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Water conduits on Antinoe Street, Hermopolis Magna

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Abstract: This study examines and analyzes the water conduits constructed along what is known as Antinoe Street in the city of Hermopolis Magna, which is believed to have been the main thoroughfare in the heart of the city during the Roman period. The research aims to document these largely unknown water channels, which have received little to no attention from previous archaeological missions that worked at the site. It also seeks to date these structures and determine their role within the city's water distribution network. The study proposes to integrate these conduits into the broader understanding of Hermopolis's urban layout in order to gain a deeper insight into how water was managed and distributed in the Roman city. This, in turn, contributes to enriching our knowledge of hydraulic infrastructure in Egyptian cities during the classical periods.

Keywords: Hermopolis Magna - Water conduits -Roman period–Water supply

قنوات المياه في شارع أنتينوي في هيرموبوليس ماجنا

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الملخص: يتناول هذا البحث بالدراسة والتحليل قنوات المياه المقامة على ما يُعرف بشارع أنتينوي في مدينة هيرموبوليس ماجنا، والذي يُعتقد أنه كان الشارع الرئيسي في قلب المدينة خلال الفترة الرومانية. وتهدف الدراسة إلى توثيق هذه القنوات المائية غير المعروفة حتى الآن، والتي لم تحظَ باهتمام يُذكر من قِبل البعثات الأثرية السابقة التي عملت في الموقع. كما تسعى إلى تأريخ هذه المنشآت وتحديد دورها ضمن شبكة توزيع المياه في المدينة. ويقترح البحث دمج هذه القنوات ضمن التصور الأوسع للتنظيم العمراني لهيرموبوليس، من أجل فهم أعمق لكيفية إدارة المياه وتوزيعها في المدينة الرومانية، مما يسهم في إثراء معرفتنا بالبنية التحتية الهيدروليكية في المدن المصرية خلال العصور الكلاسيكية.

الكلمات الدالة: هيرموبوليس ماجنا – قنوات المياه – العصر الرومانى – إمدادت المياه.

Hermopolis site

The ancient site of the city of *Hermopolis Magna* is located on the western bank of the Nile in Middle Egypt, at a distance of approximately 40 km south of the city of *Minya* and 7 km to the northwest of the city of *Mallawi*. The archaeological site occupies nowadays an area of more than 1.5 km from north to south and 1 km from east to west[1]. It is surrounded by three villages, the village of *El-Ashmounein* and its cemetery to the south, which is the historical geographical extension in the Islamic period of *Hermopolis,* which in turn is an extension of the Egyptian city of *Khemnou*, the village of *Ibrahim Awad*[2] to the southwest, and the village of *El-Idara*[3] and its cemetery to the north side. To the east, the site is delineated by agricultural lands (Fig 1).

The city of *Hermopolis* underwent remarkable development during the Roman period, thanks to its status as *nome* metropolis, the dynamism of its inhabitants and probably thanks to its proximity with the new founded city of *Antinooupolis*, established on the other side of the Nile by the Emperor Hadrian in the early 2nd c. CE[4]. The remains of the city were quite well preserved at the beginning of the 19th c. and were the subject of several excavation campaigns in the 20th century[5]. Recent research has focused on the baths and water management in the city in Roman times[6], one aspect of which is presented here.

The *Antinoe* street in the Roman period

As previously mentioned, the site of *Hermopolis* has undergone several excavations since the early 20th century, enabling us to learn more about some of its monuments and streets. A dozen buildings has been excavated and carefully studied, such as baths, a Ptolemaic temple, a *komasterion* and a Christian basilica. In addition, the basic layout of the city has been known from ancient written documents since the early years of the last century. Indeed, the site has yielded a very large number of papyri that provide precise topographical indications, in particular for the Roman and Late Roman periods. These documents give the names of several of the city's major buildings, gates, and streets[7].

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[1] Jeffery Spencer, *Excavations at El-Ashmunein I, The Topography of the Site*, *British Museum Expedition to Middle Egypt*, (London: British Museum Press, 1984), 3.

[2] The village of Ibrahim Awad was named after one of the feudal lords in the first half of the twentieth century, Ibrahim Bey Awad. The name was changed to ***Al-Hurriya*** by decision of the President of the Arab Republic of Egypt No. 587 of 1973.

[3] The El-Idara Village was established in the first half of the nineteenth century by order of Muhammad Ali Pasha to provide housing for the workers of the sugar factory that he established in the village of El-Ashmunein.

[4] Myrto Malouta, "Urban Connections: Arsinoe, Antinoopolis and Hermopolis in the papyri", in: *The Space of the City in Graeco-Roman Egypt. Image and Reality*, edit: E. Subias, (Institut Català d'Arqueologia Clàssica Tarragona, 2011), 49-56.

[5] For a summary of the excavations at the site, see Etienne Bernand, *Inscriptions grecques d'Hermoupolis Magnaet de sa nécropole*, (Le Caire: IFAO press, 1990), 9-11.

[6] This work is the subject of a PhD thesis currently prepared by Hesham Abd el-Kader. It is based on the study of archival documentation. The author was also able to conduct two field missions on the site (see Hesham Abd el-Kader. "Excavation of a Roman Public Bath at Hermopolis Magna", in *Egyptian Archaeology* 61, (london: EES Press, 2023), 40-44.

[7] Lorenzo Medini, "Hermopolis gréco-romaine ou les limites de l' archéologie d' unevilledisparue", in: *RAMAGE* 12 (2012).

One of them is the *Antinoe* street, that once linked the Sun Gate in the east to the Moon Gate in the west.

The *Antinoe* Street has been precisely located in the field by the archaeological works in *Hermopolis* in the early 20th c. and appears in the map published by Roeder in 1959[1]. It follows the course of an axis that already existed in Pharaonic times[2] and cuts the city into two districts (north and south) and crosses it from east to west. Numerous monuments stand along the street, in particular the basilica and Ptolemaic sanctuary, to the south, and the large mud-brick enclosure dated to *Nectanebo I* (378–361BC), replaced by the so-called *komasterion* in the Roman period, to the north. The intersection of the street with the north/south axis of the city (so-called "Hermes dromos") is marked by a monumental tetrastyle[3].

[1] Günter Roeder, *Hermopolis 1929-1939. Ausgrabungen der Deutschen Hermopolis-Expedition in Hermopolis*, WVPM 4, (Hildesheim: Gebruber Gerstemberg, 1959).
[2] Medini, "Hermopolis gréco-romaine ou les limites de l'archéologie d' unevilledisparue", 5.
[3] Donald Bailey, *Excavation at Al Ashmunein IV, Hermopolis magna, Buildings of Roman period, British British Museum Expedition to Middle Egypt*, (London: British Muesum Press, 1991), 29-30.

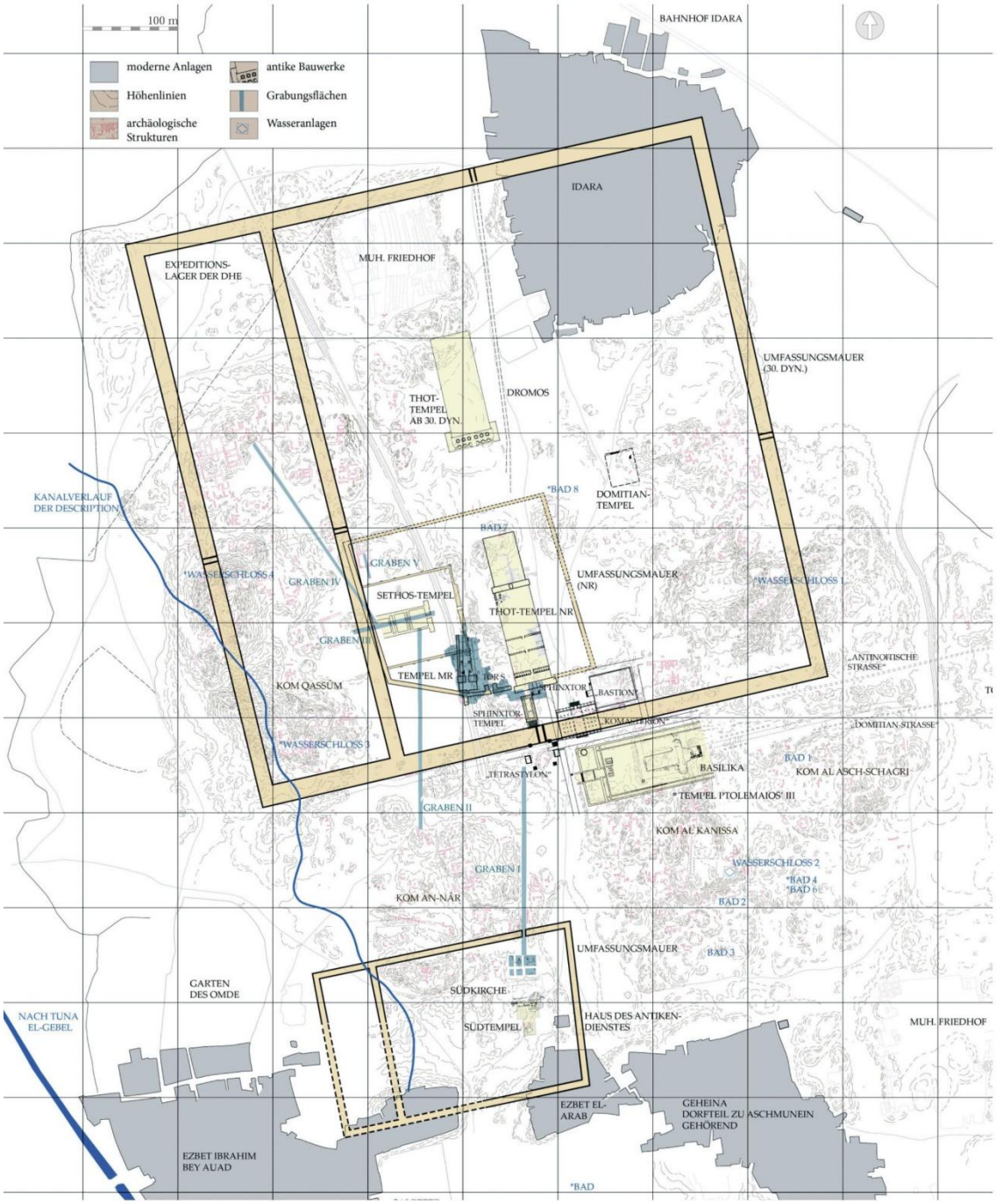

Fig.1: A general map of the current archaeological site of *El-Ashmunein,* After: Melanie Flossmann-Schütze, 'Archivgrabungen: Günther Roeder und das Stadtbild von Hermopolis Magna, Sokar 40 (2022): Fig. 16.

The name of the street (*Antinoitike Plateia*) is known from the papyri[1]. Some of the buildings built along the *Antinoe* Street are also mentioned in the written documentation. In a papyrus dating from around 263 AD[2], during the reign of *Gallienus* (253 –268 AD), a man named *Aurelius Appianus* reports to the Senate of *Hermopolis* on a series of restored buildings, at great cost, which historians have located along the *Antinoe* street. The buildings may have been damaged in recent "heinous riots," as stated in another papyrus of the time.[3] It included several temples dedicated to *Hadrian* and *Antinoos*, *Sarapis*, Nilus, *Aphrodite*, Athena, etc.[4], in addition to a market, the *komasterion* and two fountains[5].

The Reformation Papyrus of *Aurelius Appianus* comes from the Senate Archives consisting of about 100 surviving documents from the third century AD[6]. Many of these papyri detail public works, and this building activity has led some commentators to suggest that during the reign of *Gallienus* there was an "obsession" with public works[7].

The papyrus of *Aurelius Appianus* is unfortunately badly damaged and is ambiguous as to where these structures were placed; several commentators have attempted to work out their positions along *Antinoe* Street, but most were hampered by assuming erroneously that the enclosure wall running alongside *Antinoe* Street still survived to its full height, that the Sacred Way of Hermes ran through the Sphinx Gate, and that the agora was where it is now[8]. We will not discuss here these different assumptions and will focus on the archaeological remains of the street itself, a subject that has never been discussed, probably due to the little interest of the street compared to the monuments that lined it in Antiquity.

[1] CPR 35, 25 and 26.

[2] SB X 10299, recently republished by Drew-Bear 2020. See also Mare Drew-Bear, 'De la Porte du Soleil à la Porte de la Lune à Hermoupolis Magna in: Akten des 23. International en Papyrolog en kongresses, (2007): 199-202. Lorenzo Medini has challenged the attribution of the papyrus to *Hermopolis* and suggests that the street and monuments described in it could be located in Alexandria instead (see his articles published in 2011 and 2012). We will not go into this very interesting and challenging debate, which certainly merits further clarification beyond the scope of this article.

[3] On thisriots, see Mare Drew-Bear, "Guerre civile et grands travaux à Hermoupolis Magna sous Gallien", in: *Akten des 21. International en Papyrolog en kongresses I*, (1997) and Van Minnen (2002).

[4] They are mentioned in l. 173-180 of the papyrus SB XX, 10299. See the lists of these buildings in Medini 2012, 6 and Drew-Bear 1997.

[5] Mare Drew-Bear, "Sur l'alimentation en eau d'Hermoupolis Magna d'aprèsdeux papyrus du IIIe siècle", *Les problem esinstitutionnels de l'eau en Égypt eancienneet dansl' Antiquité méditerranéenne*, in: D. Bonneau (ed.), (Cairo 1994): 157-168. The fountain housesmay have looked like the 2nd century CE modelsat Dendera, with one located on eachside of the sacred road outside the northern gate of the Temple of Hathor: Donald Bailey, '*Classical Architecture in oxford Handbook of Roman Egypt* edit: Riggs, C, (Oxford, 2012), 196.

[6] They were recently republished by Mare Drew-Bearin 2020.

[7] For more about Papyrus of Aurelius Appianus, see Mare Drew-Bear, *Les Archives du Conseil Municipal Municipal d'Hermoupolis Magna, Part 1: introduction et textes*, (Berlin: De Gruyter, 2020).

[8] Bailey, *Classical Architecture in oxford Handbook of Roman Egypt*, 197.

The *Antinoe* street and its water conduits

Several portions of the *Antinoe* street have been cleared by excavators[1]. It is built with large limestone blocks (fig. 2) and measures around 7 m wide. It is bordered on each side by two sidewalks with ashlar edging, as Kamel in 1942 showed that it was bordered with columns on both sides. Unfortunately, very few data that would allow to precisely date the construction of the street have been published, but the remains are still visible and can be documented.

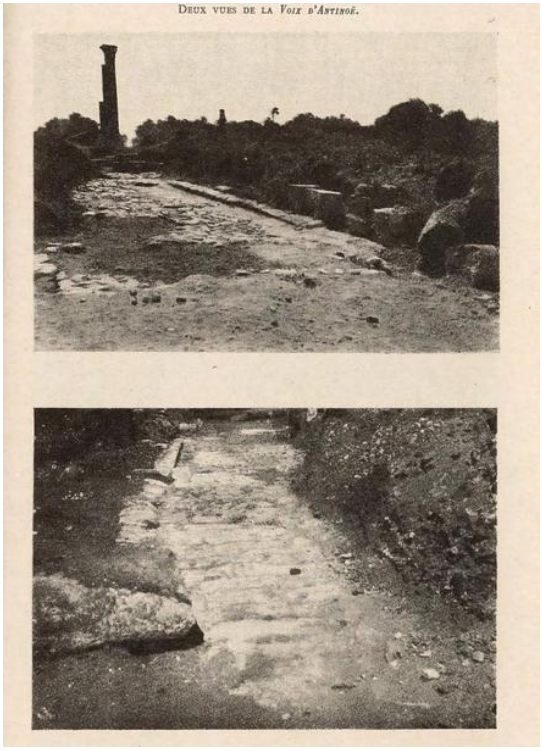

Fig. 2: Émaily Baraize, L'"Agora" d'Hermoupolis in: ASAE 40, (1940) pl. XCIII.

Water conduits are also mentioned in the area. They belong to a series of several water conduits, whose function was to transport water in the city, which have been noticed by the archaeologists in many sectors of *Hermopolis*. They are usually made in clay pipes inserted inside a rectangular masonry of red bricks and mortar.

One of these conduits has been brought to light parallel of the southern side of the *Antinoe* Street, running alongside the Ptolemaic Sanctuary on its northern and eastern sides. It is not built along the street, but at about 4,5 m to the south of it. Although severely damagedin some parts, it is one of the best preserved conduits of *Hermopolis* until now and can be followed on approximately 27,40 m long (Fig 3).The width of the brick masonryis approximately 1.7 m. The interior diameter of the pipe is18.5 cm, and the exterior diameter is 20 cm[2]. Its construction is typical of the systems used to supply

[1] For example, a large portion of the street has been cleared to the north of the Ptolemaic sanctuary and basilica by Baraize: Baraize (1940), 48 and pl. XCIII. Kamel also cleared the street in 1942.

[2] These dimensions were raised through the field study carried out by the researcher, over the course of two seasons between the years 2022 and 2023.

fresh water to Roman cities and resembles in every way the pipes used in many of the Empire's cities[1].

According to the trench dug in the street by the Polish team led by Baranski[2], the foundation trench of the canalization was dug after the completion of the four columns that were lining the street. These four columns were re-erected in 1945 by Baraize, who believed they represent the façade and entrance of the basilica to the north, although without giving any clear evidence.

Fig .3: Roman water conduits (walled clay pipes) along the "*Antinoe* street". In the background on the right Ruins of the Basilica from the 5th century AD. © Hesham A. Abdel Kader

The water conduits in *Hermopolis* are likely part of an underground conduits network in the center of the Roman city of *Hermopolis*, aimed to supply water to the public buildings (and maybe the houses?) in the center of the city[3]. In the case of the pipe built along the *Antinoe* street, Roeder[4]suggested that they were supplying water to the eastern and western fountains of the *Antinoe* Street, which are mentioned extensively in the *Hermopolis* papyri. However, this hypothesis is not based on fieldwork and Roeder did not excavate the area to check the veracity of his hypothesis, while working on the site between 1929 and 1939.

[1] Mick Wright, *Ancient Building Technology*, Volume 2: Materials, (Leiden: Brill 2007), 131, Jean-Pierre Adam, *Roman Building. Materials and Techniques*, (London and Newyork: Routledge, 1999), 520.
[2] Mark Baranski. " *Excavations at the Basilica site at El-Ashmunein/Hermopolis Magna"* in 1987-1990" in: Polish Archaeology in the Mediterranean 3, (Warsaw: PKZ Press, 1992), 22.
[3] A very interesting papyrus (CPR 35, 42, dated to 267 CE), also from the town council archives of Hermopolis, mentions the town's drinking water conduits and water supply system (*hydroparochia*). The text is commented in Drew-Bear 1994, 163-167.
[4] Roeder, *Hermopolis 1929–1939*, (1959), 123-124.

The first excavation in that area took place in 1939 under the supervision of *E. Baraize*[1], on behalf of the Antiquities service of Egypt at that time. He intended to work in this area, which had been identified in the early twentieth century, as the center of the city in the Ptolemaic-Roman period (agora), that is the City centre that was mentioned many times in the *Hermopolis* papyri, due to the huge number of granite columns in that area that were lying on the ground[2].

This identification proved to be incorrect, thanks to the work of the University of Alexandria done in this area between 1945 and 1950. Instead, they have demonstrated the existence of a Christian basilica dating back to the beginning of the fifth century AD, built on the ruins of a Ptolemaic sanctuary that was dedicated to the worship of the king Ptolemy III (246 - 222 BC) in the third century BC.

Although these excavations did not target the water conduit, it was actually cleared during their excavation[3].

By re-examining the plans published by the University of Alexandria and closely observing the conduits during the field study I conducted on that area in *Hermopolis* in March 2022, I have been able to establish several facts that help us to better understand the chronology and layout of the conduit.

It is also worth noting that to the south of the western end of the conduit, are the remains of a well[4], built of limestone blocks, with a diameter of approximately 3 m, which may have been connected to this conduit.

It turns out that the water conduit located to the south of the *Antinoe* Street is located at a higher level than the ruins of the Ptolemaic Sanctuary, which dates back to the third century BC, and at a lower level from the Christian basilica, which dates back to the late Roman period (the well also lies beneath the remains of the basilica, as demonstrated by Baranski). It therefore seems that the conduit could belong to the early Roman period (Fig 4&5). This hypothesis is further supported by the measurements and dimensions of the models of the bricks with which the conduit is built, and which are identical to their counterparts from buildings dated to the second century AD in *Hermopolis Magna*[5].

As the conduit, well and four columns are likely structurally linked, according to the observations made by Baranski in the 1990s, we suggest the same construction date for all these elements. This may also be the date of construction of the streetas we know it, with its large limestone pavements[6].

[1] Émaily Baraize, "L'"Agora" d'Hermoupolis" in: *ASAE* 40, (1940): 741-745.

[2] Patrizio Pensabene, *Elementiarchitettonici di Alessandria e di altrisitiegiziani Repertoriod'Artedell'Egitto Greco-Romano*, (Rome: L Erma, 1993), 248.

[3] Aaln Wace, *Hermopolis Magna, Ashmunein: the Ptolemaic sanctuary and the basilica*, Alexandria: (Alexandria University Press, 1959).

[4] The wellismentioned in Baranski (1991), 21.

[5] Bailey, *Excavation at Al Ashmunein IV*, Appendix 5.

[6] A test pit would have to be dug under the slabs to find dated material to confirm this. However, it is not unreasonable to propose this hypothesis, given the quality of the construction of the street and the quality of the construction of the conduit, the fact that the duct runs parallel to the street and that its upper level is almost at street level. Roman streets are usually lined with water supply pipes, and the system used here would simply be a new example of a layout very often found in all Roman cities.

If this is correct, then we could propose the following layoutfor the system as a whole: the street would have been built with two sidewalks on both sides, andthe conduit would have passed under the southern one. The street was flanked by a colonnade on both sides[1], of which the four columns re-erected by Baraize could be evidence[2].

Unfortunately, our observations did not reveal which building(s) were supplied by the conduit. New excavations would have to be carried out to determine this. We also need to determine the exact relationship of the conduit to the well uncovered beneath the basilica to determine whether it could have been used to fill the conduits. Nevertheless, the fact that the south conduit of the *Antinoe* street runs alongside the Ptolemaic sanctuary on two sides and follows its perimeter suggests that this monument was still visible and standing when the conduit was built and the street was paved with the limestone slabs, although the temple may no longer have been in use and/or used for other purposes.

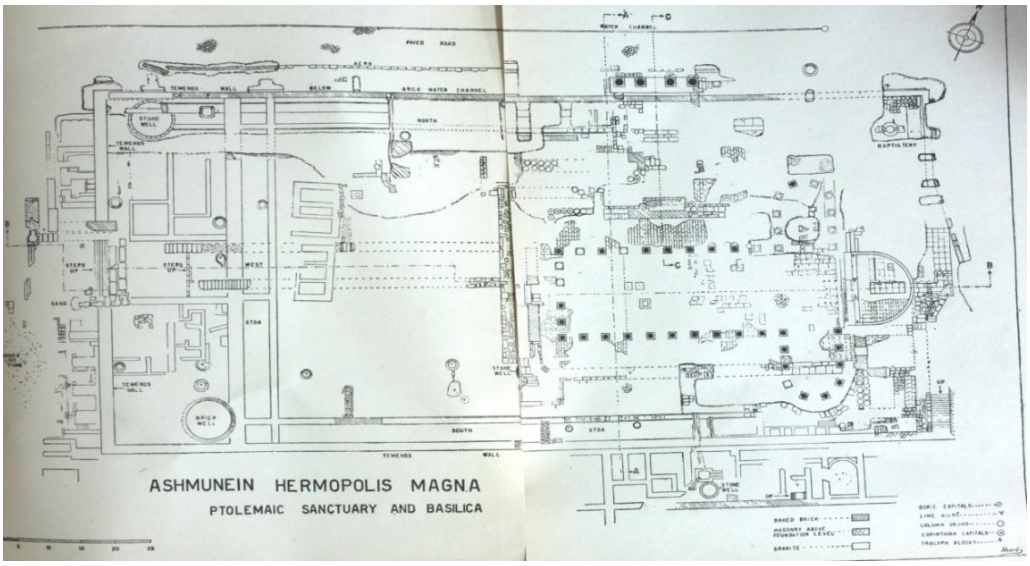

Fig. 4: Plan of the Basilica and the Ptolemaic Sanctuary, showing the water conduits in the *Antinoe* Street, After: Alan Wace, (1959). Plate 2.

[1] Kamel (1942): 294 already states that "some bases of columns were found in situ, a fact which proved that this road was boarder with columns on both sides". The fact that the *Antinoe* street is designated as a *plateia* in the papyri, a term used by Polybius, Strabo and Diodorus to refer to the main colonnaded streets of Alexandria (Polybius XV, 30, 4; Strabo XVII, 1, 10; Diodorus XVII, 52, 3) is worth noting.

[2] Kamel (1942): 297 says that the bases he found in situ on both sides of the street were in limestone, while the four columns are in granite. They may have highlighted the presence of aparticular building at the rear of the building.

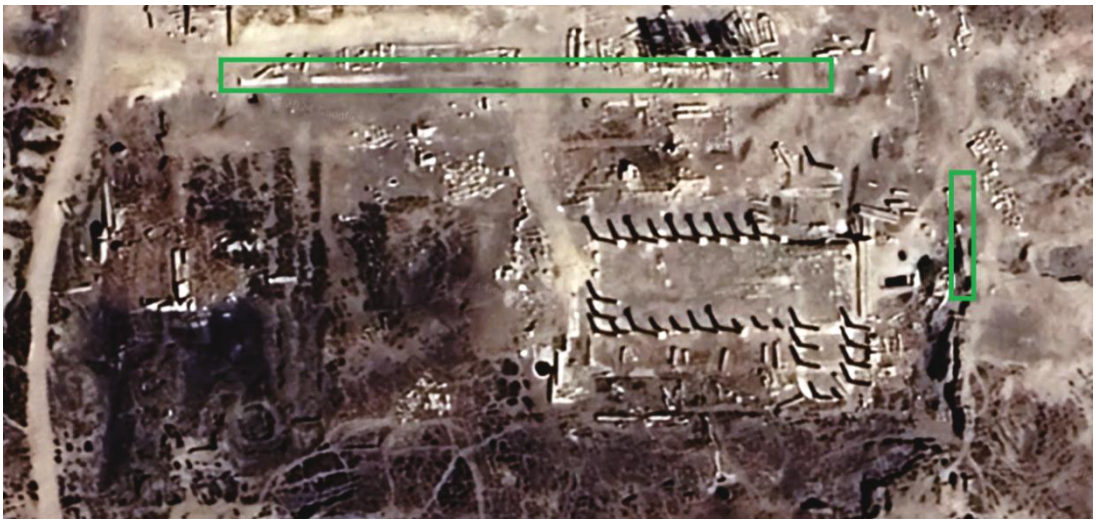

Fig 5: A recent screenshot from Google Earth of the ruins of the *Hermopolis* Basilica and the Ptolemaic Sanctuary, showing the remains of the water conduits inside the green square.

In addition to the water conduit located along the *Antinoe* Street on the southern side of the street, which is certain to have the function of supplying fresh water, another canalisation has been mentioned by previous studies on the other side of the street (the northern side). This drain is certainly related to the street and was built at the same time as the paved road, as the excavation photos clearly show. It borders the paved road to the north. The construction technique of this canalisation is different, since it is an uncovered stone canal, although it was probably partly covered in antiquity. It is 25 cm wide (internal measurement), and its depth is unknown (Fig 7&8).

The first person to notice this canal in *Antinoe* Street was *Moharam Kamal*[1] (Fig 6), who worked on behalf of the Egyptian Antiquities Service in 1942 to complete, raise and clean the columns of the basilica following the work he had carried out *Émile Baraize* in 1939. This work took place during the war (SWW), when the concession of *El-Ashmunein* was maintained by the Egyptian Antiquities Service, but part of it was soon transferred to *Faruq* University (University of Alexandria) 1945[2].

[1] Moharam Kamal, "Excavations of the Antiquities Department (1942) in the so-called 'Agora' of Hermopolis (Ashmunein)", in: *ASAE* 46, (1947): 289-295.
[2] Melanie Flossmann-Schütze, L.Medini, and P.Brose, "Émile Baraize archive and the reconstruction of the "agora"in Hermopolis Magna", in: *Tuna el-Gebel* - Band 11, (2021): 467.

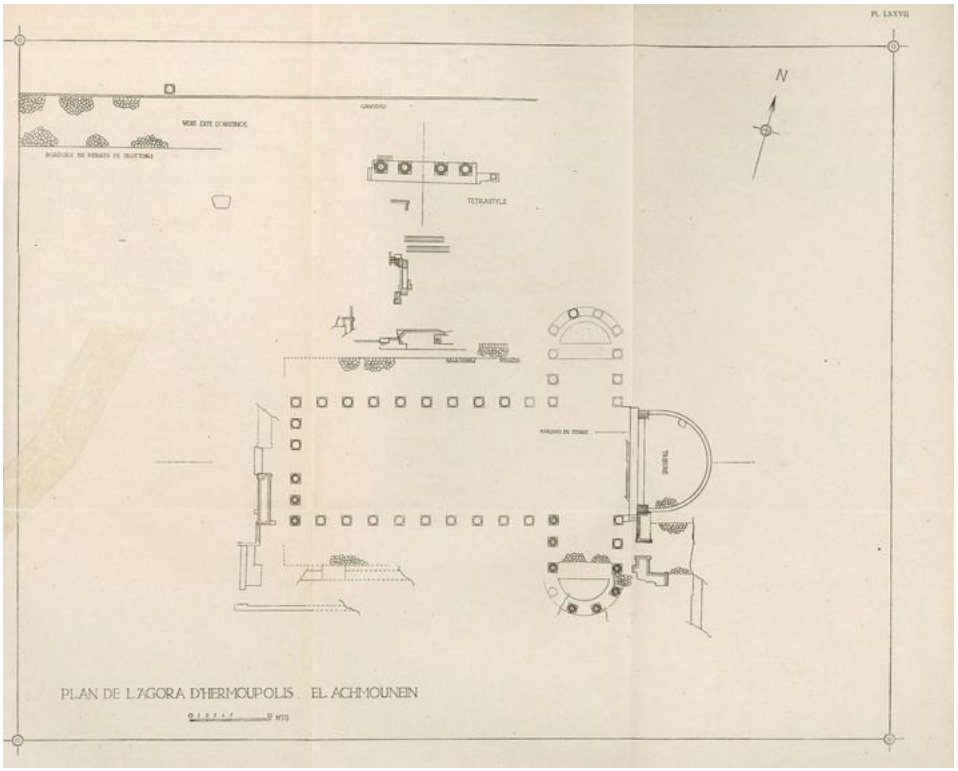

Fig. 6: Plan of the *Antinoe* Street and Basilica in 1942. After: Moharam Kamal, Excavations of the Antiquities Department (1942) in the so-called 'Agora' of Hermopolis (Ashmunein), in: ASAE 46, pl.LXXXVII

Fig. 7: *Antinoe* Street and water drains on the northern edge of the street to drain water in 1942.After: Moharam Kamal, Excavations of the Antiquities Department (1942) in the so-called 'Agora' of Hermopolis (Ashmunein), in: ASAE 46, pl. LIXXII.

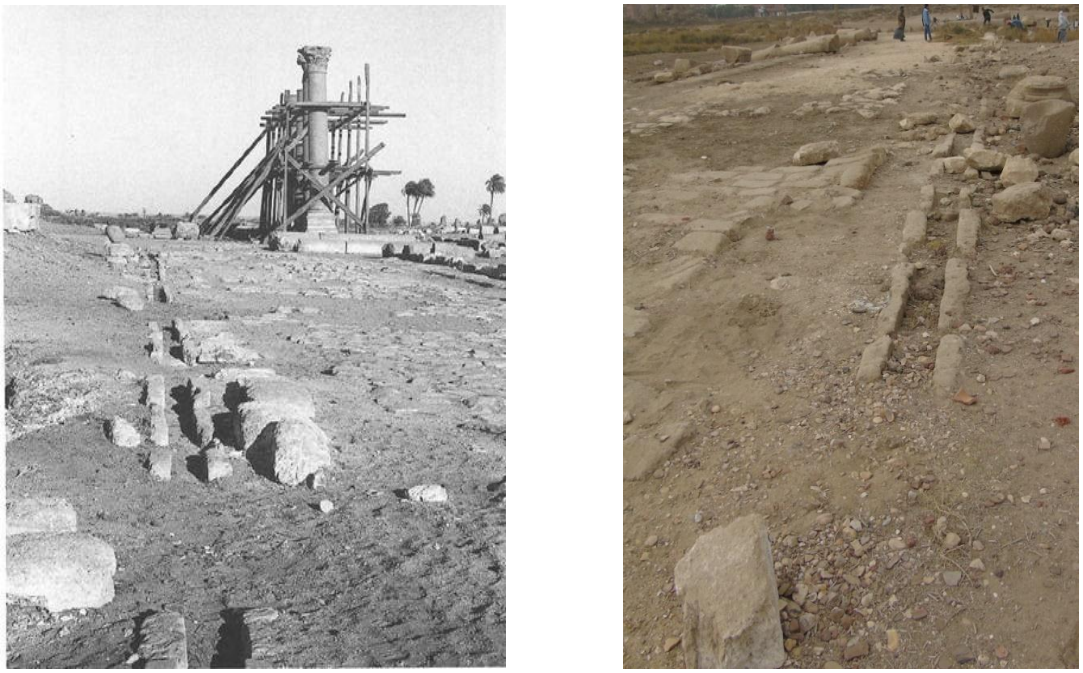

Fig .8: *Antinoe* Street and water drains on the northern edge of the street to drain water currently and 1989, © Hesham Abdel Kader.

Baraize was the first to suggest that it was used as a drain, to collect the rainwater. It is not impossible, but it must be said that *Hermopolis* has very little rainfall, and it is likely that the canalisation acted more broadly as a sewage pipe, both for rain and wastewater coming from the adjacent building. The use of stone to build the feature, and the possibility of uncovering the pipe to clean it, strongly argue in favour of this hypothesis, as well as the many parallels found all over the Roman Empire[1].

Another hypothesis is possible, based on recent field observations, which show that the pipe to the south of the street seems to turn northwards in the direction of the north canalisation. Even if it typologically looks more like a sewer than a freshwater pipe, the northern canalisation is large enough to have accommodated a lead or ceramic pipe. Hence were the north and south canalisations connected, or at least part of the same water supply system? The fact that they were not built in the same way is not a hindrance, because urban water systems are always composite; it may indicate that one of them was a major pipe while the second was a secondary pipe.

The first hypothesis seems the most likely, but the second cannot be completely ruled outand hopefully further work will make it possible to decide between the two hypotheses.

[1] For other stone canalisations linked to major streets of Roman cities and acting as collector drains for wastewater, see for instance in Baelo Claudia (Spain): Borau, Laetitia, &Gandini, Cristina et Trémeaud, Caroline, "Premiers résultats de la champagne (2022): *topographieurbaine et gestion des eauxpropres et usées à* Baelo Claudia, in: *Bulletin archéologique des Écolesfrançaises à l'étranger*, (2022) http://journals.openedition.org/baefe/6705, fig. 7. See alsoat Gerash (Jordan), several and very in spiring examples in Don Boyer, "Water Management in Gerasa and its Hinterland, Turnhout, (2022), 306-312 and fig. 9.23.

Discussion and conclusion:

The Romans have constructed ingenious water supply systems throughout their Empire, to bring water from outside sources into cities and towns. Once the water reached the city, it was dispatched in the cities' conduit networks from one to several *castella* (water tower). Conduits water supplied public baths, latrines, fountains, and private households[1]. As for the case of *Hermopolis*, the canalisation that have been built along the south side of the *Antinoe* street was probably used to provide water to the main buildings along the street, and probably also to the houses of the area. Roman cities also included a wastewater drainage system that was often just as well-developed as the water supply system. It is possible that we have identified part of this system on the northern edge of the *Antinoe* Street, although the function of this canalization could be subject to hesitation and need further research.

By re-examining the earlier documentation and with the help of field observations, we now propose to consider that the ensemble comprising the street, lined with columns, and the two canalisations is contemporary, which is a significant step forward. This is an important achievement, as it could show the existence of a large-scale concerted construction programme in the centre of *Hermopolis*, on the city's main east-west axis. It could also give evidence of a certain monumentalisation of the city, which affects its circulation routes and hydraulic system.

It is complicated to determine a precise date for the construction of the street and conduits, due to the absence of chronological data from the very few trenches conducted in the area. Bailey believed that the south conduit dated back to the second century CE, based on the sizes of the red bricks. On the other hand, it is also temptingto link the construction of the street and its two drains with the papyrus evoking the rebuilding of the street, dated 263.

Our work lends a little more weight to this hypothesis: by ruling out the possibility that the south pipe might have been in use at the same time as the Ptolemaic sanctuary and as the Christian basilica, it indicates that the whole system is very likely to have been in use in Roman times, in a period comprised between the first and third century CE. However, only serious stratigraphic work will make it possible to gain more precision on this dating.

It is not possible to determine the main function of this conduit in the Roman period, whether it was the supply of water to the buildings in the *Antinoe* Street or the northern and southern fountains from the street as mentioned in the papyrus. This cannot be confirmed because it seems that the center of the city of *Hermopolis* was subjected to many disturbances throughout the Roman period and Late Roman times.

But it is certain that the conduits designated for transporting fresh water were carefully built and prepared on *Antinoe* Street in the city center to help renew the center and make it more attractive. It also shows that attention was paid to every detail, including the simplest, so that the city could gain or regain its splendor, whether that was in the second or third century CE.

[1] See the admirable work on Gerash by Don Boyer, (2022). For a good example in Egypt of the organisation of the water supply to public and private buildings, in the Roman period, see Wolfgang Habermann, *Zur Wasserversorgung einer Metropole im kaiserzeitlichen Ägypten : Neueditionvon P.Lond. III 1177*, Munchen (2000). Seealso the seminal work of Danielle Bonneau, *Le régime administratif de l'eau du Nil dans l'Égypte grecque, romaine et byzantine*, (Leiden-Boston: 1993).

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