron Age village (D). Use of permeable compacted and stabilised gravel was recommended, rather than asphalt, owing to the high summer temperatures experienced in the region.

Parking

Several car-parks have been created:

A car-park (*ca.* 350m²) large enough for two buses and ten cars has been constructed next to

[5] In 1977: four houses; in 2010: 50 houses, two schools, electricity, running water and all modern facilities.



6. Location of works at al-Lāhūn, with indication of sectors and periods.

7. Panels and arrows with the large car-park in the background.

the archaeological museum (FIG. 7). It consists of a flat surface of permeable, compacted and stabilised limestone gravel close to the slopes of Wādī Lāhūn. It is intended for those who wish to visit the museum and admire the panoramic views of Wādī al-Mūjib from its roof-terrace (see FIGS. 12 and 16). Pamphlets about the site, the archaeological park and the possibility of hiking to the Wādī al-Mūjib dam are available.

A medium-sized car-park (*ca.* 250m²) allows tourists to gain access to the Early Bronze Age town (C1) and Iron Age village-fortress (D) by bus or car.

Three small lay-bys (each *ca.* 50m²) have been constructed along the road. These small parking areas are well-integrated within the landscape and facilitate circulation. Visitors with limited mobility will still be able to access the Nabataean temple, folklore museum, Islamic caravanserai and Mamluk mosque. Rest-sites, with benches and explanation panels, have been sited nearby.

Circulation Arrows

15 circulation arrows (on 2.55m high posts), placed along footpaths and at main road junctions, indicate the route to the next interesting point (FIG. 7). Bilingual Arabic and English text is placed on each side of the arrows.

Footpaths

For visitors who wish to enjoy a beautiful and easy walk at the site, a number of footpaths previously created by the villagers and their flocks have been extended or graded. They are integrated into the modern village and its natural environment. In general, the paths have not been changed, except for occasional widening to no more than 90cm, as we didn't wish to change the atmosphere of this quiet and peaceful village. Excess stones have been used to delineate the footpath, or create steps where the slope is steep.

Along these footpaths, markers in galvanised steel and coloured concrete allow visitors to choose

different routes around the site, depending on the time and interest levels of the visitor[6].

Explanation Panels

A variety of orientation and explanation panels have been placed in selected locations across the site.

The ten large explanation panels (90x120cm) (FIG. 7), framed by chronological timelines, are mainly divided into three equal, vertical columns in the front side, with English text on the left, Arabic on the right and illustrations, including maps, reconstruction drawings and photos, in the middle. Font size has to be large enough to be legible; letters are therefore at least 1cm high. A global orientation plan can be found on the back of each explanation panel, giving the location of the visitor.

15 small explanation panels (90x40cm) are placed near special, interesting remains and give brief details.

Various numerical signs, made of local limestone blocks, are fixed to concrete foundations set into the ground. A stainless steel plate with perforated Arabic and English numerals is attached to the inclined surface.

Site-Protection and Fencing

Although fencing is one way to protect monuments and/or sites, fencing all 66,000m² of al-Lāhūn isn't feasible. The site is both too large and home to an expanding rural community. The villagers regularly traverse the area to visit relatives, with or without their flocks. At the same time, the southern part of the site is naturally protected by the cliffs of Wādī al-Mūjib. It is thus unnecessary to put a fence around the whole site, as at Umm ar-Raṣāṣ. Nevertheless some of the monuments of al-Lāhūn require protection from goats, sheep and careless children.

Fences must be strong and in keeping with the local environment. Their life-span, maintenance, efficiency, aesthetics and integration within the landscape all need to be taken into consideration. Site-cleaning is also an essential part of long-term protection.

Fencing Particular Monuments

We recommended that fencing of the Nabataean temple (B2) (FIG. 8) and Mamluk mosque (FIG. 9) be done with barbed wire on posts with a maximum height of 1.5m. In order to tone down the visual impact of the enclosure, local plants could be grown along the inside of the fence.

8. Fencing of the Nabataean temple and explanation panel.

9. Fencing of the Mamluk mosque and explanation panel.

The Mamluk mosque needs a clear warning panel requesting that people do not destroy or damage it, owing to the vulnerability of this structure. The locked door on the north side will only be opened for guided visits.

Restoration

Depending on its state of preservation, an ancient monument may need technical care to preserve it for posterity. Several restoration options exist: hard and soft restoration, anastylosis, conservation and consolidation. Only soft restoration (including consolidation and conservation) has been carried out at al-Lāhūn. All restoration works are in accordance with the Venice Convention.

In general walls have been kept low, to avoid confusing archaeological remains with restorations. Consolidation of walls, which range in height from *ca.* 20 to 160cm in Sector D alone, is done with local materials. The following mortar was used: cement/ Suwayliḥ sand/ lime/ sieved Lāhūn earth in a ratio of 1:1:2:3; the latter lends a suitable colour to the mortar. The method of res-

[6] Dark blue paths give a complete tour of the excavations. A yellow path, crossing Wādī Lāhūn, leads to the Mamluk mosque, Ottoman houses and Early Bronze Age and Iron Age settlements. A light blue path leads from the Nabataean temple to the folklore museum etc.

toration has been clearly defined. First, the walls have to be thoroughly cleaned, which includes the removal of small stones, to a depth of at least 5cm into the joint. In so doing, one can be sure that the wall will be fully protected against the vagaries of climate and human interference. After applying the mortar, it is necessary to brush it to give it a less artificial look and to make a single consistent layer. The mortar must be kept wet for several hours after application in order to prevent it from cracking. Covering it with wet sheets for one or two days also helps. This combination turned out to be the best method for restoration at al-Lāhūn.

Room interiors will be cleaned and levelled with earth, and then covered with a sheet of 'geo-textile'. The floor should then be covered with a 10cm layer of local gravel.

Mamluk Mosque (15th Century AD) (A2) (FIG. 10)
This mosque, excavated in 1987 and re-examined in 1999, was starting to collapse as well as being dangerously overgrown by vegetation. Its courtyard, entrance and eastern wall were deteriorating fast. This unique monument is one of the few late Mamluk religious buildings in the area and is a perfect example of the rural architecture of the 15th century AD. It was restored as a matter of urgency. The area around the mosque was thoroughly cleaned; the interior was completely cleared, and the entrance pillars and western interior wall consolidated. Special attention was paid to the double-wall construction, which suggested a vaulted roof. The courtyard was also cleared to original ground-level and afterwards levelled.

10. Mamluk mosque after restoration.

Islamic Farmstead/ Caravanserai (A1) and Mamluk Village (15th Century AD) (A2)
The excavated buildings need to be consolidated according to the abovementioned method. No other work has been undertaken.

Nabataean Temple (1st centuries BC/ AD) (B2) (FIGS. 8 and 11)

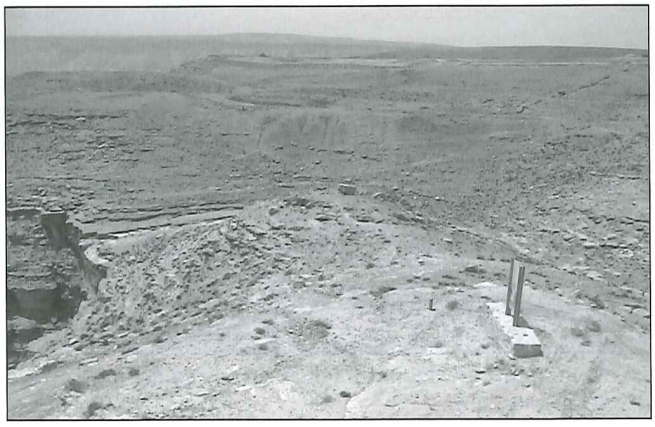
As the modern mortar is cracking, some of the earlier restorations of the interior and exterior of the Nabataean temple are in need of repair, especially around the edges of previous work. The altar inside the temple (FIG. 11) had also been restored in previous years, but the upper part needed to be restored again. The upper entablature, or cornice, was repaired with stones cut in the Nabataean manner, of the same dimensions as the originals.

Early Bronze Age I tomb (3200-3000 BC) (B3) (FIG. 12 *foreground)*

Although the Early Bronze Age tomb near the museum is no longer visible, the 5x5 m excavation squares have been laid out as if the dig was still ongoing. This enables the quadrant system, still one of the main principles of an archaeological dig, to be explained to the public Looking from the museum terrace, it will be easy to draw the visitor's attention to the 100x100m grid which covers the whole site (green lines), to topographical reference points (white), and to the 5x5m squares of the archaeological dig itself[7]. Completion of this part of the project awaits the opening of the museum.

11. Restoration of the Nabataean temple and altar.

[7] To define the 125x5m excavation squares, small metal posts (30cm high) should be placed at each corner of the 5x5m squares, plus small posts on the southern and eastern sides to define 4x4m squares for excavation and baulks for transportation of excavated earth and stones. The 5x5m square posts should be linked by red nylon rope, 2-3mm in diameter. The southern and eastern sides of the 4x4m square, i.e. the baulks, should be linked by blue rope of the same diameter. Using this system, workers can easily visualise where to put their wheelbarrows or baskets. We have sought permission to make a polyester cast of the pottery found in the tomb; the original pieces will be exhibited in the museum.



12. General view of al-Lāhūn facing west (Sectors B3, C1 and D).

Early Bronze Age Settlement (3200- 2300 BC) (C1) (FIG. 12 *middle)*
Restoration of the Early Bronze Age houses was partially completed during excavation and was thought of as 'salvage restoration'. Owing to climatic conditions, many cracks have appeared but the stones are still standing. Nevertheless, the cement is both weak and in need of repair. The colour of the new cement had to be adjusted by adding earth from al-Lāhūn to the mix. Wall foundations need to be hardened and the upper courses should be consolidated using the method described above.

A large *in situ* olive press (*ca.* 70cm in diameter) has been fixed to the ground. Also, stones around the rims of the two excavated cisterns need to be consolidated. The cistern openings also need to be covered with a frame and steel mesh for safety reasons.

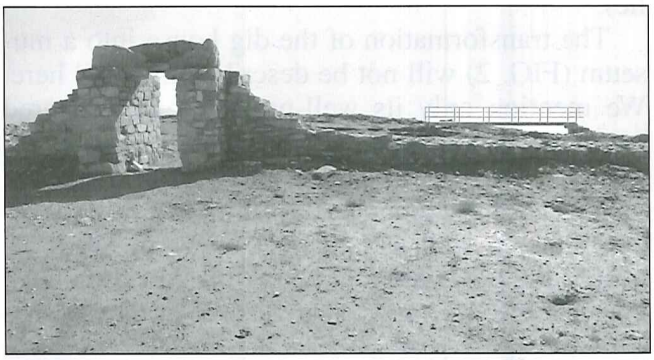
Sector D
The architectural remains of Sector D (FIG. 12 background) are suffering from erosion, climatic degradation and human interference. Consolidation works were carried out between 1993 and 1999. In order to give a clear overview of the architectural plan, all excavated floors should be covered with a layer of fine gravel.

Iron Age I Village
The precinct wall, Pillar House, Scarab House and a few excavated dwellings are all in need of restoration and repair. The cistern in the south-eastern part of the village needs to be blocked for safety[8].

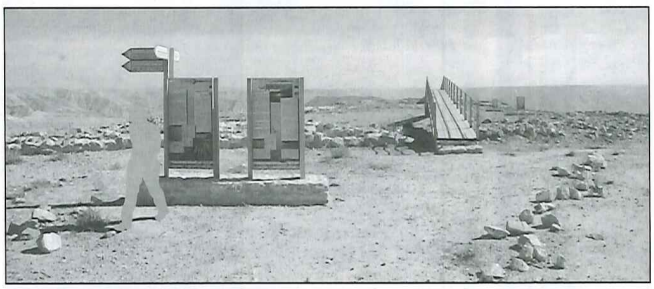
Iron Age Fortress (FIG. 13)
The monumental entrance on the north side of the fortress gives a good impression of one of the only forts in central Jordan dating to the reign of King Mesha (9th century BC). A reconstruction of the gate has been made, based on the dimensions of the existing lintel and surviving walls.

Consolidation of a Reconstructed Part of the Fortress Rampart
It was deemed worthwhile to create a 'witness' wall to establish what the original height of the rampart might have been. Therefore, all stones fallen from the wall and covering the immediate vicinity of the rampart were taken for reconstruction some distance east of the fortress.

Panoramic Footbridges (FIGS. 13 and 14*)*
Two panoramic footbridges have been constructed of steel in Sector D, passing over the ruins without destroying them. The bridge over the northern part of the Late Bronze Age-Iron Age village (FIG. 14)



13. Restoration of the Iron Age fortress gate, with small footbridge in background.



14. Footbridge over the Late Bronze Age-Iron Age village with explanation panels.

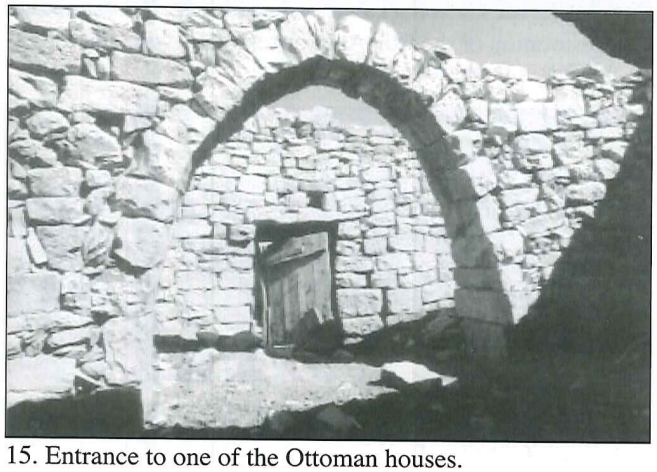
[8] For educational purposes, six 5x5m squares near the Scarab House allow for visualisation of the progress of a dig: (1) before excavation, (2) first level with plants and topsoil, (3) first excavated layer, (4) emerging walls, (5) excavated walls and (6) sounding/ excavation probe (see FIG. 3).

is *ca.* 15m long and 1m wide. It is constructed of galvanised steel beams with a pine walkway, and includes a hand-rail on both sides. Its foundations are a combination of concrete and/ or steel piles; no archaeological remains were touched.

Ottoman Houses (C2) (FIG. 15)
Four Ottoman houses, built in re-occupied caves, provide interesting details of typical village architecture of the al-Lāhūn-Umm ar-Raṣāṣ region. With their transverse arches, cave-housing and front rooms, they are excellent examples of 19th century structures. Until a few years ago, they were used as granaries by the villagers but are now collapsing because of a lack of maintenance. Intervention was urgently needed to maintain these buildings in a good state of preservation.

As these houses are not suitable for use as exhibition space, we recommend that the entrances be closed with an iron gate, allowing visitors to look in from outside. One of these houses could be converted into a handicraft workshop. A fifth house (in Sector B1) has been restored and will become the folklore museum (FIG. 3) (not yet open to the public).

The transformation of the dig house into a museum (FIG. 2) will not be described in detail here. We mention only its well-protected and covered roof terrace, with a panoramic table giving directions to the main Jordanian sites. From there, the visitor will have an overview of the whole excavation area, as well as beautiful views of Wādī al-Mūjib, the new dam and Karak plateau (FIG. 16). Poster 2 (FIGS. 2 and 3) show some of these transformations, as well as details of the educational program. The works sponsored by the European Commission are completed, but the museums and educational program have yet to be realised.



15. Entrance to one of the Ottoman houses.

16. Panoramic view facing south as seen from the roof terrace of the museum.

Acknowledgments
I would like to express my gratitude to the following institutions and colleagues who have helped during 17 years of excavation and promotion of al-Lāhūn as a tourist geo-archaeological park: the European Commission for their generous grant, successive Directors of the Department of Antiquities (Dr A. Hadidi, Dr G. Bisheh, Dr S. Tell and Dr F. al-Khraysheh) and all members of the Department of Antiquities who facilitated the project. We are especially grateful to M. Ali al-Khayyat (Archaeological Director of the Mādabā district) and Mr A. Abu Kherayeh (representative of the Department of Antiquities) who carefully supervised the work of the al-Nabar Construction Company over 14 months. The Belgian Embassy has helped us on several occasions; we warmly thank HE M. de Schoutheete de Tervarant, HE M. Godfrind and HE J. Indekeu. Last, but not least, I am greatly indebted to my two architects, L. Paul and L. Moelants, who prepared the reports with enthusiasm, and to all members of the team.

Illustrations
 Drawings, maps and plans by L. Paul. Poster photos mainly by W. De Lauwer. Photos of restoration works by L. Paul, D. Homès and the author.