



THE LOST ALTAR OF THE PTOLEMAIC SANCTUARY AT HERMOPOLIS MAGNA (EGYPT): HYPOTHETICAL RECONSTRUCTION AND PUBLICATION OF THE RIZKALLAH MAKRAMALLAH EXCAVATION WORK

EL ALTAR PERDIDO DEL SANTUARIO PTOLEMAICO DE HERMÓPOLIS MAGNA (EGIPTO): RECONSTRUCCIÓN HIPOTÉTICA Y PUBLICACIÓN DE LAS LABORES DE EXCAVACIÓN DE RIZKALLAH MAKRAMALLAH

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Highlights:

- This paper deals with a descriptive, analytical study and representations of unpublished photographic archives, housed at the British Museum from a 1945 excavation conducted by Alexandria University.
- The architectural relation between the edifices of Hellenistic sanctuaries in Egypt, as presented through the Hermopolitan and Alexandrian Ptolemaic sanctuaries.
- The monument was reconstructed using 2D and 3D technologies, relying on both AutoCAD and SketchUp, from an archaeological and historical perspective.

Abstract:

The research tackles the study, publication, and hypothetical three-dimensional (3D) reconstruction of a mudbrick construction from the Ptolemaic period, situated within a Hellenistic sanctuary at Hermopolis Magna in Middle Egypt. The sanctuary site was excavated in 1945 by Rizkallah Makramallah, a former lecturer at Alexandria University, whose findings remained largely unpublished and obscure until the present study. This study enhances our understanding of the reconstruction potential of the mudbrick construction, proposed as a lost Hellenistic altar, in relation to the broader sanctuary complex. Furthermore, it elucidates the architectural and spatial planning dynamics between Hellenistic sanctuaries at Hermopolis Magna and Alexandria; this provides novel comparative insights into the religious, civic, and ceremonial functionalities of such monuments throughout the Ptolemaic period. With the inaugural academic publication of Makramallah's excavation findings, derived from his photographic archives now preserved at the British Museum, the Hermopolis Magna sanctuary is reconstructed with enhanced detail and coherence, significantly transforming scholarly interpretations of both the monument and its functional context. The significant challenges faced included the absence of field notes, architectural drawings, or published plans; thus, it was necessary to rely on meticulous visual analyses of the photographic evidence captured from multiple perspectives and in different preservation conditions. These images underwent interpretative and comparative scrutiny; they were integrated into advanced 2D and 3D digital modelling software to reconstruct the monument's form, proportions, layout, and architectural characteristics. The reconstructed structure is subsequently examined in relation to typologically analogous Hellenistic altars discovered in Egypt, mainland Greece, and Asia Minor. This multidisciplinary approach not only revitalises an overlooked aspect of the sanctuary, but also enhances the broader understanding of the topographical, urban, and religious landscapes of Hermopolis Magna during the Graeco-Roman period. This research also proposes novel hypotheses concerning spatial organisation, monumentality, cultic accessibility, and ritual practices within provincial Ptolemaic sacred architecture.

Keywords: Ptolemaic Egypt; Hellenistic architecture; excavation reports; 3D reconstruction; Hermopolis Magna

Resumen:

La investigación aborda el estudio, la publicación y la reconstrucción hipotética tridimensional (3D) de una construcción de adobe del período ptolemaico, situada dentro de un santuario helenístico en Hermópolis Magna, en el Egipto Medio. El sitio del santuario fue excavado en 1945 por Rizkallah Makramallah, antiguo profesor de la Universidad de Alejandría, cuyos hallazgos permanecieron en gran parte inéditos y poco conocidos hasta el presente estudio. Esta investigación amplía nuestra comprensión del potencial de reconstrucción de la estructura de adobe, propuesta como un altar helenístico perdido, en relación con el conjunto más amplio del santuario. Además, aclara la dinámica de planificación arquitectónica y espacial entre los santuarios helenísticos de Hermópolis Magna y Alejandría, proporcionando nuevos conocimientos comparativos sobre las funciones religiosas, cívicas y ceremoniales de estos monumentos a lo largo del período ptolemaico. El estudio enfrenta los importantes desafíos derivados de la ausencia de

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notas de campo, dibujos arquitectónicos o planos publicados; así se hizo necesario realizar un análisis visual meticuloso de la evidencia fotográfica capturada desde múltiples perspectivas y en diversos estados de conservación. Estas imágenes fueron sometidas a un escrutinio interpretativo y comparativo, integrándolas en software avanzado de modelado digital 2D y 3D; se pudo así reconstruir la forma, las proporciones, el diseño y las características arquitectónicas del monumento. La estructura reconstruida se examina a continuación en relación con altares helenísticos análogos desde el punto de vista tipológico, descubiertos en Egipto, Grecia continental y Asia Menor. Este enfoque multidisciplinario no solo revitaliza un aspecto previamente olvidado del santuario, sino que también mejora la comprensión global de los paisajes topográficos, urbanos y religiosos de Hermópolis Magna durante el período grecorromano. Además, este trabajo propone nuevas hipótesis sobre la organización espacial, la monumentalidad, la accesibilidad al culto y las prácticas rituales dentro de la arquitectura sagrada ptolemaica provincial.

Palabras clave: Egipto ptolemaico; arquitectura helenística; informes de excavación; reconstrucción 3D; Hermópolis Magna

1. Introduction

1.1. Contextual background

The presented study revolves around the unpublished photographs and work of Rizkallah Makramallah, a lecturer at Farouq I University, currently known as Alexandria University, from 1941 until his passing in 1949. The study is based on the photographic archives of Makramallah, currently housed at the British Museum Archives as part of the Alan Wace archives.

In 1945, Rizkallah Makramallah of Farouq I University, currently Alexandria University, and Henri Riad, the then-director of the Graeco-Roman Museum in Alexandria, excavated at the ancient site of Hermopolis Magna (El-Ashmunein) in Middle Egypt, primarily at the site of the Christian Basilica, which Wace revealed to have been built atop a Ptolemaic temple. Makramallah's work concentrated on the Ptolemaic Sanctuary underneath the nave area of the Basilica Church. His scholarly pursuits laid the groundwork for Wace's excavation in 1949 and research efforts at the Ptolemaic Sanctuary and the Christian Basilica at Hermopolis Magna, as Wace assumed control of the site following Makramallah's death (Habachi, 1956; Wace, 1946; Wace et al., 1959).

Makramallah's photographs were subsequently acquired by Wace, who conducted excavations at the same site that Makramallah had previously explored. After relocating to London, Wace departed from Egypt, taking with him the photographs produced by Makramallah. The entirety of Wace's archives was distributed among prestigious British institutions, with the majority of the collection, including Makramallah's work, being donated to the British Museum.

The excavations conducted by Makramallah were documented exclusively through photography. There exists a lack of supporting notes or documentation generated by either Makramallah or his successors. Furthermore, the excavations attributed to Makramallah have not been subjected to prior scholarly analysis. Researchers such as Wace in the 1950s, followed by Spencer and Bailey in the 1980s, referenced Makramallah's work without examining his uncovered findings. Documentation related to Makramallah's contributions remains limited, primarily serving to distinguish his work from that of Wace.

Although no visible remains of the discovered monument currently exist, the photographic archives are the only remaining reference to Makramallah's achievement. A handful of references mentioned Makramallah's

excavations without specifying this specific monument or its function. Fortunately, it was possible to reconstruct the monument using photographs from the British Museum Archives in relation to the ruins of the main temple.

1.2. Topographical and historical layout

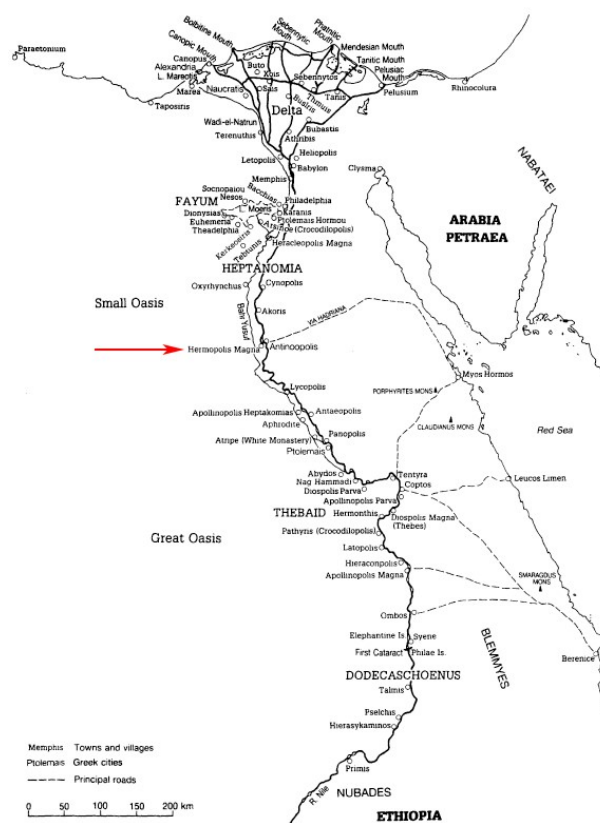


Figure 1: Map of Egyptian cities in the Graeco-Roman Period, highlighting the site of Hermopolis Magna. Photo after Bowman, 1986, p. 10, Fig. 1.

The archaeological site of Hermopolis Magna (Figs. 1, 2 and 3) is located atop El-Ashmunein Hill in Minya Governorate in Middle Egypt. Whilst the site lies 40 m above sea level, El-Ashmunein Hill lies 5 km north-northwest of Mallawi town, 15 km northwest of Amarna, and 240 km southwest of Cairo. The archaeological site is encircled by two villages: El-Idara to its north, and El-Ashmunein to its south. El-Ashmunein Hill resembles an island encircled by water, situated 3.5 km east of Bahr Yusuf and 5 km east of the Nile. Since the predynastic period, Hermopolis Magna has been the centre of worshipping Thoth, the Egyptian lunar deity of wisdom.

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Figure 2: Satellite image of El-Ashmunein Hill with the archaeological site highlighted. Photo after Google Earth Pro 7.3, modified by the author.

The site remained of value until its abandonment in the 10th century AD. However, Arab and European travellers referred to the site occasionally until the 16th century AD in its ruinous state. It was not until the French Expedition in the 18th century AD and the rediscovery of the site that Hermopolis Magna regained its historical significance through several archaeological discoveries (Roeder, 1959; Spencer, Bailey, & Burnett, 1983; Fathy & Abdelgawad, 2021).

The history of Hermopolis Magna stretches back to the Old Kingdom, if not to the Predynastic period. While Hermopolis has been the cult centre for worshipping Thoth, it became a major city in the Middle Kingdom. Hermopolis Magna became the seat of the Hermopolitan nomarchs during the 2nd Intermediate Period. Egyptian pharaohs paid much attention to Hermopolis in the New Kingdom, where lavish temples were constructed, and expensive offerings were dedicated (Allen, 2002). The main temple of Thoth underwent several renovations, reaching its peak expansion during the Late Period, when an entire Late Period temple replaced the New Kingdom Temple's naos. Most notable were the efforts and renovations carried out by the High-Priest Petosiris during the Late Period, followed by several modifications in the early Ptolemaic period (Lefebvre, 1924).

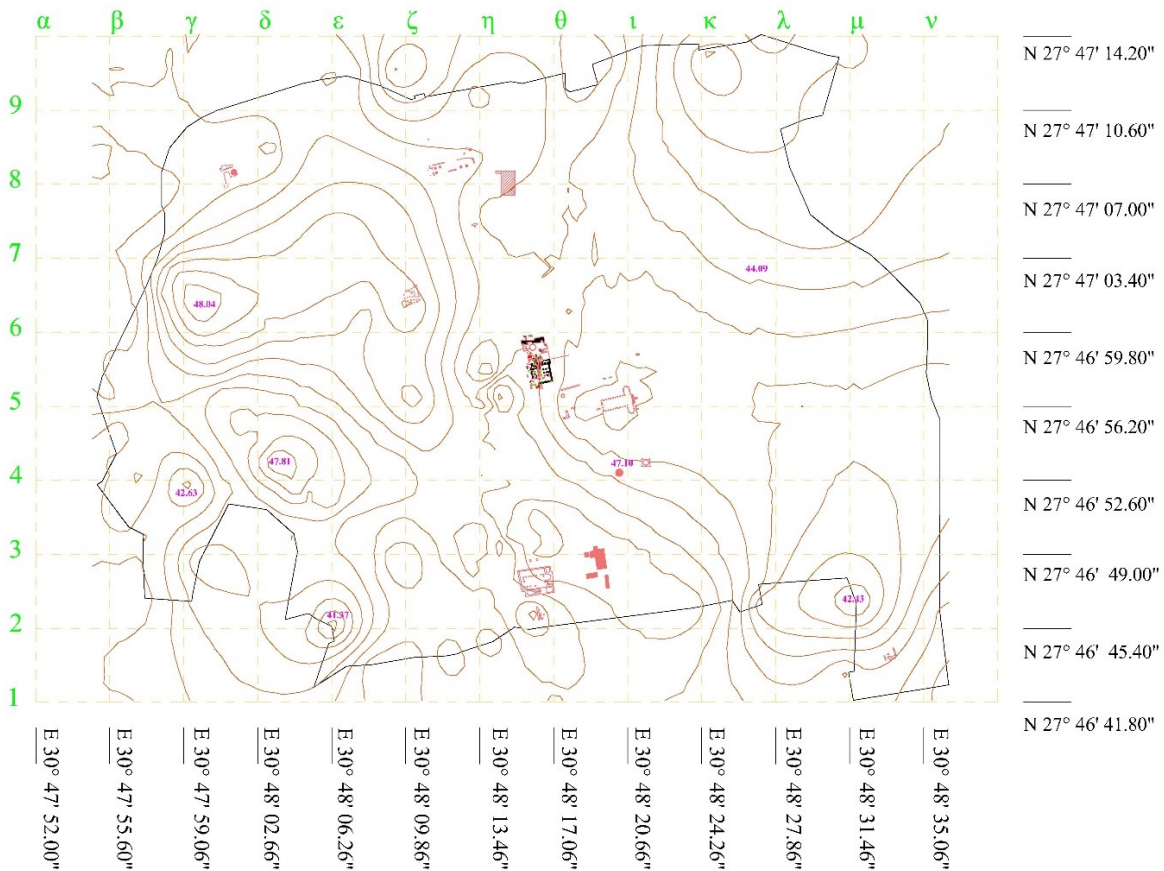


Figure 3: Geography and topography of Hermopolis Magna.

The city's expansion under the Ptolemaic kings brings us to the core of this study. In addition, the entire city was replanned and rebuilt during the Antonine period from a Roman perspective. Roman buildings mostly survived the Byzantine period, even with the erection of churches atop pagan temples; the same planning remained, except for the conversion of the Holy Precinct into a residential area (Fig. 3). The city remained inhabited during the Islamic period until the 10th century AD. Locals abandoned the ancient city, leaving only the churches and monasteries in use until the 16th century AD, with the rise of the modern village (Spencer, Bailey, & Burnett, 1983).

2. State-of-the-art literature review

2.1. Previous excavations at the site of the Ptolemaic Sanctuary and the Christian Basilica

The site of the Ptolemaic Sanctuary and the Christian Basilica has been identified in 1905 (Fig. 4) by local and Italian archaeologists (Breccia, 1905; Biondi & Schiaparelli, 1905; Châban, 1907) who proclaimed the site to be a Roman agora, based on the Repair Papyrus of Aurelius Appianos (P.Vindob. gr. 12565) from the 3rd century AD (Baraize, 1940; Kamal, 1947; Bailey et al, 1991; Van Minnen, 1997). Between 1929 and 1939, the German mission of the Römer- und Pelizäus-Museum of Hildesheim acknowledged the proclamations of the building being a Roman agora without carrying out excavations at the site (Roeder, 1959, Flossmann-Schütze, 2021-2022).



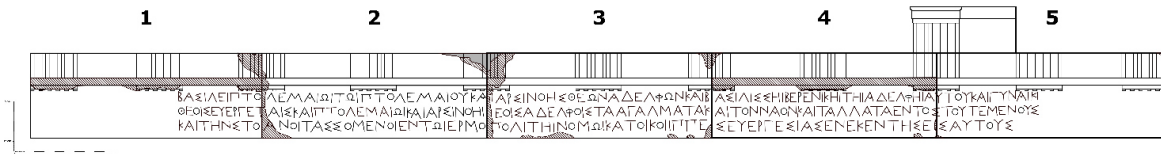
Figure 4: Ruins of the Basilica Church (1905). Photo from the Museo Egizio Archives.

In 1939, French archaeologist Émile Baraize conducted a restoration mission at the tetrastylon of the proclaimed agora. Baraize aimed to restore the entrance to the proclaimed agora overlooking the main East-West Road of the city. Baraize, then, realised that the agora (Figures 5 & 10a) is, in fact, a Christian Basilica (Baraize, 1940; Wace et al., 1959, Wilkinson, 2000). Baraize's theory was confirmed by Kamal in 1942 during his study of the Repair Papyrus of Aurelius Appianos, and the site was confirmed to be a Christian Basilica from the 5th century AD (Kamal, 1947).

Additionally, Baraize unearthed a five-block inscribed Doric frieze (Fig. 6) in the same year. The inscription was studied and published by Wace, who presented the hypothesis that the Christian Basilica was built atop a Ptolemaic temple, in which its blocks were dismantled and reused for the construction of the Basilica (Wace, 1945; Wace, 1946; Bernard, 1999).



Figure 5: Ruins of the Basilica Church (1939). Photo After Baraize, 1940, pl. XCII.



(a)



(b)

Figure 6: The 5-block inscribed Doric frieze from the Ptolemaic Sanctuary: a) reconstruction and photogrammetry; b) current state. Photos after Jedrzejewski, 2023, Abb. 52 & 53.

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Between 1945 and 1949, Alexandria University excavated the double site of the Ptolemaic Sanctuary and Christian Basilica (Leclant, 1952) (Fig. 7). Excavations began in 1945 under Makramallah, the author of the unpublished archives upon which this research is built. Makramallah excavated between February and July of 1945. Although it was most unfortunate that Makramallah never published his discoveries, glimpses of his work were mentioned by his successors, mostly by Professor Alan Wace, a lecturer at Alexandria University at the same time as Makramallah. The only literature available by Makramallah himself is the photographic archives presented in this study. Makramallah's excavations focused on the western half of the site, where he uncovered the original Ptolemaic entrance to the sanctuary, which faced westwards. Flanking the entrance are two rows of shops, dating to both the Ptolemaic and Roman periods. Makramallah also excavated south of the Basilica Church, where he uncovered the southern stoa, and original walls and foundations of the Ptolemaic Sanctuary (Wace et al., 1959; McKenzie, 2010).

In 1949, Wace began excavating at the same site. Wace's mission was a collaboration with the Department of Antiquities in Egypt and the British Department of Antiquities in Cyprus. While Wace mentions Makramallah's contributions, he focuses mainly on the Basilica Church (Fig. 8), its replanning, architecture, and reconstruction (Wace et al., 1959).



Figure 7: The state of the Ptolemaic Sanctuary/Basilica Church site prior to Makramallah's work (1944). Photo after Bailey et al., 1991, pl. 116, Fig. a.



Figure 8: Ruins of the Basilica Church (1949). Photo after Wace et al., 1959, pl. 20, Fig. 2.

By observing the map Wace presented regarding the Christian Basilica layout atop the Ptolemaic Sanctuary (Fig. 11), Wace included parts of Makramallah's discoveries west of the Basilica Church. However, Wace mentions in his publication that he deliberately omitted a section of Makramallah's discoveries, referring to the mudbrick walls proclaimed to be from the Pharaonic period. This omitted section is the base of this study. The monument in question would have likely never been discovered without the photographs held in the British Museum archives.

Between 1987 and 1990, Warsaw University's Polish Centre for Mediterranean Archaeology in Cairo excavated the Basilica site in an attempt to uncover buried sections from both the Ptolemaic Sanctuary and the Basilica Church and restore fallen columns. The mission conducted a detailed and extensive study to understand and rescue the tetrastylon from demise (Fig. 10b,c). Additionally, the Polish mission has uncovered Late Period artefacts, suggesting that the site may date back to the ancient Egyptian period, and the possibility of an ancient Egyptian presence beneath the Ptolemaic Sanctuary. This led to confusion with the origin of the discoveries by Makramallah (Barański, 1989; Gromnicki et al., 1989; Barański, 1990; Barański, 1992; Krzyżanowski & Olbryś 1992; Barański, 1996; Barański, 2002; Barański, 2004; Barański, 2019).

In 2021, a joint Egyptian-American mission took over to restore and re-erect the remaining columns of the Basilica. The mission also excavated underneath the tetrastylon, revealing several architectural blocks from different periods (Fig. 9). The mission succeeded in restoring and stabilising the foundations of the tetrastylon (Fig. 10c,d), in addition to erecting and restoring several columns from the northern nave of the basilica (Trnka-Amrhein, 2024).

However, the mission has favoured the restoration of the Basilica Church over the Ptolemaic Sanctuary, leading to the use of permanent and solid foundations for the columns of the Basilica. This would prove troublesome for any researcher aiming to uncover the Ptolemaic layers. The dismantling of the columns of the Basilica and its solid foundations would be expensive and destructive to any Ptolemaic monument or artefact underneath the solid foundations.



Figure 9: Architectural blocks excavated underneath the tetrastylon of the Basilica Church (2024).

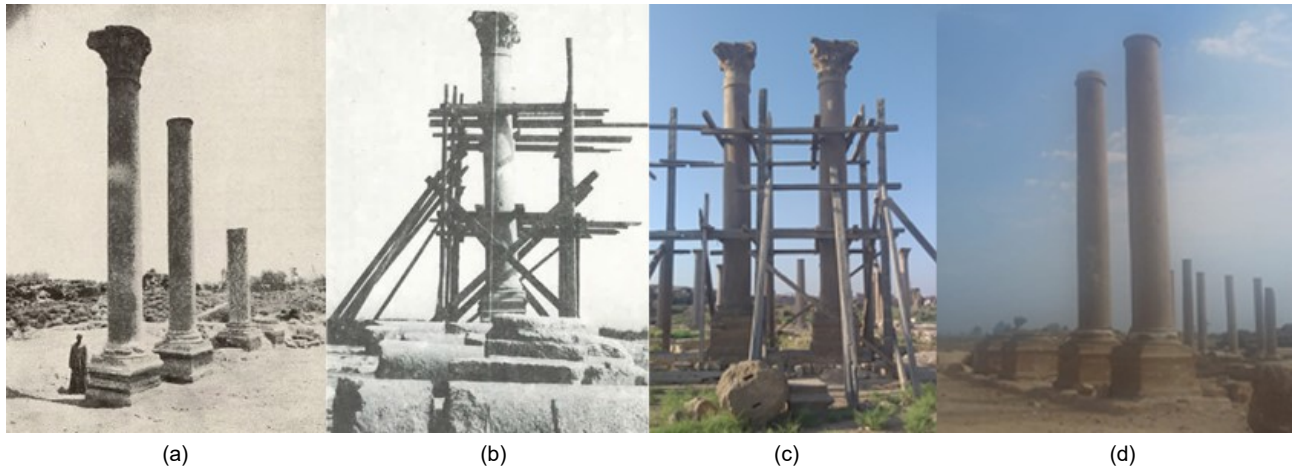


Figure 10: The tetrastyle of the Basilica Church: a) after Baraize's restoration mission (1939), photo after Baraize, 1940, pl. LXXXVIII, Fig. 2; b) after Baranski's restoration mission (1987-1990), photo after Gromnicki et al., 1989, p. 21, Fig. 1; c) prior to the Egyptian-American Mission restoration mission (2023); d) after the Egyptian-American Mission's restoration in its current state of the tetrastyle after restoration (2025).

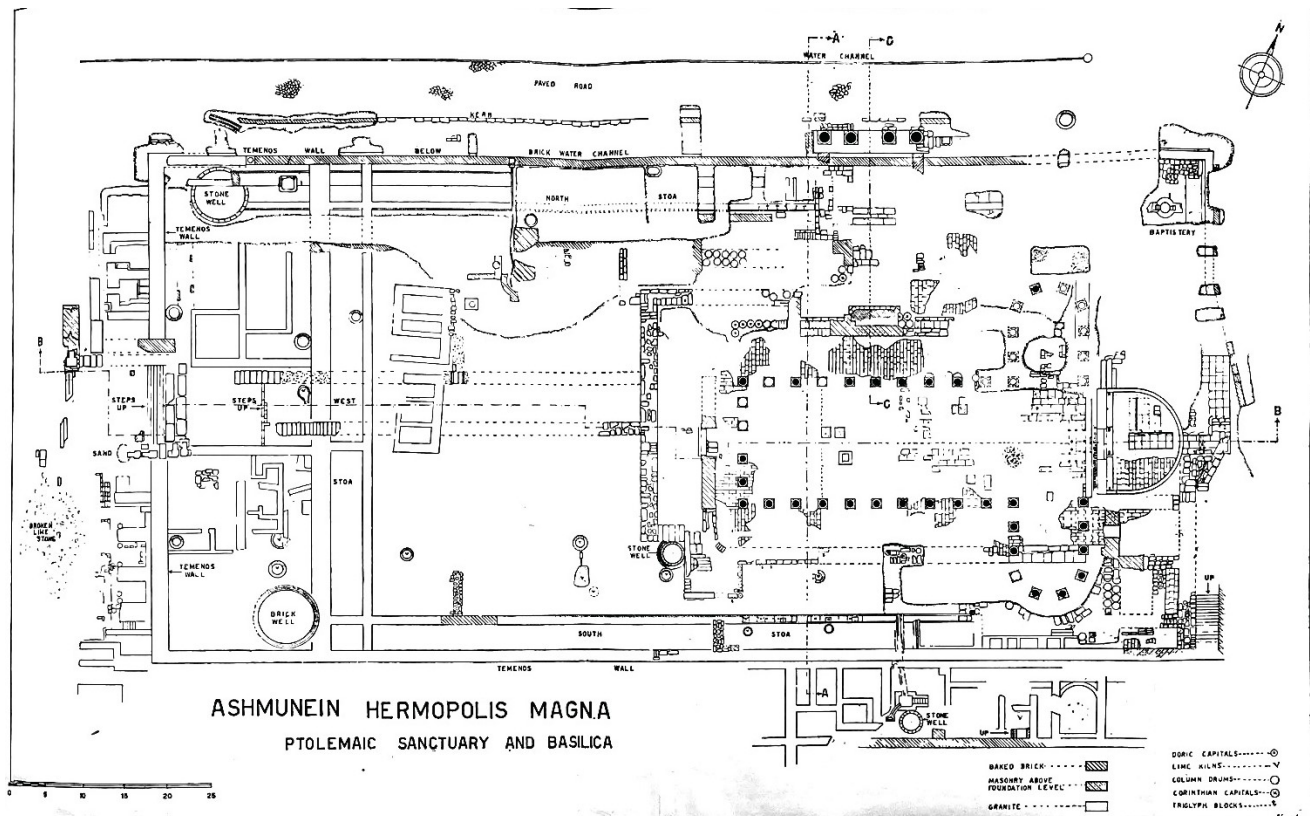


Figure 11: The excavated site of the Ptolemaic Sanctuary/Christian Basilica. Photo after Wace et al, 1959, pl. 2.

2.2. The photographic archives of Rizkallah Makramallah

During my research regarding the Ptolemaic Sanctuary, Makramallah's excavations were of great interest. Unfortunately, the only references to Makramallah's work were the citations and acknowledgements of his successors, mainly professors Wace, Spencer, and Bailey. None of Makramallah's documents were available at Alexandria University for close study. Upon contacting Professor Spencer, I was successful in obtaining the location of Makramallah's photographic archives.

I was able to acquire copies of Makramallah's photographs in 2024 via contacting the archives department at the British Museum. The Makramallah photographs of the excavations underneath the area of the atrium of the Basilica are currently stored at BM Box Number: YAR76582 AESAr.1035 photographic print (archive room/5.6.1).

The photographs under study depict only the excavation stages underneath the atrium of the Basilica, where Makramallah was able to uncover the mudbrick monument at hand. The excavations beneath the site of the atrium ranged between c. 25 March 1945, and 3 April 1945, and revisited in May 1945.

The photographs narrate the stages of the excavation from the south-west corner of the monument, uncovering most of the western wall and the south-west corner of the structure. The excavations are resumed north-eastward. By April 1945, the monument, save for its eastern side, was revealed entirely. While the photographs do not show the eastern section of the monument, the decision to avoid excavation further east is to preserve the remnants of the atrium of the Basilica, as well as the foundations underneath the western columns of the Basilica proper.

2.3. The Ptolemaic Sanctuary

The Ptolemaic Sanctuary is a temple enclosure at the city centre's crossroads (Fig. 12). The sanctuary's original western entrance overlooks the north-south procession road, known as the Dromos of Hermes. During the Byzantine period, the western entrance was replaced by a northern entrance overlooking the Antonine Road, the western half of the East-West Main Road of the city.

The sanctuary was built in c. 240 BC by the Ptolemaic military garrison stationed at Hermopolis. Based on the inscribed Doric frieze (Fig. 6), the sanctuary was erected in honour of Ptolemy II Philadelphus and his sister/wife Arsinoe II in commemoration of Ptolemy's victory at the Third Syrian War (246–241 BC) over Seleucus II (Wace et al., 1959; Bernard, 1999; McKenzie, 2010).

The Ptolemaic Sanctuary measures c. 60 m × 140 m north-south and east-west, respectively. The inscribed Doric frieze referred to monuments within the enclosure wall of the sanctuary: a temple, a stoa, and "other monuments." Wace's mission, being the primary mission to uncover the Ptolemaic and Byzantine ruins, has confirmed the presence of a Ptolemaic temple to the east of the sanctuary, buried underneath the northern and western apses of the Basilica Church, as well as the northern,

southern, and western stoas of the sanctuary proper. In addition, Wace has uncovered a Ptolemaic statue, presumably of Arsinoe II. The monument at hand falls within the "other monuments" category (Wace et al., 1959; McKenzie, 2004; McKenzie, 2010).



Figure 12: Satellite image of the Ptolemaic Sanctuary/Basilica Church area; Makramallah's excavations highlighted in red.

3. Methodology

In this section, the study and representation of the monument are tackled and presented using the following methodologies and applications: first, an analytical and descriptive study of the photographic archival material with modifications and labelling processes; second, surveying the site and measuring the elevation profiles of the proposed location using geospatial tools; third, a reconstruction of the discovered monument using 2D and 3D technologies based on the photographic evidence within its geospatial location; fourth, a comparative study and identifying the monument in relation to similar constructions/altars within Egypt and the Eastern Mediterranean regions (Greece and Asia Minor); and finally, reconstruction of the monument using 2D and 3D technologies in relation to similar Hellenistic monuments by presenting various hypotheses for the superstructure.

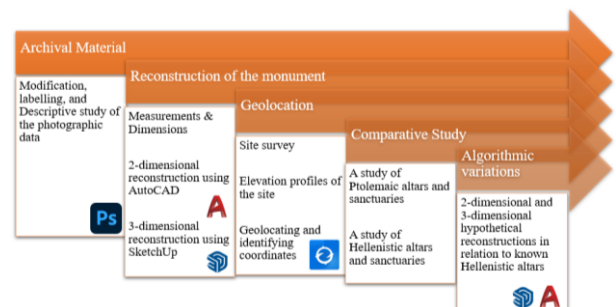


Figure 13: Summary of the Methodology used in the research.

Section 3.1. provides an exhaustive analytical examination of the excavation photographs from Makramallah, dated 1945. These images, captured from various angles, constitute the primary resource for interpreting dimensions and structural characteristics. A meticulous visual analysis facilitated the identification of architectural features and their proportions. Despite references to Makramallah's work by Wace (1959) and publications from the British Museum (Spencer, 1983; Bailey et al., 1991), these sources present only a limited contextual exploration of the monument in question. In light of the absence of EXIF data or camera calibration, a comparative methodology was employed, utilising discernible reference points, particularly "Marker L," to ascertain the north orientation and categorise wall alignments: designating East–West as S# and North–South as N#. Closed sections were identified as Construction B(#). This preliminary phase established a robust analytical foundation for subsequent reconstructions.

Section 3.2. delineates the methodology employed for the importation of identified walls and their respective dimensions into AutoCAD and SketchUp, facilitating comprehensive 2D and 3D reconstructions. This process integrated all applicable photographic documentation while explicitly omitting post-Classical features. Critical dimensions were derived from a singular photograph that featured two field scales positioned adjacent to the walls, thereby allowing for the precise determination of elevation. Subsequent calculations produced accurate wall dimensions, and the resultant 2D and 3D models effectively visually reconstructed both extant and demolished segments. The structure is analysed as a substructure of a two-tiered monument, plausibly an altar.

Section 3.3. addresses the geolocation of the monument relative to nearby Ptolemaic structures and the overlying Basilica. Its positioning may offer clues to its function. A preliminary location was established via photograph analysis and Wace's notes. Makramallah identified a depression at the site, later confirmed with ArcGIS Earth v. 2.4 elevation profiles. These profiles were cross-referenced with ruins and visible structures. The 3D model was manually placed in ArcGIS Earth using satellite imagery, topography, and photographic cues. Although formal georeferencing was not possible, the estimated location reflects its historical setting.

Section 3.4. provides a comparative study of the monument's spatial relationship to other Hellenistic structures. Its positioning within the sanctuary mirrors the layout of similar altars near main temples in Egypt and beyond. These comparisons support interpretations of architectural intent and spatial logic, supplementing the limited archaeological record.

Section 3.5. presents hypothetical reconstructions of the superstructure using 2D and 3D modelling. Data from analogous Hellenistic monuments inform these reconstructions. This interpretive stage expands the digital reconstruction by proposing plausible architectural solutions, drawing on regional typologies from the Eastern Mediterranean.

3.1. A detailed and analytical study of Makramallah's photographic archives

3.1.1. Source provenance and metadata integrity

The images herein are derived from a collection of six glass negatives, printed into physical photographs. The physical photographs are organised across five distinct documents or sheets, identified explicitly as British Museum References (BM REF) 13, 15, 18, 20, and 24. These photographic prints are preserved within BM Box Number: YAR76582 AESAr. 1035, located in archive room 5.6.1. The images are published under Creative Commons CC-BY-NC-SA 4.0 Licence as part of the agreement with the British Museum's Permissions Department.

The acquisition of reproductions of glass negatives was conducted using a photographic camera at a resolution of 600 dpi as JPEG files. Each photograph is paired with its archival number and reference, alongside an indication of its publication license. Furthermore, the original photographs were subtly altered using warp and skew techniques in Adobe Photoshop 2020 to enhance clarity.

Photographs (BM REF 13, 15, 18, 20, and 24) serve as a visual narrative documenting the excavation process. Each image captures a specific section of the trench that has been newly excavated. Furthermore, these photographs illustrate both the structural degradation and the collapse of wall sections from the site, explicitly in BM REF 24 (Fig. 19).

Although a limited number of photographs have been previously published, these were presented within broader studies pertaining to the archaeological site. Those publications, however, did not address the specific monument of Makramallah or the excavations associated with the designated area within the Ptolemaic Sanctuary/Christian Basilica site.

3.1.2. Photographic analysis techniques

The photographs BM REF 13, 15, 18, 20, and 24 (Figs. 14–19) were produced on 25 March, 27 March, 3 April, and 19 May 1945. All photographs available were captured at elevations exceeding the zero level of the monument, where only BM REF 13 and 20 (Figs. 14 and 19) depict the monument's full-scale height. The images were taken from oblique angles during the excavation process, utilising daylight as the primary light source. The restrictions of the technology employed, particularly the use of glass negatives, led to overexposed areas that obscured the texture of the walls. Consequently, this resulted in a concealment of both the structural condition and any inscriptions that may have been present beneath the overexposed sections.

The calibration reference point for this monument is designated as "Marker L." This methodology has been adopted due to the absence of EXIF data, camera calibration information, and any accompanying physical or written documentation to corroborate the photographs.

Calibration is fundamentally established on the orientation and architectural design of the monument's walls. Walls oriented in the east-west direction are designated with an S# label, numerically ranging from S1 to S9. In contrast,

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those aligned in the north-south direction are indicated with an N# label, numerically ranging from N1 to N4. Within the monument, two angled corners are identified, with the south-west corner serving as the primary reference point, termed "Marker L," which is symmetrically mirrored by its north-west counterpart, referred to as "Marker P."

Finally, scaling has been the most challenging aspect to measure accurately. Only BM REF 13 (Fig. 14) presents two field scales at two different levels. Dimensions were calculated using these field scales in relation to the workers depicted in the photographs. This method was cross-referenced with other photographs where workers were hypothetically used as human scales, allowing for comparison with those from BM REF 13 (Fig. 14) and the field scales. This approach effectively confirmed the fixed height of the walls, facilitating the calculation of other dimensions from the remaining photographs.

3.1.3. Analytical and descriptive study of the photographs

According to an unpublished handwritten note by Megaw, dated 26 April 1958, archived at the British Museum Archives (BM REF 1 – not included due to copyrights issues), it indicates that the photographs in question were taken in 1945 during excavations conducted by Makramallah beneath the atrium of the Basilica Church (Figs. 14-19; Fig. S1-S6; Table S1). The photographs depict a monument approximately 2 m in height, comprised of several distinct mudbrick walls. The lengths of these walls range between 3 m and 7 m, with a consistent width of 0.7 m, except for the two innermost walls, which expand to 0.3 m. All walls exhibit a slight projection near their upper edges (Tab. 1).

Although there are no visible remnants from the excavations conducted by Makramallah beneath the atrium of the Basilica, the area presents a depression that can only be discerned through satellite imagery and elevation profiles of the section (Figs. 12, 21 and 23). The ultimate outcome of the construction unearthed in this region remains uncertain. Despite Wace providing a cross-section of the site that resembles current elevation profiles displaying the same depression left in the wake of Makramallah's excavations, Wace asserted that he intentionally omitted Makramallah's findings to prevent any misunderstanding with his own interpretations.

On March 25 1945, beneath the atrium of the Basilica, a series of mudbrick walls were excavated by Makramallah. Three distinct sections were initially observable from the trench, each separated by an approximate distance of 1.2 m. The height of these mudbrick walls measures approximately 2 m, while their length is around 3 m and their width is approximately 0.60 m. Each section of the walls exhibits a robust, slightly projecting feature along its longitudinal edge, with a thickness of approximately 0.25 m, which may indicate the presence of a cornice.

The distinguished visible segment is the central section, denoted as S2, whereas the eastern section is predominantly subterranean and referred to as S3. In contrast, the western section is characterised by a square-shaped configuration, including an elongated feature labelled "Marker L," which is distinctly separate from the

mentioned 0.2 m cornice that extends northward, thus forming a right-angle arrangement. Collectively, these three sections are aligned in parallel with an adjacent wall located to the south, which remains buried during this excavation phase. Furthermore, the southernmost identified wall, designated as S1, exhibits a parallel alignment with the sections Marker L, S2, and S3, intersecting with N1 at a right angle (Fig. 14; Fig. S1).

The entire mudbrick construction lies beneath the atrium of the basilica. A stacked arrangement of two layers of reused architectural limestone blocks outlines the entrance to the narthex, extending westward from the atrium atop the mudbrick walls. By the time excavations were conducted by Makramallah and Wace, only the southern segment of the narthex entrance had survived. Situated between the mudbrick walls and the two-layer foundational structure is a substantial layer of debris and compacted mud, isolating the foundations from the mudbrick walls. This debris likely resulted from a filling process aimed at closing the gap between the walls and raising the ground level to align with that of the nave. Notably, the debris layer measures approximately 0.8 m in thickness.



Figure 14: Mudbrick walls underneath the atrium of the Basilica (BM REF: 13, PS: 171503). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence. Photo also published by Flossmann-Schütze, Medini, & Brose, 2021, p. 473, Fig. 33.



Figure 15: Eastern view of a two-course, reused blocks at the atrium of the Basilica Church (BM REF: 15, PS: 327643). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence. Photo also published by Wace et al., 1959.

On 27 March, Makramallah expanded his trench in a westward direction. This operation uncovered the entirety of Structure S2 and the foundations of the visible section of Structure S3. Decorative architectural blocks were observed at the eastern end of the trench, directly adjacent to the south of S3. The trench expansion led to the demolition of c. one-third of S1's total length. Furthermore, S2 was cut vertically in an almost perfectly straight line, with no visible cracks, consisting of unbaked mudbricks, attributable to the material's nature (Fig. 15; Fig. S2).

By 3 April, Makramallah expanded his trench both northward and westward (Fig. 16; Fig. S3). A section of perpendicular walls and a rectangular structure emerged north of Marker L and S2. Opposite Marker L, a mudbrick wall is presented with dimensions closely resembling those of S2 and appears to extend northward. Concurrently, a wall designated as N3, of equivalent length to S2, also extends northward, alongside a rectangular structure situated to the east of N3, referred to as construction B.

East of construction B lies another wall that extends in the eastern direction. This wall, designated S5, is interrupted by a mudbrick well, likely dating to the Byzantine period. To the north of N3 and construction B, a wall S6 with dimensions similar to wall S2 exists. Additionally, to the east of S6 is another wall, S7, with comparable dimensions that extends eastward; however, it was not fully uncovered by this stage of the excavations. Due to remaining buried portions, the extension of S7, tentatively referred to as N9(?), remains indeterminate as to whether it constitutes an extension of S7 or represents an entirely different wall. There is no further photographic evidence to substantiate either theory. Nevertheless, a wall is certainly oriented eastward from S7. The question of its connection to S7 remains unresolved (Fig. 17; Fig. S4).

During the trench expansion, S2 was removed. In addition, the southern middle section of S1 has been demolished, dividing the wall into two unconnected segments. N2 remains partially buried at this juncture, with its western wall exposed and debris-free. Construction B is situated to the east of N3, while S4 and the Byzantine well are located to its west, and S6 is positioned to the north. The observable section of S4 is oriented at a right angle, akin to construction B. Nonetheless, the Byzantine well intersects the northern extension of S4. This situation prompts an inquiry into the potential connection between S4 and S5, the parallel wall located to the north, facilitated by a wall perpendicular to both structures, forming two right angles. This configuration may alter the perception of S4 and S5 as distinct constructions that resemble construction B (Fig. 18; Fig. S5).

Furthermore, an additional wall emerges, extending fully and running parallel to S6 and S7; this wall progresses westward, intersecting with N1. This configuration may suggest the presence of an enclosing wall that encapsulates both the freestanding walls and construction B, where S1, N1, and S8 collectively delineate the boundaries of the central structures from the south, west, and north, respectively. Regrettably, similar to the situation with S1, we cannot ascertain the complete reaches of S8 and S1 towards their eastern terminus.

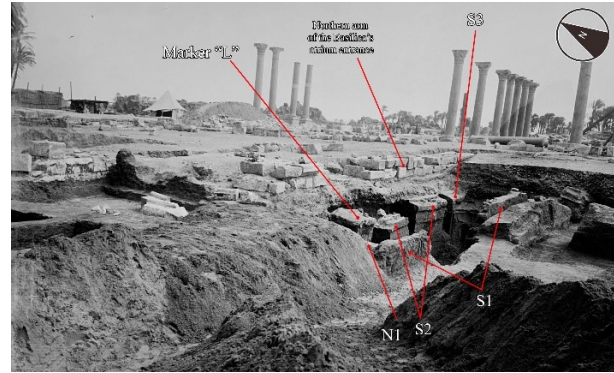


Figure 16: Extended trench showing the southern mudbrick walls underneath the atrium (BM REF: 18). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence. Photo also published by Flossmann-Schütze, Medini, & Brose, 2021, p. 474, Fig. 34.

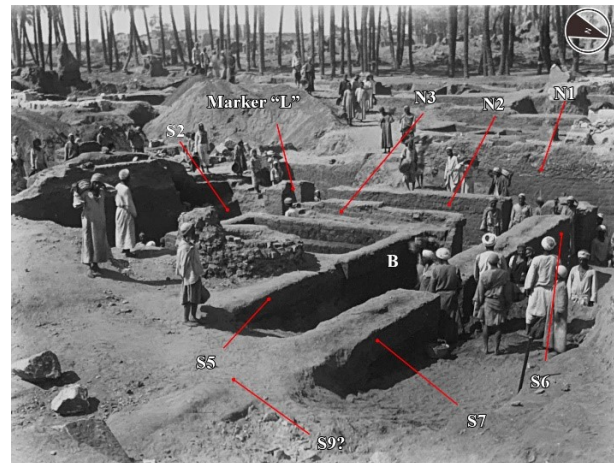


Figure 17: Mudbrick walls to the west and north of construction "B" found underneath the atrium (BM REF: 20). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence.

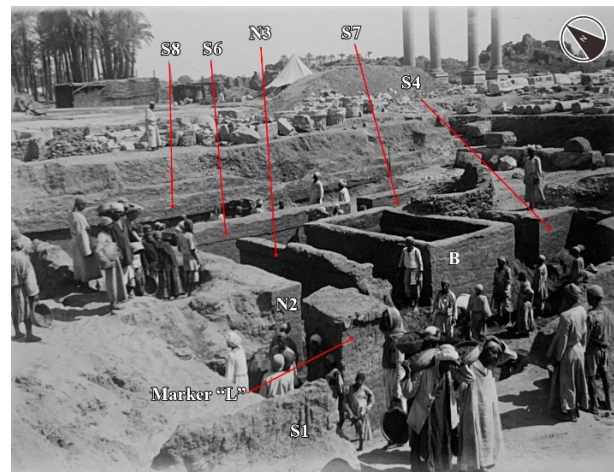


Figure 18: Different angle of the previous image; construction B with the surrounding mudbrick walls (BM REF: 20). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence.

THE LOST ALTAR OF THE PTOLEMAIC SANCTUARY AT HERMOPOLIS MAGNA (EGYPT): HYPOTHETICAL RECONSTRUCTION AND PUBLICATION OF THE EXCAVATION WORK OF RIZKALLAH MAKRAMALLAH

Makramallah resumed his excavations in the atrium area on 15 May 1945. On this date, both construction B and the Byzantine well were dismantled. Remnants of construction B can be observed, resting against the eastern wall of structure N3. To the east of N3 is an elevated block composed of mudbricks, which is likely the foundational base of construction B. Further eastward, structures S4 and S5 appear to be interconnected with N4. Unfortunately, it remains challenging to ascertain whether N4 had a corresponding parallel wall to the east. If such a wall existed, the four walls S4, N4, S5, and the prospective parallel wall would collectively delineate another rectangular configuration analogous to construction B.

The intersection of S8 and N1 at a right angle is observable. This observation substantiates that S8, N1, and S1 collectively establish a continuous enclosure wall, which encompasses three sides only at this point, effectively surrounding the stand-alone walls and construction B. To the east of Marker L, S2 has been entirely dismantled, with the resultant debris appropriately removed. The rationale for the demolition activities conducted at S2, the central section of S1, and construction B remains unclear. Nonetheless, it can be hypothesised that the decision to demolish the Byzantine was well aimed at uncovering the linking wall, N4, which interconnects S4 and S5.

Additionally, the inner walls of S5 and N4, and potentially S4, exhibit an inward projecting section. In contrast, walls such as S6 and N2 have a slightly projected section in their upper regions, whereas S5 and N4 display projections in their lower sections. The rationale for this architectural feature is understood; however, it is plausible that a rectangular structure, akin to construction B, existed, characterised by a narrow segment at the base and a broader segment at the upper portion. This design may have served the purpose of accommodating objects on the projecting sections. Nonetheless, the precise function of these elements remains unknown and unidentified (Fig. 19; Fig. S6).

Through careful examination of the photographs left by Makramallah, one can reconstruct the mudbrick structure that Wace intentionally excluded from his map. This decision by Wace is regrettable; however, the photographs facilitate the reconstruction of the majority, if not the entirety, depending upon whether the photographed sections represent all walls of the building.

Utilising Marker L as a foundational reference point, and its presence in various photographs provides the basis for several deductions. Firstly, it is observed that Marker L is within an enclosure wall in the southwest corner of the site under investigation. This enclosure wall is bounded by S1 to the south, N1 to the west, and S8 to the north. Notably, both S1 and S8 converge with N1 at right angles in a westward direction. Furthermore, the terminus of both S1 and S8 coincides at a singular point. However, due to the lack of detailed representation of the eastern boundary in the photographs, one can reasonably infer that the mudbrick enclosure wall likely featured an entrance on the east side, regardless of whether parallel walls accompanied N1 or not.



Figure 19: Post-demolition view of the area underneath the atrium; S2 and construction B are demolished/in ruins (BM REF: 24). Photo © The Trustees of the British Museum. Available under a Creative Commons CC-BY-NC-SA 4.0 Licence.

The enclosure wall contains multiple stand-alone walls that encapsulate a rectangular structure. To the east of Marker L is a stand-alone wall designated as S2, with an additional wall to its east labelled S3. Notably, the eastern endpoint of S3 aligns vertically with the north-south (NS) line of both S1 and S8. The distance between Marker L and S2 is identical to the distance from S2 to S3, approximately 0.70 m. Comparable constructions are present in the northern section of the enclosure; walls S6 and S7 are situated south of S8, with S6 matching the length of S2, and S7 corresponding in length with S3. All four walls share equivalent length, width, and height dimensions, as outlined in the specifications below. Additionally, the location of the western endpoint of S9 remains unspecified, despite S9 having a known eastern endpoint, raising uncertainties regarding its potential connection to S7.

To the west of S6 is a demolished, square-shaped, stand-alone wall, which shares the dimensions of Marker L but exhibits a significantly higher level of deterioration; designated as Marker P. Positioned between Marker L and Marker P is a short wall, referred to as N2, aligned in a north-south orientation and parallel to N1. To the east of N2 is an identical wall, designated as N3. Notably, N2 and N3 are shorter in length than S2 and the other east-west aligned S-numbered walls, while their width and height remain consistent.

The central section of the construction comprises two distinct structures. Construction B deviates significantly from the other S-numbered and N-numbered structures previously examined. Its design resembles a cache, with a length of 2.8 m, comparable to the dimensions of N2 and N3, and a width of 1.8 m. The walls of Construction B appear to be thinner than those of the other standalone walls; however, this narrowing occurs only in the upper section. Approximately 0.5 m inwards, there are inner expansions of the walls, maintaining a known thickness of 0.7 m. The inner base of Construction B became partially visible after its destruction, the cause of which remains unknown, paralleling the circumstances surrounding S2. The base remnants measured roughly 1 m², indicating that the hollow area within Construction B adopts a T-shaped profile, being narrow at the base and broader at the apex (Fig. 20).

Table 1: Measurements of the Monument's Walls.

Wall	The location from Marker L	Orient ation	Length in m	Width in m	Height in m
S1	S-SE	East-West	c. 12.1	c. 0.7	2
S2	E	East-West	3.5	c. 0.7	2
S3	E	East-West	3.5	c. 0.7	2
S4	E-NE	East-West	3.5	c. 0.7(?)	2
S5	NE	East-West	3.5	c. 0.7(?)	2
S6	N-NE	East-West	3.5	c. 0.7	2
S7	NE	East-West	Un-known	c. 0.7	2
S8	N & N-NE	East-West	Un-known	c. 0.7	2
S9(?)	NE	East-West	Un-known	c. 0.7	2
N1	W	North-South	c. 10.5	c. 0.7	2
N2	N	North-South	3	c. 0.7	2
N3	N-NE	North-South	3	c. 0.7	2
N4	E-NE	North-South	3(?)	c. 0.7	2
Marker "L"	-	-	c. 1.2	c. 0.25	2
Marker "P"	N	-	c. 1.2	c. 0.25	2
Construction B	NE	North-South	2.8	1.8	2

East of Construction B lies another construction with traces of connection to Construction B. Construction B has similar geometric features to Construction B2(?), except for its eastern wall, which did not appear in Makramallah's photographs. This construction is accessible via its eastern side, probably via a staircase to the upper area. The construction features two parallel walls, S4 and S5, which have the same length as S3 and S7, their northern and southern stand-alone counterparts. The western wall N4 has almost similar N2, N3, and construction B lengths, except that its north section was partially demolished. Its area, however, is nearly double that of Construction B.

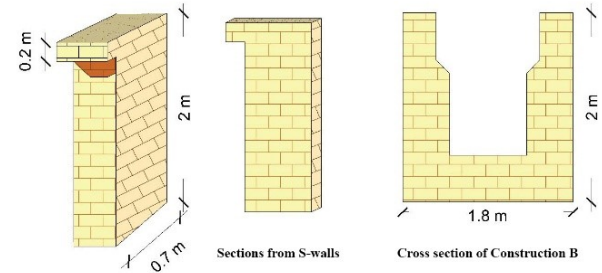


Figure 20: 3D sections and cross-sections of mudbrick walls and construction B.

3.2. Geospatial analysis and terrain modelling

Identifying and accurately situating the monument's walls within their geographical coordinates is crucial for understanding their functional role within the framework of the Ptolemaic Sanctuary. Geospatial analysis plays an essential role in elucidating the relationships among the architectural elements within the sanctuary, thereby facilitating a deeper understanding of how the monument's walls interact with the surrounding topography and adjacent structural components. This methodology further contributes to reconstructing the site's functional context.

Terrain modelling, essential for visualising site characteristics, is constrained by the resolution and accessibility of publicly available Digital Elevation Models (DEMs). These constraints may lead to approximations in modelling finer topographic features, particularly when addressing subtle terrain variations.

The geospatial analysis process covers two fundamental methodologies: first, an approximate localisation of the excavated sections, and second, the examination and analysis of the site's topographical profile. These procedures conclude in the calculation of both the coordinates and orientation of the walls within the site.

The first phase of this process was outlined in the preceding section, which focused on determining true North by utilising the reference point designated as "Marker L" beneath the remains of the Basilica Church. This location was approximated through the remnants of the Basilica's atrium, situated atop the monument, alongside the depression resulting from the Makramallah excavations, as recorded by Wace.

In the second phase, the monument's walls were geolocated within the Ptolemaic Sanctuary/Basilica area. This phase was divided into two sub-processes: first, identifying the coordinates of the four corners of the broader Ptolemaic Sanctuary area, which extended over a larger terrain than the Basilica Church, and second, utilising ArcGIS Earth and Google Earth Pro for precise geolocation.

By combining both methodologies, it became possible to cross-reference the Ptolemaic substructure with the extant remnants of the Christian Basilica, thereby establishing a foundational point for the geospatial reference.

The visual alignment methodology was subsequently applied, involving the interpretation of photographic perspectives and angles in relation to the known positions of the surviving ruins of the Basilica. Key architectural structures, such as the tetrastylon, functioned as geospatial anchors, facilitating the identification of the trench excavated by Makramallah.

It is crucial to highlight that the geospatial anchoring process is inherently approximate, primarily due to the absence of direct metadata in the photographs. Consequently, measurements derived from these images must be regarded as estimates, accompanied by a significant margin of error.

3.2.1. Photographic geospatial analysis

Analysing the photographs from the preceding section enables the identification of specific segments of the mudbrick walls in relation to the Basilica Church.

Due to the absence of embedded metadata in the photographs, including crucial details such as focal length and camera position, the spatial referencing process was conducted through indirect means, primarily relying on visual comparison with established architectural landmarks within the site.

The backgrounds of these photographs illustrate one of the site's most critical anchor points, the tetrastylon. Eastward of the trench are located the western and northern colonnades of the Basilica's nave, while westward is the main western entrance to the Ptolemaic Sanctuary.

Furthermore, the image-guided spatial references, as outlined through the orientation of the camera angles specified in the captions accompanying the photographs in section 3.2.2., enhanced the identification of the trench's location in relation to the ruins of the Basilica Church.

This positioning highlights that the trench excavated by Makramallah is situated within the area marked by Wace. This conclusion will be verified through the examination of the elevation profiles related to this specific area within the site.

3.2.2. Elevation profiling

The identification of the depression that formerly housed the Makramallah monument is critical to this study. Accurately determining the precise coordinates in relation to the adjacent and surrounding ruins of the Basilica is essential for delineating the monument's boundaries, especially given that Marker L has already been established. This analysis is performed using ArcGIS Earth, harnessing two key functionalities: elevation profiling and viewshed tools.

The first phase comprised the visual identification of the depression utilising satellite imagery from both Google Earth and ArcGIS Earth. The utilisation of Google Earth is particularly significant, given the recent updates to Google Maps of the site in March 2025, whereas ArcGIS Earth's database maps provided by Esri remain outdated, reflecting imagery from 2020, identified by the vegetal infestation of camelthorn and halfa plants, which has recently been reduced significantly.

It was determined to be approximately 20 m west of the western colonnade of the Basilica's nave. The distance from the atrium entrance to the western colonnade measures approximately 9 m. In comparison, the distance from the existing section of the atrium's entrance, c. 4 m in length, to the estimated lowest point of the depression is approximately 6 m. The diameter of the depression is approximately 14 m.

This procedure involved the random selection of three sections for elevation profiling along both the X-axis and Y-axis, located above the depression. Wace (1959) presented an east-west cross-section of the site (Fig. 21), highlighting the columns from the Basilica's nave, the depression identified in Makramallah's excavation, and the western entrance to the Ptolemaic Sanctuary. Notably, Wace intentionally excluded Makramallah's findings to concentrate on the Basilica's structural elements. Furthermore, the six elevation profiles measured using ArcGIS Earth yielded significant geospatial data, demonstrating the lowest points in relation to the baseline level of the street situated to the north of the Basilica Church.

The elevation profiling tool within ArcGIS Earth generates cross-sectional profiles that visualise the variation in terrain along user-defined paths (Fig. 22). This analysis utilises data derived from publicly available DEMs, which typically offer a ground sampling distance (GSD) of 5 m. Consequently, finer microtopographic variations may remain undetected. Thus, the interpretation of elevation discrepancies is most effective for identifying prominent topographic features, such as depressions and ridges. Given the limitations of the DEM data, the tool is best suited for identifying broader topographic features, while subtle variations in terrain may be underrepresented.

The second phase was undertaken utilising the viewshed tool from ArcGIS Earth (Fig. 23). Following the identification of the lowest point within the depression at approximately 39.5 m (N274652.96, E304813.16), the viewshed tool facilitated a comprehensive 360° perspective of the depression. This tool enabled a thorough analysis of the depression's visibility in relation to the surrounding landscape, providing insights into both the areas visible from the depression and those hidden by elevated features in the surrounding terrain.

This analysis revealed the visible terrain within the depression and identified concealed areas of the surrounding landscape at elevated positions. This process effectively delineated the current boundaries of the depression in relation to the street and basilica elevations, adding a further layer of spatial understanding to the overall site analysis.

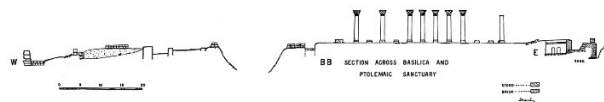


Figure 21: Cross-section of the Ptolemaic Sanctuary/Christian Basilica site (Wace, 1959).

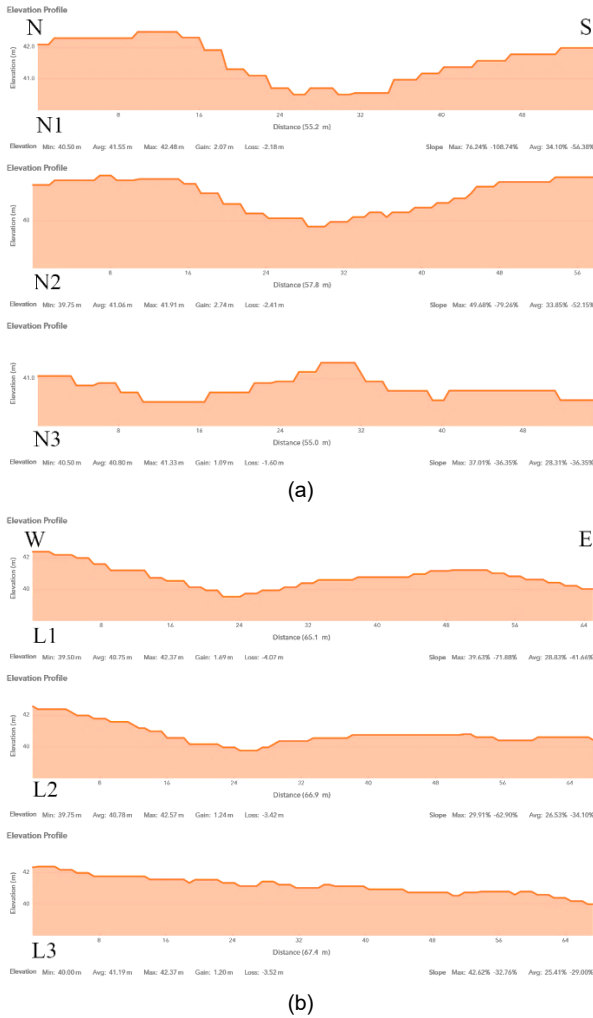


Figure 22: Elevation profiles of the atrium area of the Basilica Church and the Ptolemaic western entrance: a) north-south elevation profiles; b) west-east elevation profiles.



Figure 23: 360° view of the depression left by Makramallah at the atrium area of the Basilica Church in relation to the current ground level/blind spots from zero level.

3.2.3. Geospatial anchoring

To reconstruct the mudbrick walls from the archival photographs, the concluded methodology of geospatial anchoring was employed. Since the original Ptolemaic monument no longer exists and its corresponding photographs lack embedded coordinate data, spatial referencing relied on indirect geolocation through stratigraphic continuity. Specifically, the established plan, elevations, and coordinates of the entrance to the Basilica's atrium, located atop the original monument, were utilised as reference anchors. Visible wall sections in relation to the ruins from the Basilica served as control points for georeferencing.

The ruinous section of the atrium in the Basilica is aligned parallel to the mudbrick structure beneath it and is situated nearly directly above Marker L, S2, and S3. This preliminary geospatial identification facilitates the calculation of the distance from the tetrastylon of the Basilica, thereby elucidating the distance from the northern walls of the Sanctuary and Marker L.

Estimations indicate that the distance along the Y-axis between the atrium and the tetrastylon remnants measures c. 16 m, with the existing remnants of the arm being around 4 m. Additionally, the distance from Marker L to the northern walls of the Ptolemaic Sanctuary along the X-axis is quantified at 40 m. The remaining section of the arm from the entrance to the atrium is c. 4 m in length, while the historical photographs from 1945 suggest that the arm extended c. 5.5 m to the west of Marker L. These findings reveal that, during the excavation process, approximately 1.5 m from the western section of the arm leading to the entrance of the atrium was removed.

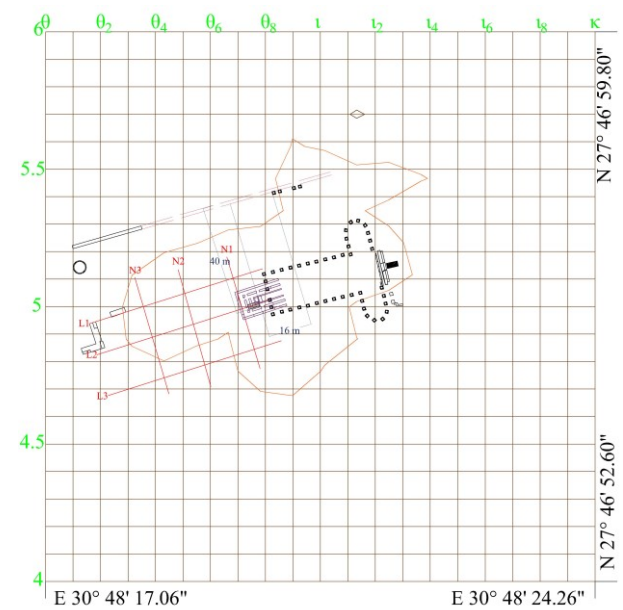


Figure 24: Geospatial map of the location of the Basilica Church and the Makramallah monument, with representations of the locations of the elevation profiles.

Given the lack of focal length, camera angle, and lens distortion data in the historical photos, this geospatial anchoring should be regarded as an approximation. The resulting georeferenced positions should be interpreted within a range of uncertainty, as no direct measurements of the photos' scale or orientation were available.

This evaluation establishes the position of the reference point "Marker L" within the sanctuary. Therefore, Marker L is situated at coordinates N274653 E303814 – Fig. 24 on (θ_7 - θ_8 ,5). By geolocating Marker L, the limits of the monument are located within the following coordinates: N274652.59, E304813.98 (θ_7 , 4.9); N274653.28, E304813.98 (θ_7 , 5.1); N274652.28, E304814.72 (θ_9 , 4.9); and N274652.58, E304814.72 (θ_9 , 5.1).

3.3. Architectural analysis and digital reconstruction

This section explores the methodology employed in the reconstruction of the monument utilising both 2D and 3D digital models, which were generated from an analysis of photographic documentation, architectural schematics, and spatial data. The initial phase of this analysis delineates the 2D reconstruction executed through AutoCAD 2020, emphasising the precision required in capturing the alignment, dimensions, and spatial interrelations of the walls. The following phase investigates the 3D reconstruction conducted in SketchUp 2023, which facilitated a deeper comprehension of the monument's structural composition. This methodology enabled the exploration of volumetric space, the testing of hypotheses affecting the superstructure, and the visualisation of the monument within its original context.

These digital models serve as essential tools in addressing uncertainties regarding the monument's design and function, as underscored by previous geospatial and elevation profiling analyses. The capacity to visually and spatially examine the alignment of the walls, assess the monument's potential purpose, and comprehend its interaction with the surrounding topography significantly enhances scholarly interpretation of the site. Furthermore, the process of digital reconstruction not only deepens understanding of the monument's original appearance but also serves as a critical linkage between the physical remnants of the site and contemporary archaeological inquiry, thereby providing opportunities for further research and theoretical reconstruction of missing elements.

Collectively, these reconstructions enhance the comprehensive understanding of the monument's architectural layout and its potential function within the Ptolemaic sanctuary, providing new insights into the monument's role within the broader context of Ptolemaic architecture and religious practices.

3.3.1. 2D architectural reconstruction and digital modelling

In this section, AutoCAD was employed for the 2D reconstruction of the Ptolemaic monument, using measurements derived from archival photographs. The software's precision in drafting and scaling facilitated the accurate mapping of the monument's walls and

foundations, with alignment verified through references to prominent architectural landmarks and established site features. Due to the absence of direct geospatial metadata in the photographs, the reconstruction relied on visual comparison and measurement-based techniques. These methods enabled the creation of a foundational 2D model, which was then used for further analysis and comparison with the 3D model, providing insights into the monument's relationship with the surrounding topography and the remains of the Basilica.

The data utilised for the reconstruction of the monument, including its dimensions and spatial relationships, was derived from a comprehensive analysis of the photographic archives. By incorporating two field scales documented at BM REF 13 (Fig. 14), alongside measurements of adjacent monuments, the dimensions of the monument were inferred precisely. Furthermore, the documentation of human presence within the photographs served as a significant scaling reference. Utilising these scale references and anchor points, such as the tetrastylon and the remnants of the atrium entrance, the monument's dimensions were accurately measured and integrated into the AutoCAD model. This method established a robust framework for geolocation and facilitated meaningful comparisons with the 3D reconstruction, thereby ensuring a coherent representation of the monument within its historical and spatial context.

Additionally, it was possible to trace the steps of the excavation from the photographs. Each wall of the monument is presented in the reconstruction with regard to its condition. The implication of maximum length (east-west orientation) on the monument helped in hypothetically reconstructing unexcavated sections or sections that were not captured during the excavation. Furthermore, demolished sections are highlighted, indicating which sections were removed to understand the steps of the excavations and what Makramallah was hoping to achieve.

Following the excavation process, it was determined that the entire structure (Figs. 25 and 26) comprises unbaked mudbrick walls, a finding corroborated by Wace and Megaw. The walls S1, N1, and S8 constitute an enclosing wall that encircles the core of the monument. Both S1 and S8 measure c. 15 m in length, while wall N1 measures c.10.5 m.

The inner sections of the monument are delineated by walls N2, N3, S2, S3, S6, S7, and S9(?), in addition to Markers L and P. The standalone S# walls exhibit a length of 3.5 m, whereas the N# walls are c.2.8 m in height. Markers L and P each encompass an area of 0.7 m², featuring a mirrored projection towards N2 that measures 0.35 m². The width of the standalone S# walls matches that of Markers L and P, both of which are 0.7 m wide.

The central section comprises Constructions B and B2(?). The walls of this section are narrower than those of the surrounding standalone walls and the enclosure wall, with a thickness corresponding to the projected dimensions indicated by Markers L and P, measuring 0.35 m. Both Constructions B and B2(?) have a width identical to that of the standalone N# walls, which is 2.8 m. Due to the interconnected nature of these constructions, their total length is c.10.8 m.

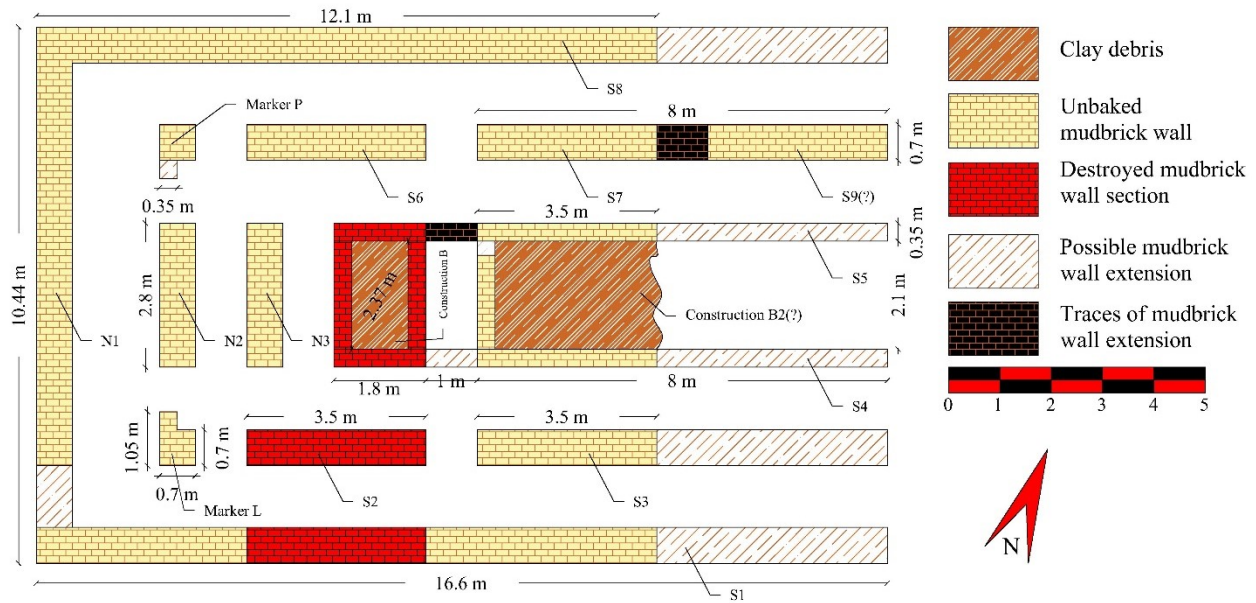


Figure 25: Reconstruction and partition of the Hellenistic altar's mudbrick walls and their conditions from Makramallah's photographs.

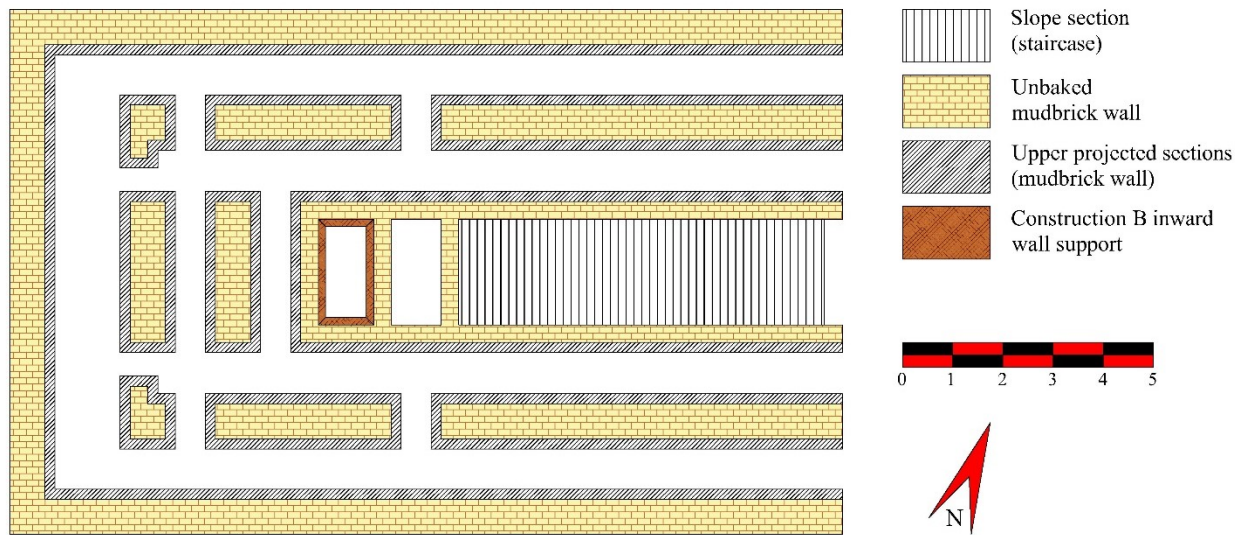


Figure 26: Complete reconstruction of the monument with depiction of the upper projected sections.

The interior of Construction B is presumed to be configured in a T-shape, with wall widths measuring 0.35 m at the sides, expanding to approximately 0.5 m in the lower section. The clarity of the T-shaped interior is dependent on whether it exhibits a sloping configuration or maintains right angles. In contrast, Construction B2 is significantly obscured by debris and soil, creating an eastward-sloping incline. This particular inclination will be examined in the subsequent section.

It has also been indicated that the foundations of the Ptolemaic temple are similarly positioned 2 m beneath the basilica. Consequently, it is plausible to assert that the mudbrick construction may be attributed to the Ptolemaic era rather than to ancient Egyptian origins.

The precise purpose of the mudbrick structure remains undetermined; however, it may be posited that the edifice could have served as an altar. The walls' configuration resembles a small temple, and the structure's entrance is oriented towards the east, contrasting with the temple's west-facing entrance. This positioning suggests that the two edifices could be positioned to face one another.

The U-shaped wall, comprising S1, N1, and S8, forms the primary outline of the monument and serves as an enclosure wall. Marker P, Marker L, S2, S3, N2, N3, S6, S7 and S9(?) form the inner foundations of the monument. N2 and N3 also form the base upon which the sacrificial altar is placed. Construction B might have been a hidden cache at the altar, where valuables and ritualistic objects were

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stored. Construction B2(?) is accessible via its eastern side, where no walls have been discovered. Notably, Constructions B and B2(?) have thinner walls than the rest of the monument. While all main walls have a thickness of 0.7 m, Constructions B and B2, as well as walls S4 and S5, have a thickness of 0.35 m, half of the original thickness. Therefore, the walls of Constructions B and B2 were not used as foundations, but rather as separators (Fig. 18).

In the case of Construction B, walls S4 and S5 may have served as the rails that supported the stairs leading to the superstructure of the monument. In relation to other Hellenistic altars, Construction B2 was likely the staircase and entrance to the superstructure of the monument.

This would leave the foundations exposed via the eastern side. The foundations would form a labyrinth of corridors, probably used as a treasury of storage rooms. Another possibility is that the eastern side might have been closed by slabs or doors of a sort. Unfortunately, this matter would not be resolved without excavating at the site of Makramallah.

3.3.2. 3D reconstruction and SketchUp

In addition to creating a 2D reconstruction, a comprehensive 3D digital model of the Ptolemaic monument was developed with precision using SketchUp. The 2D plans, drafted initially in AutoCAD, served as a foundational layer in this modelling process. The monument's foundations were meticulously redrawn utilising the line and rectangle tools, thereby ensuring exact dimensional accuracy. Consistency in measurements was maintained through the utilisation of the tape measure and dimension tools. Subsequently, the push/pull tool was

employed to extrude the structural elements to their estimated elevations, facilitating the modelling of walls and upper architectural projections informed by photographic evidence.

To enhance the visual fidelity of the model, surface textures were methodically applied using the paint bucket tool, effectively replicating the appearance of unbaked mudbrick as observed in the excavation images. The in-built modelling environment of SketchUp facilitated the layered construction of the monument, allowing for a clear differentiation among architectural components. In instances where documentation was deficient, reconstruction was executed thoughtfully, and structural volumes were modelled according to measurable data extracted from the photographs. This 3D model delivered an accurate volumetric representation of the structure, thereby enabling a more comprehensive and systematic examination of its architectural characteristics.

The development of the 3D model significantly enhanced interpretive comprehension of the monument. By converting the foundational layout into a volumetric representation, this model provided a more precise 3D understanding of the architectural elements, their proportions, and their interrelations. This transformation from a 2D plan to a 3D volume facilitated the identification of structural consistencies and discrepancies, allowing for a more tangible appreciation of the monument's original configuration. Moreover, the layered modelling approach facilitated hypothetical reconstructions of incomplete sections, thereby assisting in visualising the potential full extent of the monument.

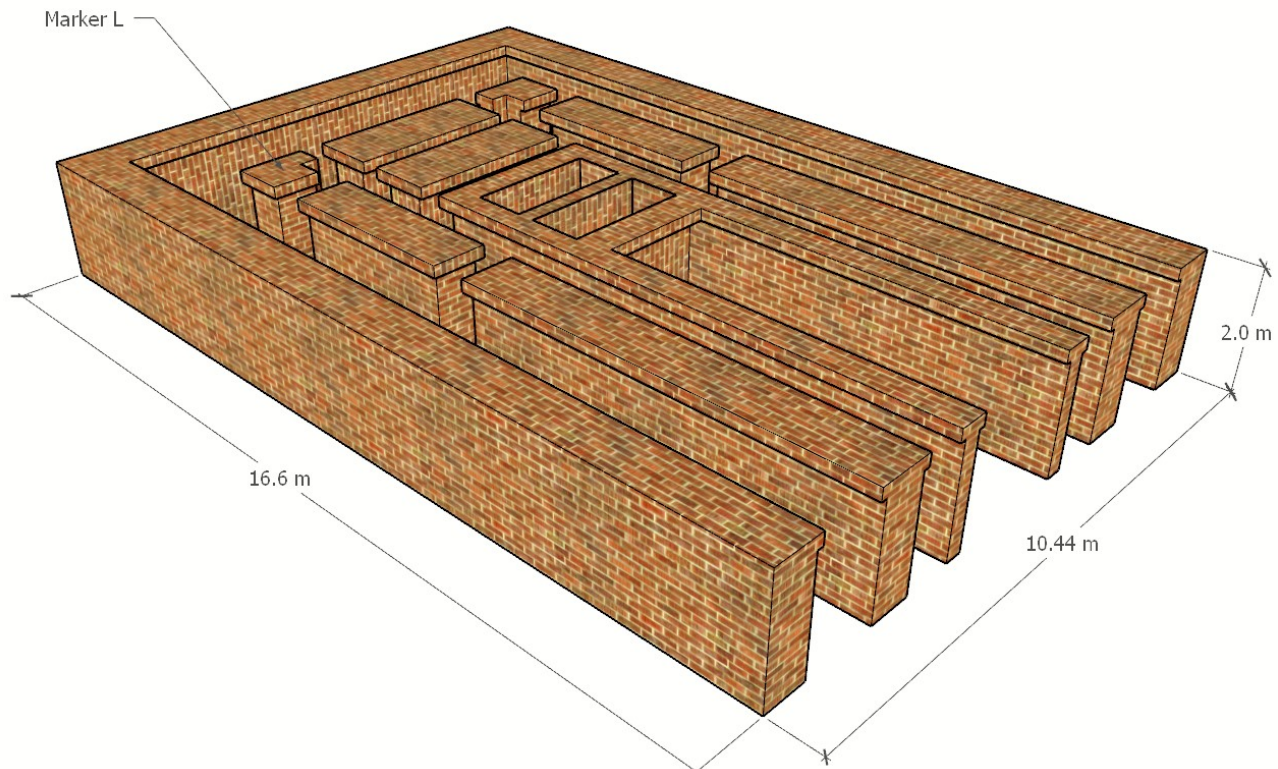


Figure 27: 3D Reconstruction of the Makramallah monument.

The modelling process encountered several challenges, restricted mainly by the inherent limitations of archival sources. Numerous sections of the monument were either obscured or inadequately documented in the photographs available. In response, the reconstruction adopted a conservative approach, relying exclusively on verifiable measurements and observable features. In instances where data proved inconclusive, speculative additions were deliberately eschewed, thereby preserving those areas for future scholarly investigation or digital enhancement.

The 3D reconstruction additionally serves as a pivotal reference model for comparative architectural analysis. As a meticulously controlled and dimensionally precise representation, it fosters proportional evaluations and underpins the testing of 3D hypotheses. Furthermore, the model operates as a versatile analytical framework, accommodating dynamic interpretations as new archaeological or digital evidence is unearthed.

Finally, the model (Fig. 27) is integrated into the broader methodological workflow, bridging the data acquired through geospatial analysis and 2D drafting. It enhances the interpretive process by linking visual documentation with architectural reconstruction and supports the production of visual outputs for scholarly and public engagement. As such, the SketchUp model plays a central role in both the documentation and interpretation of the monument.

3.4. Comparative study

As previously noted, the mudbrick construction unearthed by Makramallah beneath the atrium of the Christian Basilica has largely been overlooked in scholarly discourse. Wace (1959), for example, dismissed it merely as “a number of unbaked walls apparently of Pharaonic date,” offering no further consideration of its architectural form or potential ritual significance. Since then, no comprehensive documentation or interpretive analysis has sought to clarify the spatial logic, architectural typology, or cultic function of the monument.

The architectural analysis presented in this study elucidates a distinctly defined enclosure, characterised by a U-shaped wall configuration featuring its primary entrance positioned on the eastern façade. The internal arrangement of freestanding walls within this enclosure evidences a coherent spatial logic, suggesting an organised rather than haphazard or purely functional layout. The dimensions and intentional spacing between the walls point towards a deliberate design strategy. This methodical arrangement theorises the potential for the structure to have served a ritualistic function, possibly functioning as an altar linked to the more extensive Ptolemaic sanctuary situated to the east.

The Hellenistic period displays a notable architectural diversity in altar structures; however, certain recurring features enable substantive comparative analysis. Hellenistic altars range extensively, from unassuming rectangular sacrificial altars to elaborate monumental designs that integrate superstructures adorned with decorative reliefs. The Makramallah monument exhibits architectural similarities with established counterparts in the Eastern Mediterranean, specifically those from Mainland Greece, Asia Minor, and Ptolemaic Alexandria. Principal shared characteristics

encompass rectangular foundations, the presence of architectural columns, U-shaped enclosure walls, elevated platforms, and access points that are axially or near-axially aligned with principal temple structures.

The Makramallah monument exhibits characteristics aligned with monumental altars recognised in Asia Minor, which characteristically encompass a superstructure accessible through a staircase, implying a two-tiered architectural design. Although there is a lack of superstructural evidence at Hermopolis, the reconstructed form suggests the existence of an obliterated superstructure. This architectural element, although generally absent in most Ptolemaic Egyptian altars, is present in notable structures such as the Altar of Zeus at Pergamon and the Altar of Artemis Leukophryene at Magnesia (Winter, 2006; Herring, 2020).

3.4.1. Architectural setting and typological comparisons

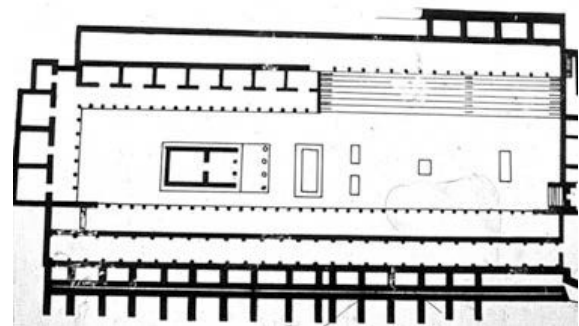


Figure 28: Reconstruction and plan of the Sanctuary of Demeter at Pergamon. Photo after Winter, 2006, p. 349, Fig. 68.

By employing geolocation techniques to position the monument within Wace’s plan and conducting a spatial analysis of its contextual placement in relation to the broader Ptolemaic sanctuary, it becomes evident that the Makramallah monument exhibits significant affinities with Hellenistic altars strategically located at calculated distances and orientations from central temples. These comparative parallels manifest particularly in Greek, Anatolian, and Alexandrian models, where altars are frequently situated along axial or subtly offset lines in relation to the temple façade, thereby reinforcing both visual and ritual connections.

The predominant form of altars in ancient architecture is the single-storey rectangular altar, commonly referred to as columnar altars. These altars were frequently adorned with friezes, sculptural elements, and various motifs, and were typically oriented towards the main façade of the temple. Their architectural proportions are characterised by a broad design, as exemplified by the altar of Temple L at Epidaurus and the Sanctuary of Demeter at Pergamon (Fig. 28). Although these altars primarily served sacrificial purposes, their monumental scale also suggests additional cultic and processional functions (Winter, 2006).

By the 2nd century BC, a distinct typology emerged, characterised by two-storey monumental altars that incorporated an inner sacrificial altar. These altars featured

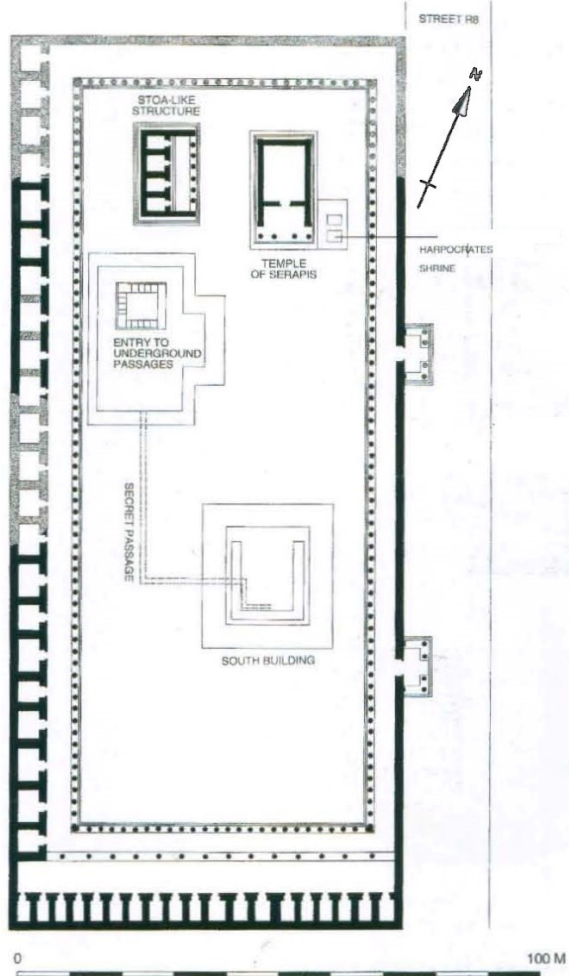


Figure 31: Plan of the Alexandrian Sanctuary of Sarapis.

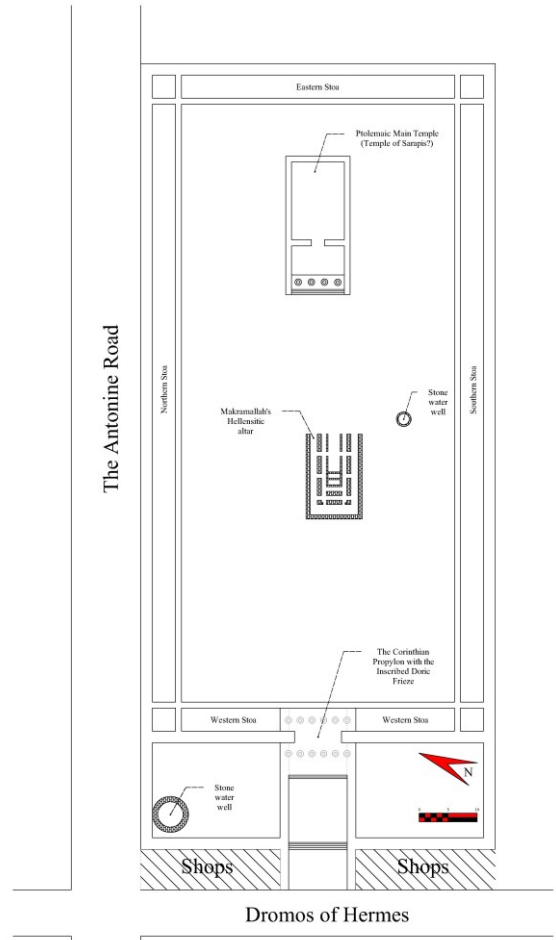


Figure 32: Reconstruction of the Hermopolitan Ptolemaic Sanctuary with the Makramallah Monument.

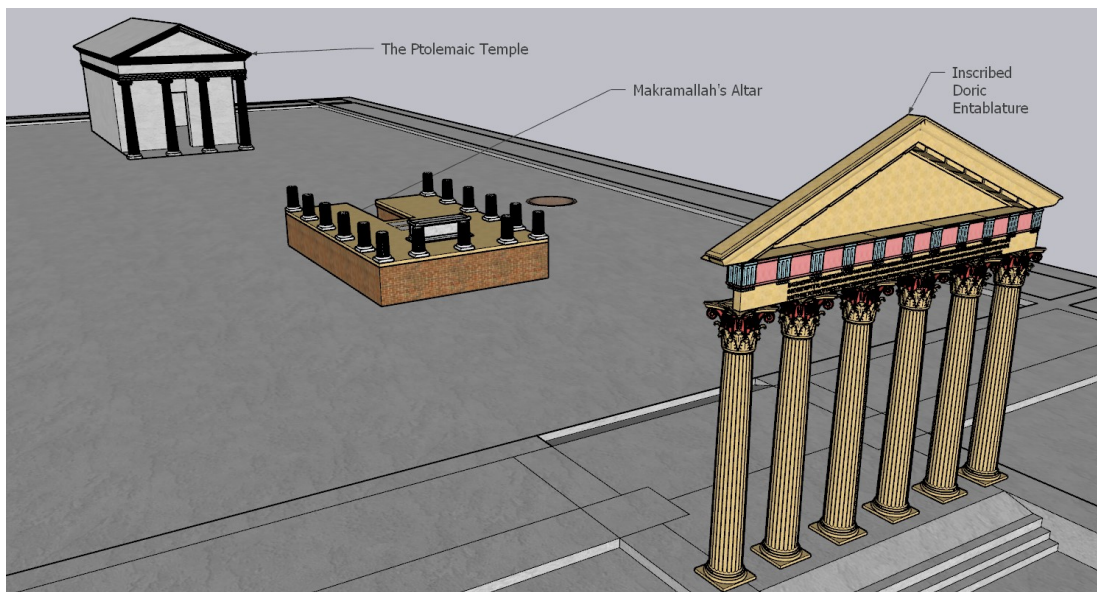


Figure 33: Hypothetical 3D reconstruction of the Ptolemaic Sanctuary, including the Makramallah monument.

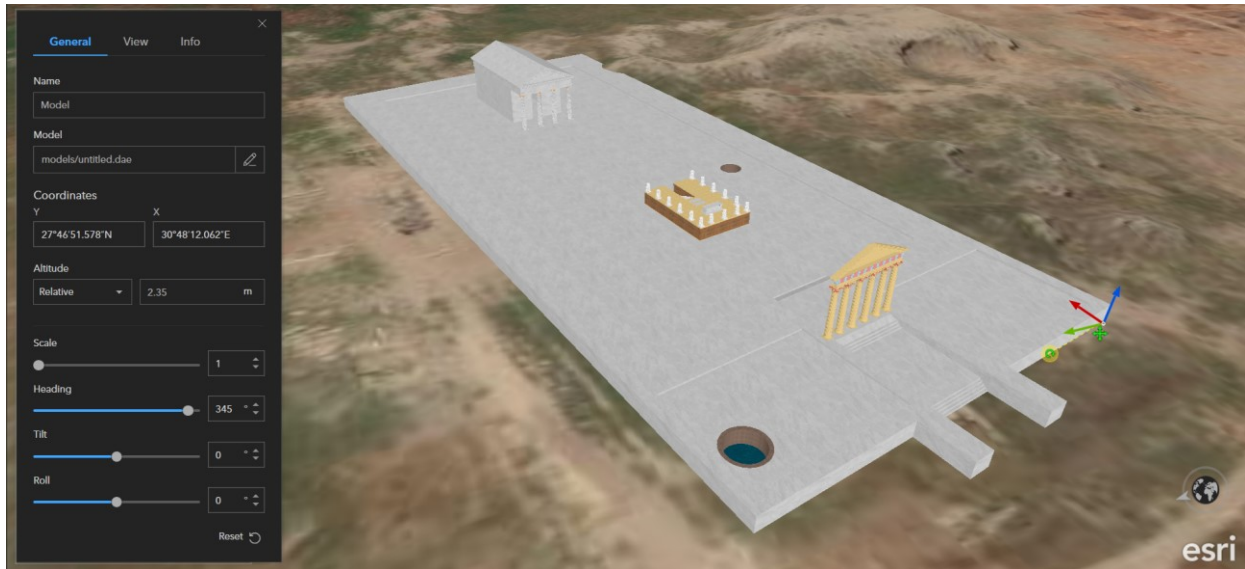


Figure 34: Geolocation and topographical cues of the Ptolemaic Sanctuary within the surrounding field.

3.5. Modelling hypotheses of the superstructure

The reconstructions presented herein constitute numerous potential architectural hypotheses that affect the monument unearthed by Makramallah. The preserved monument serves as the observed foundation; however, the absence of a superstructure necessitated a critical and comparative methodology to formulate informed variants that are anchored in archaeological plausibility.

This phase of the project employed AutoCAD for the drafting of variant 2D plans (Fig. 35) derived from scaled archival photographs and observable site scales. Subsequently, these plans were imported into SketchUp to facilitate the execution of a 3D reconstruction variants (Fig. 36). Utilising the base plan as a reference, the foundations were redrawn with line and rectangle tools, thereby ensuring the dimensional accuracy established in the 2D reconstruction. The push/pull tool was utilised to extrude walls to their estimated original heights, which were informed by excavation imagery and contextual parallels from existing structures. In instances where architectural projections or upper elements were only partially visible in the archival photographs, they were modelled accordingly. Furthermore, the application of texture was employed to approximate the appearance of the mudbrick surface, thereby enhancing the visual representation of the structure.

In addition to modelling preserved architectural elements, this workflow was broadened to encompass hypothetical reconstructions of the superstructure. These reconstructions were not merely speculative; instead, they were grounded in a comparative analysis of

Hellenistic altars located throughout Greece, Asia Minor, and Egypt. By examining typologically analogous structures, specifically those featuring U-shaped layouts, enclosure walls, and elevated platforms, various models of the monument's upper architecture were formulated. This endeavour sought to accurately represent the recurring spatial logic and construction conventions prevalent in sanctuaries from the same historical period.

Each variant was constructed with rigorous attention to dimensional discipline, ensuring consistency with the proportions and alignments of the foundational remains. While these hypothetical reconstructions cannot assert absolute certainty, they function as well-informed interpretations grounded in architectural analogy and archaeological context. The distinct models were preserved as discrete layers within the SketchUp environment, facilitating analytical comparisons among alternatives.

This methodology provides a flexible interpretive framework, rather than presenting a definitive solution. It recognises the constraints of the available evidence while simultaneously employing comparative architecture to investigate the potential original appearance of the monument. The models produced function as visual hypotheses and serve as heuristic instruments for analysing the spatial and cultic functions of the monument within its original context.

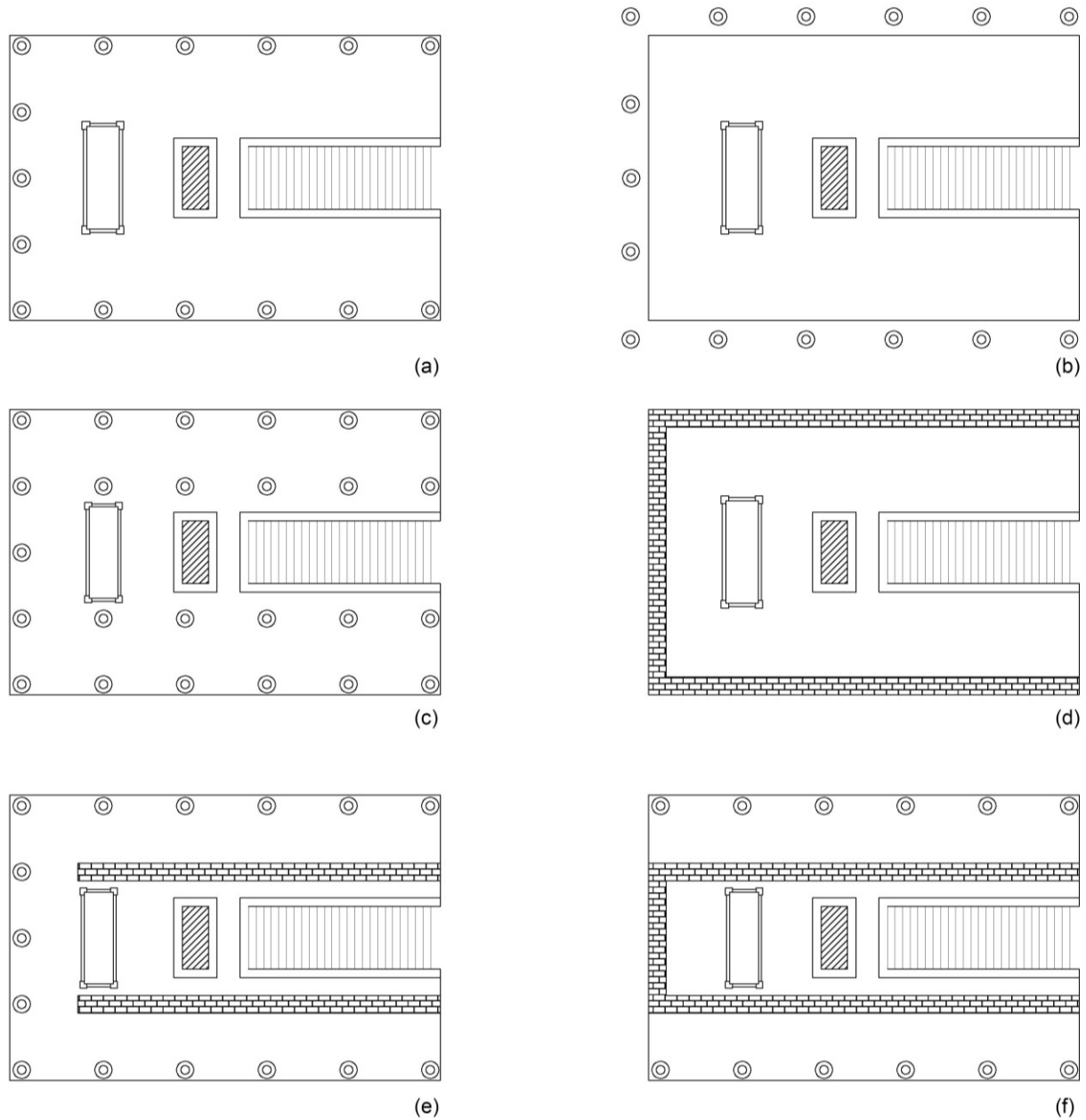


Figure 35: 2D variant hypothetical reconstructions of the superstructure: a) based on the reconstruction of the South Building at the Alexandrian Sarapeum; b) based on the layout of the altar at the Sanctuary of Hekate at Lagina; c) a double-colonnade version of the South Building at the Alexandrian Sarapeum; d) based on the walled superstructure at the Pergamene Altar; e) based on the superstructure at altar of Artemis Leukophryene; f) another version based on the superstructure at altar of Artemis Leukophryene.

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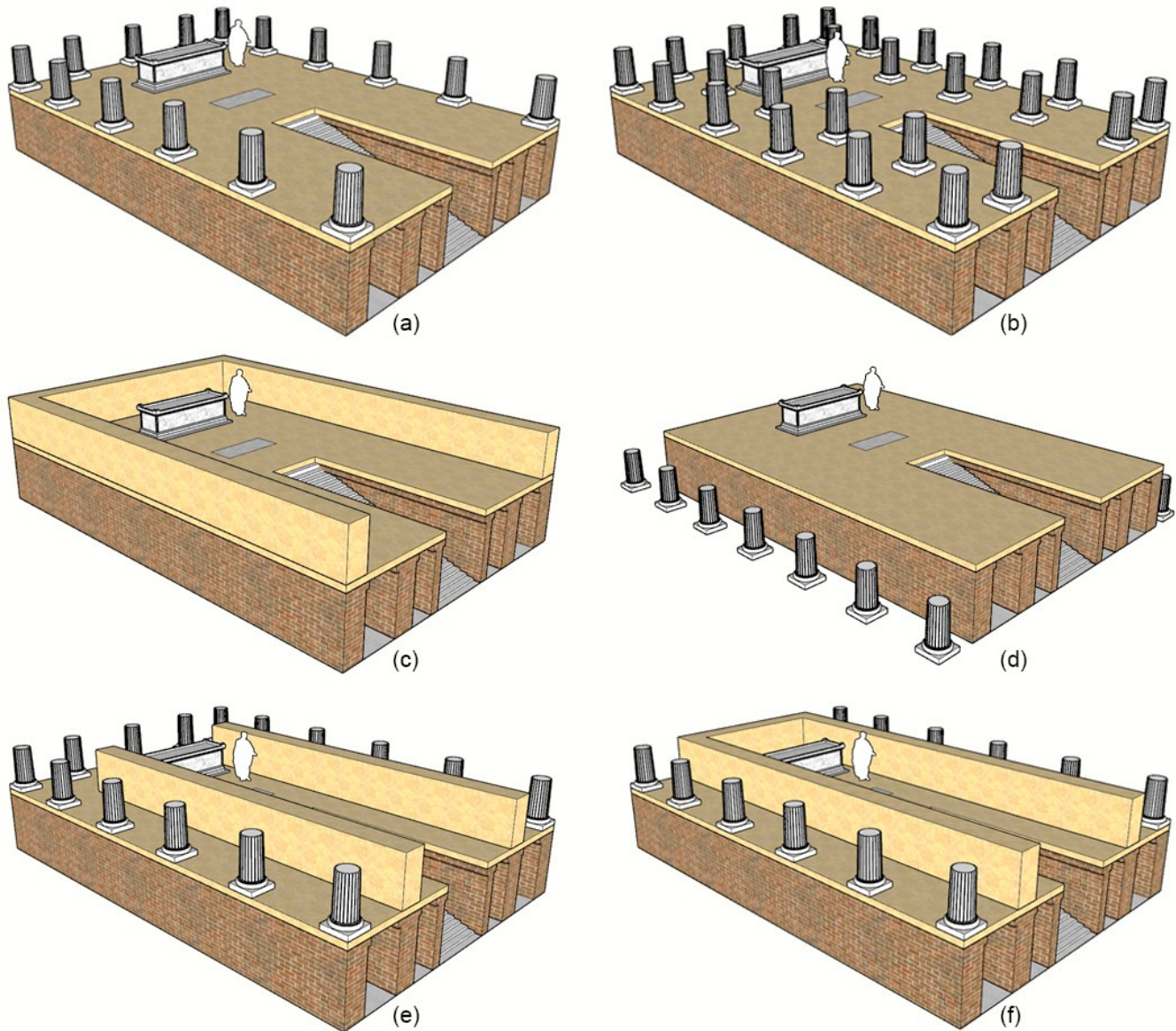


Figure 36: 3D variant hypothetical reconstructions of the superstructure: a) based on the reconstruction of the South Building at the Alexandrian Sarapeum; b) based on the layout of the altar at the Sanctuary of Hekate at Lagina; c) a double-colonnade version of the South Building at the Alexandrian Sarapeum; d) based on the walled superstructure at the Pergamene Altar; e) based on the superstructure at altar of Artemis Leukophryene; f) another version based on the superstructure at altar of Artemis Leukophryene.

4. Discussion

Since 1949, the discoveries of Makramallah at Hermopolis Magna have remained virtually unexamined in scholarly publications. The majority of scholarship has relied heavily on Wace's 1959 account of the Ptolemaic Sanctuary, overlooking Makramallah's contributions due to their unpublished and uncatalogued nature. Although scholars previously made several attempts to locate his scholarly material, they proved unsuccessful. The rediscovery of Makramallah's photographic archive, catalogued under the Wace collection at the British Museum, occurred during the course of this research. The confirmation of the photographs' relevance was made possible through the

generous assistance of the British Museum, which provided catalogue samples and visual references that confirmed their connection to Makramallah's 1945 excavation campaign.

The reconstruction of the monument entailed significant methodological and interpretive challenges. Although the photographic archive is extensive, it is scarce in descriptive metadata, containing only minimal captions provided by the curators of the British Museum. It appears that Makramallah did not leave any field notes, architectural sketches, or interpretive documentation that are preserved within the British Museum's collections. A singular note by Megaw, which is archived alongside the photographs,

offers a brief commentary on the construction of the monument, designating the bricks as “Pharaonic” rather than Ptolemaic. Nevertheless, this assertion is speculative and lacks a comprehensive description of the monument’s form or function.

One of the primary challenges encountered was establishing the orientation of the site. The photographs documented the sanctuary in a substantially dilapidated condition, markedly different from its present arrangement. Numerous architectural features, such as column shafts, were observed to be collapsed or displaced within the images, many of which have been restored as of 2023. Furthermore, the landscape has experienced significant alterations, with notable discrepancies in vegetation and ground conditions when compared to the mid-20th century. Determining the cardinal orientation necessitated tracking the position of a recurrent architectural feature, referred to in this study as “Marker L,” which served as a spatial reference point across various images.

A significant challenge presented by the analysis was the lack of consistent scale references within the photographic documentation. Only one photograph incorporated two field scales, which subsequently served as the foundation for dimension estimation. These measurements facilitated the calculation of the monument’s height, length, and width through geometric extrapolation and proportional analysis. Furthermore, the reconstruction of wall segments and foundational layout was corroborated through comparative analysis with similar Hellenistic structures in Egypt and the Eastern Mediterranean. Thus, the analogical method was instrumental in both validating uncertain elements and producing credible reconstructions of absent features.

The utilisation of AutoCAD for 2D modelling and SketchUp for 3D visualisation was essential to the interpretive methodology. These applications afforded the necessary flexibility to conduct iterative tests of the monument’s structural logic while addressing inconsistencies that arose during the analytical process. By converting photographic data into dimensional schematics and 3D reconstructions, the software supported both visual representation and spatial analysis. Furthermore, these reconstructions unveiled architectural patterns indicative of an upper superstructure, which likely served as an altar. This hypothesis broadens the potential for a more extensive comparative framework.

One critical implication of this reconstruction is its potential relationship with the Alexandrian Sarapeum. Although previous scholarship, most notably McKenzie (2010), has suggested a Hermopolitan parallel, no definitive architectural connection has been established. Nonetheless, the reconstructed monument’s plan, proportions, and possible cultic orientation may lend renewed support to this hypothesis. The study proposes a credible model for a Ptolemaic substructure that exhibits both functional and symbolic parallels to its Alexandrian counterpart, thereby reintroducing the proposition that the primary sanctuary at Hermopolis was dedicated to Sarapis.

Beyond its local significance, the reconstruction serves as a paradigm of how digital methodologies can recover and reinterpret architectural forms that are lost due to incomplete or inadequately documented sources. The

success of this initiative emphasises the importance of archival re-evaluation, digital modelling, and comparative analysis as synergistic strategies for heritage reconstruction. Although the lack of definitive excavation records presents certain limitations, the methodological framework mitigates these challenges through meticulous image analysis and analogical reasoning. Future research endeavours could implement analogous workflows to similarly underexplored or fragmentary datasets within the Hellenistic context.

5. Conclusion

This study aims to re-evaluate a lesser-known architectural feature uncovered during Makramallah’s excavation campaign in 1945 at the Ptolemaic Sanctuary in Hermopolis Magna. Through a thorough analysis of the photographic archives, the research identifies a significant mudbrick structure situated beneath the atrium of the superimposed 5th-century AD Christian Basilica. Although the original material composition may have led to a misidentification, causing Wace to associate the structure with Pharaonic constructions, the monument’s formal characteristics and spatial configuration indicate a notable resemblance to established Hellenistic altars.

Utilising a comprehensive approach that integrates archival photography analysis, geospatial positioning, and digital reconstruction in both two and three dimensions, this research aims to offer a re-interpretation of the structure as a monumental altar. Should this classification be substantiated by future archaeological findings, it could significantly enhance the existing comprehension of religious architecture during the Ptolemaic era in Egypt. Although altars are consistently documented in the textual and iconographic repositories of the Graeco-Roman period, instances of monumental altars are exceptionally scarce within the archaeological record. To date, no securely identified monumental altar has been discovered in Egypt, with a potential exception being the enigmatic South Building at the Alexandrian Sarapeum.

The possible reclassification of the Hermopolitan structure adds to the increasing evidence indicating that monumental altars could have had a significantly greater role in Egyptian sanctuary complexes than has been recognised in prior scholarship. Consequently, this discovery encourages a more comprehensive re-evaluation of altar typologies, spatial arrangements, and cultic functions within major urban centres, including Alexandria and Hermopolis Magna.

It is imperative to recognise that the conclusions clarified herein remain provisional, constrained by the inherent limitations of the available documentation. The lack of supplementary field notes, stratigraphic records, and architectural plans significantly diminishes the level of certainty surrounding the monument’s function. However, the methodological framework employed, integrating historical documentation, digital reconstruction, and comparative architectural analysis, provides a robust basis for proposing and examining possible hypotheses despite the absence of comprehensive data.

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In conclusion, this research emphasises the importance of re-evaluating archival materials utilising modern analytical and digital methodologies. Furthermore, it illustrates how such reassessments can produce significant insights into the architectural and ritual practices prevalent during the Hellenistic period in Egypt, ultimately enhancing our comprehension of sacred spaces in antiquity.

Acknowledgement

I would like to dedicate this study to the memory of Professor Rizkallah Naguib Makramallah, whose untimely death prevented him from sharing his discovery with the world.

Special thanks to my professor and mentor, Dr. Mona Haggag, for her unwavering support and for bringing to light Makramallah's "lost" work, which sparked the search

for his photographic archives and served as the starting point for this research. I would like to thank the team of the British Museum at both the Permissions Department and the archives of the Department of Egypt and Sudan. Their assistance was invaluable and made this publication possible. I would also like to thank my friend and colleague, Dr. Nada Zeyada, for her assistance with the Spanish translations.

Disclaimer

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References

- Allen, J. (2002). The Speos Artemidos Inscription of Hatshepsut. *Bulletin of the Egyptological Seminar*, 16, 1–17, pls.1+2.
- Arnold, D. (1999). *Temples of the Last Pharaohs*. New York: Oxford University Press. https://archive.org/details/isbn_9780195126334
- Bailey, D. M., Bimson, M., Burn, L. M., Cockle, W. E. H., Freestone, I. C., Middleton, A. P., Tait, W. J., Walker, S. E. C., & Bird, S. (1991). *Excavations at El-Ashmunein IV: Hermopolis Magna: Buildings of the Roman Period*. London: British Museum Press. <https://doi.org/10.2307/3821888>
- Baraize, É. (1940). L'«Agora!» d'Hermoupolis. *Annales du Services des Antiquités de l'Égypte*, 40(2), 741–745. <https://archive.org/details/ASAE-40-2-1940>
- Barański, M. (1989). Problemy konserwacji ruin starożytnych w Aszmunein w Egipcie. *Ochrona Zabytków*, 42(1), 42–47. https://bazhum.muzhp.pl/media/texts/ochrona-zabytkow/1989-tom-42-numer-1-164/ochrona_zabytkow-r1989-t42-n1_164-s42-47.pdf
- Barański, M. (1990). Konserwacja wczesnochrześcijańskiej bazyliki w Aszmunein. *Ochrona Zabytków*, 43(3), 135–139. https://bazhum.muzhp.pl/media/texts/ochrona-zabytkow/1990-tom-43-numer-3-170/ochrona_zabytkow-r1990-t43-n3_170-s135-139.pdf
- Barański, M. (1992). Excavations at the basilica site at el-Ashmunein/ Hermopolis magna in 1987–1990. *Polish Archaeology in the Mediterranean*, 3, 19–23. <https://doi.org/10.11588/diglit.26426.6>
- Barański, M. (1996). The archaeological setting of the great Basilica Church at el-Ashmunein. In D. M. Bailey (Ed.), *Archaeological Research in Roman Egypt: The Proceedings of the Seventeenth Classical Colloquium of the Department of Greek and Roman Antiquities, British Museum, 1993* (pp. 99–106). London, United Kingdom.
- Barański, M. (2002). Czy można określić rolę biskupów Hermopolis Magna (Szmun) w kształtowaniu miasta. In Iwaszkiewicz-Wronikowska, B. and Próchniak, D. (Eds.), *Sympozja Kazimierskie poświęcone kulturze świata późnego antyku i wczesnego chrześcijaństwa 3*, 237–243. Lublin, Poland.
- Barański, M. (2004). Coloured Hellenistic Architectural Remains from El Ashmunein (Hermopolis Magna) Egypt. In Cleland, L. and Stears, K. (Eds.), *Colours in Antiquity; Colour in the ancient Mediterranean world* (pp. 96–99). Oxford: British Archaeological Reports.
- Barański, M. (2019). Hermopolis Magna at the Crossroad of Cultures. In G. Bąkowska-Czerner, and R. Czerner (Eds.), *Greco-Roman Cities at the Crossroads of Cultures: the 20th Anniversary of Polish-Egyptian Conservation Mission Marina el-Alamein*, 7-18. Oxford: Archaeopress Ltd. <https://doi.org/10.2307/j.ctvndv687.5>
- Bernard, É. (1999). *Inscriptions Grecques d'Hermoupolis Magna et de sa Nécropole*. Cairo: Institut Français d'Archéologie orientale.
- Biondi, G., & Schiaparelli, E. (1905). Scavi eseguiti a Hermopolis Magna. *Rendiconti della Reale Accademia dei Lincei, Classe di scienze morali, storiche e filologiche*, 14, 283–389.

- Bowman, A. (1986). *Egypt after the Pharaohs 332 BC – AD 642*. Berkley – LA: University of California Press.
- Bozza, S. (2018). Spazio urbano e memoria religiosa a Hermoupolis Magna, città cerimoniale dell'Egitto ellenistico-romano. *Theatroideis: l'immagine della città, la città delle immagini. Thaisos Monographie*, 11(2), 453–468. <https://hdl.handle.net/11573/1556990>
- Breccia, E. (1905). ΕΡΜΟΥ ΠΟΛΙΣ Η ΜΕΓΑΛΗ. *Bulletin de la Société Archéologique d'Alexandrie*, 7, 18–42.
- Châban, M. (1907). Fouilles à Achmounein. *Annales du Services des Antiquités de l'Égypte*, 8, 211–223.
- Fathy, M., & Abdelgawad, E. (2021). Al-Ashmunin (Hermopolis Magna) in some Arabic Sources. *Weltentstehung und Theologie Von Hermopolis Magna II: Der Deutsche Hermopolis-Expedition im Licht aktueller Forrschung, TeG 11*, 1–28. Hildesheim: Verlag Patrick Brose.
- Flossmann-Schütze, M., Medini, L., & Brose, P. (2021). The Émile Baraize archive and the reconstruction of the “Agora.” Hermopolis Magna. *Weltentstehung und Theologie Von Hermopolis Magna II: Der Deutsche Hermopolis-Expedition im Licht aktueller Forrschung, TeG 11*, 421–478. Hildesheim: Verlag Patrick Brose.
- Flossmann-Schütze, M. (2021–2022). Archivgrabungen: Günther Roeder und das Stadtbild von Hermopolis Magna. *Sokar*, 40, 152–169.
- Gromnicki, J., Janiszowski, K., Jurkiewicz, R., Kowalczykova, E., Krzyżanowski, L., Łotysz, A., & Olbryś, M. (Eds). (1989). *Reports from Ashmunein: Polish-Egyptian Archaeological and Preservation Mission at El Ashmunein, Vol. 1*. Warsaw: Pracownia Konserwacji Zabytków.
- Habachi, L. (1956). Rizkallah Naguib Makramallah. *Annales du Services des Antiquités de l'Égypte*, 54, 43–46. <https://archive.org/details/ASAE-54.1-1956/mode/2up>
- Herring, A. (2020). Reconstructing the Sacred Experience at the Sanctuary of Hekate at Lagina. *Journal of the Society of Architectural Historians*, 79(3), 247–263. <https://doi.org/10.1525/jsah.2020.79.3.247>
- Jedrzejewski, J. (2023). Studien zur ptolemäischen Baupräsenz: Entwicklung und Charakteristika frühptolemäischer Architektur (Doctoral dissertation). Ludwig Maximilians University, Munich, Germany. Retrieved from <https://edoc.ub.uni-muenchen.de/32716/>
- Kamal, M. (1947). Excavations of the Antiquities Department (1942) in the So-Called ‘Agora’ of Hermopolis (Ashmunein). *Annales du Services des antiquités de l'Égypte*, 46, 289–295. <https://archive.org/details/ASAE-46-1947>
- Krzyżanowski, L., & Olbryś, M. (Eds). (1992). *Reports from Ashmunein: Polish-Egyptian Archaeological and Preservation Mission at El Ashmunein, Vol. 2*. Warsaw: Pracownia Konserwacji Zabytków.
- Leclant, J. (1952). Fouilles et travaux en Egypte, 1950–1951. 2. *Orientalia*, 21, 233–249. <https://www.jstor.org/stable/43078932>
- Lefebvre, G. (1924). *Le tombeau de Petosiris: Description*. 1ère partie. Cairo: Institut Français d'Archéologie Orientale.
- McKenzie, J., Gibson, S., & Reyes, T. (2004). Reconstructing the Serapeum in Alexandria from the Archaeological Evidence. *The Journal of Roman Studies*, 94, 73–121.
- McKenzie, J. (2010). *The Architecture of Alexandria and Egypt, c. 300 B.C. to A.D. 700*. New Haven, conn.: Yale University Press. https://archive.org/details/architectureofal0000mcke_n2h6
- Pensabene, P. (1993). *Elementi Architettonici di Alessandria e di Altri Siti Egiziani*. Repertorio d'Arte dell'Egitto Greco-Romano. Rome: L'Erma di Bretschneider.
- Roeder, G. (1959). *Hermopolis 1929–1939*. Hildesheim: Verlag Gerstenberg.
- Rowe, A. (1946). *Discovery of the Famous Temple and Enclosure of Sarapis at Alexandria*. Supp. aux Annales du Services des antiquités de l'Égypte. Cairo: Institut Français d'Archéologie Orientale.
- Spencer, A. J. (1983). *Excavations at El-Ashmunein I: based on the survey by R. D. Andrews and D. M. Bailey*. London: British Museum Publications.
- Spencer, A. J., Bailey, D. M., & Burnett, A. (1983). *British Museum Expedition to Middle Egypt: Ashmunein (1982)*. London: British Museum.

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- Trnka-Amrhein, Y. (2024). News from the City of the Baboon Project. *Scribe*, 13, 50-51. Cairo: American Research Center in Egypt.
- Van Minnen, P. (1997). Roman Hermopolis: A Study of the Social and Economic History of an Egyptian Town in the First Four Centuries A.D. (Doctoral Dissertation). KU Leuven University, Leuven, Belgium.
- Wace, A. J. B. (1945). Recent Ptolemaic Finds in Egypt: Alexandria. *Journal of Hellenic Studies*, 65, 106-109. <https://doi.org/10.2307/626345>
- Wace, A. J. B. (1946). A Ptolemaic Inscription from Hermopolis Magna. *Bulletin of the Faculty of Arts*, 3, 9-14. Alexandria: Alexandria University Press.
- Wace, A. J. B., Megaw, A. H. S., Skeat, T. C., & Shenouda, S. (1959). *Hermopolis Magna, Ashmunein: The Ptolemaic Sanctuary and the Basilica*. Faculty of Arts, Publication No. 8. Alexandria: Alexandria University Press.
- Wilkinson, R. (2000). *The Complete Temples of Ancient Egypt*. New York: Thames & Hudson. https://archive.org/details/the-complete-temples-of-ancient-egypt_202407
- Winter, F. (2006). *Studies in Hellenistic Architecture*. Toronto–Buffalo–London: University of Toronto Press. <https://doi.org/10.3138/9781442657595-toc>