Rosetta

Abdelwahed, Y. & Shehata, F. (2022): ‘The Nile Water Management in Graeco-Roman Egypt: Some Water-related Jobs’

Rosetta **27**: 44-70

http://www.rosetta.bham.ac.uk/Issue27/abdelwahedshehata.pdf

DOI: https://doi.org/10.25500/rosetta.bham.00000004

The Nile Water Management in Graeco-Roman Egypt: Some Water-related Jobs

Dr. Youssri Abdelwahed & Dr. Farag Shehata (Minia University)

Abstract

The Nile has always occupied an important place in the Egyptian natural and cultural landscape. The ancient Egyptian civilization depended entirely on the annual donations of water and silt of the Nile flood, which played a vital political, religious, and socio-economic role in ancient Egyptian culture. This article uses Greek papyrological evidence to examine some water-related jobs as evidence of the control and management of the Nile water resources in Graeco-Roman Egypt. It will focus in particular on the Nile conservancy and other water-related administrative officers, notably the sailors-divers, the inspectors of sowing, the sluice guards, the irrigation guards, the river-workers, and the inspectors of fishing. The transportation and distribution of water for public and personal use by the water-providers and water-carriers will also be investigated. The analysis will help us gain a better understanding of how the state and the inhabitants could manage and make the most of the Nile river and its water assets through the use of a series of administrative water-related jobs.

Keywords: The Nile waters, water management, Greek papyri, texts, Graeco-Roman Egypt

***

Introduction

The Nile river has occupied an important place in current literature and discussions on Egypt.[1] Haapi, the god of the Nile inundation, has received considerable academic

[1] For an annotated bibliography on the Nile see Tvedt 2000.

attention.[2] Scholars have also examined the Nile landscape from the Neolithic to the Roman conquest, and how the ancient Egyptians attempted to harness power of the Nile as a useful force for agriculture and transportation.[3] The Nile quays and harbours built along the Nile banks, particularly near the temple frontages, and the Nilometers used for determining the taxation rates have equally been points of scholarly interest.[4] The nature of irrigation officialdom in the Arsinoite nome (modern Fayum) has already been dealt with in great depth. In 1993, Bonneau presented the most detailed study on the administrative offices related to the irrigation system in the region.[5] However, there is currently no comprehensive study on the control, management, and use of the Nile and its water resources through the Nile conservancy and a series of other water-related administrative offices in the light of surviving Greek papyrological documentations. This paper will provide such as study.

The paper starts with a brief discussion of the precautionary measures against the furious annual Nile flood, most notably the repair of dams, dykes, and bridges. It highlights the importance of the Nile water resources for the welfare of the inhabitants and the prosperity of Egypt. It then introduces the Nile water administration represented in the Nile conservancy as a high administrative body associated with the management of the Nile. It then continues into discussions of evidence for the use of the Nile for internal transportation through the Nile boats, land irrigation through the irrigation-related offices, and fishing through the inspectors of fishing. The water transportation and reservation for personal and public use through the water carrier (hydrophoros) and the water provider (hydroparochos) will be the final elements presented in the article.[6]

---

[2] Bonneau 1964; Spence 1990: 169-171; Watterson 1996: 8-11; Pinch 2002: 136-137; Redford 2002: 282; Wilkinson 2003: 106-108; Hart 2005: 61.
[3] See e.g. Bunbury 2019.
[4] Sandri 2017; Bietak 2017.
[5] Bonneau 1993.
[6] Throughout the article, we primarily use the texts and translations of Greek papyri as they appear in the Duke Databank of Documentary Papyri (DDbDP). All the papyri from the DDbDP are digitally available on via papyri.info, accessible at https://papyri.info/browse/ddbdp/ (last accessed on 21/3/2022). Primary sources for this article are the papyri in Hunt and Edgar 1943 (*Select Papyri, Volume II: Public Documents*), which are also available online at http://www.attalus.org/docs/select.html#2.1 (last accessed on 21/3/2022). If a different text and translation than those of the DDbDP and Hunt and Edgar 1943 is used, it is recorded in the footnote.

The Precautionary Measures Against the Nile Flood

The annual flood brought with its water and soil both fertility and prosperity, which secured for the ancient Egyptians the reasons for life and survival. Nevertheless, the inundation was a disastrous natural phenomenon that necessitated taking serious precautionary measures by the successive Egyptian administrative authorities and the inhabitants alike. In the early second century AD, Tabetheus, who lived in Karanis, wrote a letter to her brother Tiberianus, telling him that his daughter Segathis 'remains in attendance on me lest [the flood] come in the river with great violence, since I am not able to leave the house on account of [the flood]'.[7] Despite the prosperity which resulted from the rich silt (fertile soil) and massive quantities of water it deposited and brought annually, the Nile river and its flood caused serious threats to the lives and properties of local inhabitants.

Undoubtedly, the Nile flood was a major component of the ancient Egyptian socio-economic life. It was an unstoppable natural phenomenon that occurred every year. It brought billions of cubic meters of water mixed with soil, which had the potential to turn the life of the Egyptian society into a chaotic state, unless the public authorities and inhabitants were well-prepared for it. Flow records of the Nile waters at Aswan from 1869 to 1902 may draw attention to, and help visualize, the drastic impact of the furious Nile on Egyptian land and life during the flood period.[8] Visually, it can be imagined that the flood water penetrated everywhere, whether in temple grounds, tombs, streets, alleyways, houses, and other structures, particularly since the ancient Egyptians lived and constructed buildings along the banks of the Nile river. Prior to the construction of the Aswan High Dam in the 1960s, many ancient Egyptian monuments, particularly the temples located in Upper Egypt, along with their sacred precincts, courts, colonnades, and sanctuaries, were largely flooded with the Nile waters.[9] This seems to explain why

[7] *P.Mich*. 8.474.
[8] Sutcliffe and Parks 1999: 151-160. See e.g. Sutcliffe et al 2016: fig. 6, where the bodies of the survey party members traversing cross-section of the Nile flood-plain are nearly submerged under the Nile water up to their heads.
[9] Hassan 2007; Okasha 2010.

Tiberius built a new brick enclosure wall for the temple of Luxor following severe damage from a high inundation.[10] According to the stelae inscribed on that occasion and unearthed in the eastern side of the temple, Tiberius ordered the building of a dam and perhaps a canal to safeguard the temple in the future.[11] The avoidance of the negative impacts of the annual Nile flood made the control and management of the Nile water imperative to guarantee the success of the official authority and the welfare of the inhabitants.

To the inhabitants of Graeco-Roman Egypt, the rise of the annual Nile flood was a natural challenge that could hinder the performance of their daily routine activities, including business matters. Thus, in the third century BC, an unknown official sent a letter to Zenon, concerning a caravan that had to stop because of the inundation in the Delta, informing Zenon that 'we are keeping the camels in the (village) of Nechthenibis as we were not able to bring them down to Hermopolis; for several floods are open and waters have been released everywhere'.[12] Due to the Nile flood, the inhabitants took all possible measures to protect their lives and commodities. Some inhabitants could not leave their domestic property and preferred to stay at home until the chaotic and unsafe situation caused by the Nile flood came to an end, as was the case of Tabetheus mentioned above.[13] Due to the flood, other inhabitants had to move their possessions to a more secure place. Thus, in AD 40 in the Arsinoite nome, Ammonius sent a letter to his dearest Aphrodisius, asking him to 'get the corn in the granary moved because of the inundation, all of it'.[14]

Because the annual Nile inundation flooded cast areas of land and consequently spoiled agricultural products, the king issued several decrees with relief measures, which were implemented by magistrates. This was the case in 116 BC, when king Ptolemy VIII Euergetes decreed:

[10] Bagnall and Rathbone 2004: 188.
[11] Habachi 1975-1976.
[12] *P.Mich*. 1.103.
[13] *P.Mich*. 8.474.
[14] *P.Ryl*. 2.231.

> The cultivators of vine-land or gardens throughout the country, if they plant them between the fifty-third and fifty-seventh years in the land which has become flooded or dry, shall be left untaxed for five years dating from the time at which they plant them, and from the sixth year for three years more they shall be required to pay less than the proper amount, payment being made in the fourth year, but from the ninth year onwards they shall pay the same as the other owners of land in good condition.[15]

As it stands, the owners of the lands which became flooded were fully exempted from the taxation for five years, and they paid the taxation imposed on their agricultural lands as well as products at a reduced rate for the following three years. Such royal and official measures were quite important for reducing the negative economic impacts of the annual flood on inhabitants' lives.

The Repair of Dams, Dykes, and Bridges

In preparation for the coming of the annual Nile flood, the official authorities took serious measures throughout Egypt to keep the disastrous effect of the inundation on the country to the minimum. Dams, dykes, and bridges were fully repaired, and canals were similarly cleaned out, to be able to withstand the furious flood and absorb the influx of the Nile waters. The Nile waters would be regulated and used for irrigation through the year and until the coming of the next flood. In AD 278, the diocetes (financial exchequer) Ulpius Aurelius sent a circular letter addressed to the strategi (nome governors) and the decemprimi (ten senior members of the local council) of the Heptanomia and the Arsinoite nome, who, along with the yearly magistrates, formed a group which in times of crisis represented the community in dealings with the central government concerning the preparations of the flood:

> The season for the consolidation of the dykes and the cleansing of the canals having arrived, I thought it necessary to instruct you by this letter that all the cultivators and ... ought now to carry out these operations with all zeal on the ... belonging to them, with a view both to the public good and to their private advantage. For I am persuaded that everyone is aware of the benefit resulting from these works. Therefore let it be the care of you, the strategi and decemprimi, both to urge all to take in hand this most necessary labour and to

[15] *P.Tebt*. 1.5.93-95.

> see that the overseers usually elected for the purpose are chosen from magistrates or even private individuals, their task being to compel everyone to perform his proper work in person, according to the rule given in the constitution of the appointment, without enmity or favour, so that the dykes are brought up to the prescribed height and breadth and the breaches filled in, to enable them to withstand the flood of the most sacred Nile auspiciously approaching, and that the canals are cleansed to the depth of the so-called standards and the usual width, in order that they may easily absorb the coming influx of water for the irrigation of the fields, this being a matter of public utility, and that in no case is money exacted from any person instead of work. If anyone dares to attempt such a thing or disregards these orders, let him know that by impairing measures designed for the welfare of the whole of Egypt he will put to stake not only his property but his very life. I pray for your health.[16]

It is clear from the passage that it was the responsibility of the diocetes to issue the alarm for the approach of the annual flood of the 'most sacred Nile'. It seems that he supervised the administration of the personnel involved in the construction and repair works on the dams, dykes, bridges, and canals necessary to survive the influx of the Nile water. Working alongside the diocetes were the strategi and decemprimi, who were in charge of choosing and compelling the public officials and other selected and appointed private individuals to repair the dykes and cleanse the canals to the prescribed height, (twelve cubits to the satisfaction of the oikonomos and the chief engineer according to a papyrus of 257 BC)[17] and depth to withstand the annual flood of the Nile. It appears that the inhabitants were sometimes allowed to pay money as a compensation for not helping during the crisis and for not carrying out the necessarily public labour, hence the diocetes found it necessary to stress that 'in no case is money exacted from any person instead of work'.[18]

Undoubtedly, the precautionary measures taken to protect the province from the furious Nile flood promised the welfare of the state and the population, as the above-mentioned papyrus states. Hence, it should come as no surprise that a festival was held around the time of the summer solstice when the river began to rise, undoubtedly in connection with the annual Nile flood. In the second century AD, a list of articles which were presented to

[16] *Sel.Pap*. 2.225 (trans. Hunt and Edgar 1943: 117-119) = *P.Oxy*. 12.1409.
[17] *Sel.Pap.* 2.346 (trans. Hunt and Edgar 1943: 406-409) = *PSI* 488, 11, 9-19.
[18] *Sel.Pap*. 2.225 (trans. Hunt and Edgar 1943: 117-119) = *P.Oxy*. 12.1409.

the strategos of Oxyrhynchus in connection with 'the sacrifice to the most sacred Nile on 30 Pauni' included '1 calf, 2 jars of sweet-smelling wine, 16 wafers, 16 garlands, 16 pine-cones, 16 cakes, 16 green palm-branches, 16 reeds likewise, oil, honey, milk, every spice except frankincense'.[19] It is tempting to suggest here that the sixteen articles used in the sacrifice denote the sixteen cubits by which the Nile rises for its annual flood, which are shown in sculptures as the sixteen children of the god Nilus.[20] It seems that certain rituals had numerical connection in ancient Egypt. For instance, there are different interpretations for the seventy or seventy-two day embalming period. Scholars often connect the seventy-day period with the movement of the Dog Star Sirius.[21] However, the seventy-two day period also coincided with the number of the fellow conspirators of Seth, who participated in the assassination of Osiris.[22] Possibly, it was thought essential to mourn and keep the body away from the followers of Seth for seventy-two days.[23] In a society where rituals were always tempered with symbolic meanings, this symbolic interpretation cannot be totally disregarded.

Together, the strategi and decemprimi were responsible for the individuals who were selected to perform the public works in preparation for the coming of the flood. In an early-third-century AD letter, the strategi and the decemprimi stated that:

> We present and report at our own risk the persons mentioned below, being well-to-do and suitable, for the performance of the services of the year. They are as follows. For Cynopolis: for the cleaning of canals Gikon son of Diodorus, aged about 46 years, having property worth 600 drachmae; for the guarding of crops the persons previously presented for flood-duties, watering, sowing, and all other public works, Patron, without patronymic, his mother being Protons, aged

[19] *Sel.Pap*. 2.225 (trans. Hunt and Edgar 1943: 117-119) = *P.Oxy*. 12.1409.
[20] See e.g. the colossal statue of the Nile found in AD 1513 in Campo Marzio, where it was probably part of the decoration of the *Iseo Campense* dedicated to Isis and Serapis. It is now kept in The Vatican Museum, cat. 2300. https://www.museivaticani.va/content/museivaticani/en/collezioni/musei/braccio-nuovo/Nilo.html (last accessed on 3/5/2021).
[21] The rising of Sirius marked the Egyptian New Year in the beginning of the inundation season. The time when Sirius disappeared in the sky until the time it returned was seventy days. The Egyptians perhaps equated this astronomical phenomenon with the time from death in the physical world to rebirth into the afterlife (Smith 2009).
[22] Plutarch *De Is. et Os*. 13. Cf.Herodotus 2.86.
[23] Abdelwahed 2016: 73.

> about 30, having property worth 1000 drachmae, Aphrodas son of Nepheros, aged about 45, having house-sites worth 1000 drachmae.[24]

Only male individuals were selected for the public service and work during the flood season. In most cases, the people chosen for this task were in their thirties and forties and must have property as a surety for their appointment.[25]

Dykes and embankments are frequently mentioned in papyrological evidence. While dykes are usually portrayed as state projects and public properties, they also appear in Greek papyri as private possessions and properties that could be sold or inherited.[26] Dykes were sometimes named after private individuals, such as the dyke of Archias in the Arsinoite[27] or the Psinali... dyke at Theadelphia.[28] Other dykes were also named after Egyptian deities, like the dyke of the great god Soknebtunis at the village of Kerkeosiris.[29] More often than not, dykes were given the names of the towns or villages in which they were built, such as the dyke of the village of Alabanthis in the Arsinoite, which was located on a major water stream.[30] Like all other dykes, the dyke of Alabanthis was built to manage the distribution of the irrigation Nile water into the arable lands of Alabanthis, and perhaps into those of other nearby villages which were closely connected with Alabanthis geographically and/or economically.[31] The dyke-area of Alabanthis appears in an official register of copies of outgoing correspondence to various officials, datable to 235 BC, , where Architimos is instructed to ‘give orders for the measurement to Sokonos son of Pasis, for the dyke-area at Alabanthis’.[32]

P.Tebt. 3.1.701, in which the official asks for the wheat seeds given to farmers by the state to be returned from the new crop with an increase of one half and the rent shall be

[24] *Sel.Pap*. 2.343 (trans. Hunt and Edgar 1943: 401-403) = *P.Ryl* 90.ii.30-56.
[25] *Sel.Pap*. 2.343 (trans. Hunt and Edgar 1943: 401-403) = *P.Ryl* 90.ii.30-56; *P.Tebt*. 1.5.193-206.
[26] *P.Mich.* 5.274, 275, 322.
[27] *P.Ryl* 2.154.
[28] *P.Fay* 77.
[29] *P.Tebt*. 1.13.
[30] *P.Tebt*. 3.1.701.1-5.
[31] *P.Petaus* 40. 8-9.
[32] *P.Tebt*. 3.1.701.1-5.

paid in wheat proportionate to the seed,[33] suggests that the dyke-area at Alabanthis was enclosed with an arable land of wheat. In 241 BC, Hermogenes, the head of the quarrymen of the copper mines near Philoteris, sent a letter to Theodoros, the engineer and architect working on the irrigation canals and in the stone quarries in the Arsinoite area. Hermogenes informed Theodoros that Harmachoros, the secretary of the public record office, had sent him a complaint of the quarrymen, who 'have been working in the Chalkorychia (copper mines) for quite some time now, and have been hoping to move on to Alabanthis when they have finished the job on which they were at work up to the 30th of Pachon, since there is no water around here'.[34] Undoubtedly, the drought of the copper mines near Philoteris and the richness of Alabanthis in water resources, which is apparent from its dyke-area and plain, was the motivation behind the strike of the quarrymen at Philoteris and their eagerness to be transferred to the quarry at Alabanthis.

Like many other public taxes which were imposed on the inhabitants to ensure their participation in the welfare of the state, such as the poll tax, the weaver's tax, the bath tax, and the tax on fountains, there was a tax levied for the work on the embankments of dykes.[35] Under Augustus, Tryphon son of Dionysius paid six drachmae for the embankment-tax on the tenth of Epeiph.[36] It is not clear whether the individuals appointed to carry out the public work on the repairs of dykes and embankments were selected from the nearby villages or had come from further away. There has been some debate on the potential mobility of labour in the Roman period, where skilled and non-skilled workers had to migrate to fulfill their tasks, whether voluntarily or compulsorily.[37] Migration was an everyday feature of Roman Egypt. Inhabitants practiced permanent, long-term, and temporary movements within Egyptian nomes for many reasons, most notably work, marriage, military service, and public work.[38] It appears that the inhabitants selected for public works on dykes were obliged to work hard to fulfil their mission before the arrival of the furious flood. They were also compelled to perform their proper work in person,

[33] *P.Tebt*. 3.1.701.1-5.
[34] *P.Petr*. 3.43.8.fr2, r, 1-6.
[35] *P.Mich*. 5.255.
[36] *Sel.Pap.* 2.380 (trans. Hunt and Edgar 1943: 482-485) = *P.Oxy*. 2.288.ii.16-20, 31-34.
[37] Holleran 2021.
[38] Adams 2016.

'according to the rule given in the constitution of the appointment'.[39] Some individuals were selected to provide reeds and light material for the embankments, perhaps as a kind of corveé or public service. The amnesty decree of Ptolemy VIII Euergetes from 116 BC states that 'the persons who have failed to provide reeds and light material for the embankments are released from the penalties which they have incurred'.[40]

Also in 116 BC, Menches, the village scribe of Kerkeosiris, informed Ptolemaios, probably the strategos, about damage done to a dyke by certain persons who had carried off earth from it for their own use:

> Menches, village scribe of Kerkeosiris in the division of Polemon, to Ptolemaios, greeting. On the sixteenth of Epeiph of the third year as I was inspecting, in company with Horos the komarches and Patanis and other elders of the farmers, the embankment works near the village, when we came along the drain the banking up of the surrounding dyke of the great god Soknebtunis, the lands near the village being situated between, we found that certain persons in the employ of Philonautes son of Leon, one of the catoecic[41] cavalrymen at Berenikis Thesmophorou, had dug away part of the aforesaid drain, (undermining) the mounds of the surrounding dyke called that of Themistos for the length of eight schoinia, and had heaped the earth from it on to the mounds of the holding of the said Philonautes. Whereupon we immediately seized one of the above-mentioned persons and sent a message to Polemon who is performing the duties of Epistates of the village, asking him to bring the offenders before you. I send this report therefore in order that you may, if you please (give instructions), first of all that the mounds are made secure and that Philonautes and his agents may appear before you and receive the punishment which they deserve for their (offences).[42]

The village scribe, the komarches (village administrators), and the elders of the farmers were responsible for the regular inspection of dykes to make sure that the embankments were well maintained. In this case, the catoecic cavalrymen at Berenikis Thesmophorou caused serious damage to the dyke of Themistos, and threatened its safety and therefore

[39] *Sel.Pap*. 2.225 (trans. Hunt and Edgar 1943: 117-119) = *P.Oxy*. 12.1409.
[40] *P.Tebt*. 1.5.193-206.
[41] The term "catoecic" refers to Greek military settlers in Egypt, who are estimated at 50,000 by the end of the third century BC. They were probably mostly descendants of the original military settlers under Ptolemy I and II (Rathbone 1990: 113).
[42] *P.Tebt*. 1.13.

efficiency by undermining its mounds. The harm caused to the dyke was taken seriously by the official authorities, and the perpetrators were promptly caught and brought to justice, perhaps in front of the strategos.

The construction and repair works on the dykes, bridges, and embankments was done through contracts between state and private engineers and contractors, who received the expenses of the work done on the structures from the public treasury. In 257 BC, Harmais sent a letter to Apollonius, the dioecetes, informing that the various embankments at the city of Memphis measured 100 schoenia. The sum given in the twenty-eigth year for the heaping up of these embankments was one talent 5500 drachmae, when the rise of the river was ten cubits, three palms, and one and a sixth fingerbreadths, whereas in the twenty-seventh year the sum given was one talent 1300 drachmae, when the river rose ten cubits, six palms, and two and two-thirds fingerbreadths. Harmais promised to heap up the same embankments beginning from their bases to the height of a rise of twelve cubits, the ideal height of the embankments, to the satisfaction of the oeconomus and the chief engineer if he received one talent from the treasury. According to the usual practice, the engineers were furnished with mattocks, which they were to return once the work had been done.[43] In 245 BC, a contract for public work on bridges was similarly given out from the treasury after public auction through Hermaphilus, the oeconomus, in the presence of Theodorus, the engineer, in preparation for the annual Nile flood in Crocodilopolis. The contractor was asked, among other works, to take down and replace the old bridges over the watercourse running to private farmsteads like those of Pterphorion and Calliphanes or running to towns, like Cynopolis.[44]

In preparation for the reception of the annual Nile flood, all canals throughout the country were completely cleansed. Suetonius even recounted that Augustus sent his soldiers to clean out all the canals into which the Nile overflows, to make Egypt more fruitful for Rome's grain supply.[45] The endeavours of Augustus to cleanse the Egyptian canals can

[43] *Sel.Pap.* 2.346 (trans. Hunt and Edgar 1943: 406-409) = *PSI* 488.ii.9-19.
[44] *Sel.Pap*. 2.348 (trans. Hunt and Edgar 1943: 408-415).
[45] Suetonius, *The Life of Augustus* 18.

also be understood in terms of his intent to maximize the profits of the agricultural products of Egypt, and consequently also increase the annual tribute, and similarly to help the province withstand the violent flood. Canals and other water channels existed almost everywhere in the country. In the third century BC, for example, there was a canal, the name of which is unfortunately lost, running to the west of Alabanthis.[46] The shrine of the Dioskouroi in the village of Kerkeosiris was similarly surrounded on the north and east by a canal.[47] In AD 131, a certificate of work on the embankments mentions that Zoilus, son of Petesouchus, his mother being Taorsenouphis, worked on the embanking works of the said sixteenth year from the fourth to eighth of Phaophi at the desert canal of Patsontis in Bacchias.[48] This suggests that labour was requisitioned every year for the consolidation of the embankments, where each man worked for nearly five days and received a certificate at the end of his work-period.

The Nile Water Administration

The Nile Conservancy and its Responsibilities

Egypt was one of the earliest countries to administratively organize its water resources by establishing supreme councils and higher administrative offices concerned with the organization, conservation, and management of the river Nile and its water assets. The Mesopotamian culture similarly attempted to administratively organize the water of its main rivers, the Tigris and Euphrates. Large-scale, hydraulic devices and cross-regional canals were frequently constructed under the sponsorship of the state. For example, there is textual evidence from the Ur III Period (2112–2004 BC) that irrigation works in the governor-run sector of the province of Umma were organized by the agricultural bureau in a highly centralized fashion, with a hierarchy of administrators in charge of cultivation, as well as the construction and upkeep of irrigation and water-control devices.[49] As will be discussed later, papyrological evidence confirms that Egypt once had a Nile conservancy (*tōn potamitōn grammatōn*) involved in the administration and control of the

[46] *P.Petrie Kleon* 43.5-6.
[47] *P.Tebt*. 1.14.
[48] *Sel.Pap*. 2.389 (trans. Hunt and Edgar 1943: 494-495) = *P.Ryl.* 210.
[49] For further discussion on these texts, see Rost 2017.

Nile water resources, operating at least as early as the third century AD. This perhaps also existed through the Ptolemaic period given the importance of the Nile for the Ptolemaic agricultural economy and the presence of the same officials associated with the Nile under Ptolemaic rule.[50]

In a private letter datable to AD 249-257, Ninnos addressed Eirenaios, Neres, and Theodoros concerning labour carried out for the Nile conservancy:

> From Ninnos to Eirenaios, Neres and Theodoros. Greetings! From the letter sent to me by Eirenaios through the workers employed by the Nile conservancy (*tōn potamitōn grammatōn*) (concerning the transportation expenses?). I have been informed that ninety naubia (cubits) of labour have been carried out and ... (which) you (i.e. Eirenaios) undertook (to carry out) in addition to the due sum and to require from the others and ... to sail upstream ... have paid (?) to the ... the salary, because...[51]

Although not much is known about the hierarchy of the Nile conservancy as a higher administrative body concerned with the management and preservation of the Nile water, textual evidence helps to give insights into the titles and duties of the offices working for this administrative body and its role in organizing the use and preservation of the Nile water resources through the country.

The Transportation on the Nile Boats

Unfortunately, it is not clear from textual evidence whether the supervision and management of the transportation of different cargoes via the river Nile, the main artery of internal transport within the country, was associated with the Nile conservancy. In 252 BC, Dionysius, a boat-captain, acknowledged that ‘he has embarked upon the transport of Xenodocus and Alexander, of which Ekteuris son of Pasis, of Memphis, is pilot, through Nechthembes the agent of the royal scribes, for conveyance to Alexandria to the royal granary, with a sample, 4800 artabae of barley, being pure, unadulterated, and sifted

[50] See the variety of water officials in Bonneau 1971, 1993. Cf. *Sel.Pap.* 2.346 (trans. Hunt and Edgar 1943: 406-409) = *PSI* 488, 11, 9-19; *Sel.Pap*. 2.348 (trans. Hunt and Edgar 1943: 408-415).
[51] *P.Oslo* 2.57.

grain, by the measure and smoothing-rod which he himself brought from Alexandria, with just measurement'.[52] The involvement of public officials, the presence of public boats, and the carrying and delivery of public cargoes via the Nile, such as the transportation of wheat and barley from and to public granaries between the nomes, may have necessitated the involvement of an official authority to control and manage the conveyance of cargo. Yet there is no explicit evidence that this authority was the Nile conservancy.

From the Old Kingdom through to the Roman Period, Egypt possessed an integrated transportation system that combined both land and river transport. Important heavy cargoes such as stone and wood used for monumental building projects, large cargoes of grain collected as in-kind taxation and turned over to the state granaries, and important cargoes of reeds used for the lighting of the public baths and the papyrus rolls used for the documentation of public and private dealings, were all transported through the Nile.[53] The Nile traffic would have been busy throughout the year, except for the inundation season, when commercial and other human activities were paused.[54] The Nile transportation necessitated the existence of many boats with a variety of sizes to accommodate the different cargo loads.

The manufacturing of boats was an important industry under Ptolemaic and Roman rule. Boats and boat builders are often mentioned in Greek papyri.[55] While some boats were private possessions, others were owned by the state. In AD 220-221, a registration of a private boat under Antoninius Pius reads:

> To his excellency the epistrategos Aurelius Sabinianus from Aurelius Ptolemaeus also called Sempronius son of Apollinarius, of Antinoe. I register in accordance with the orders of the most illustrious praefect Geminius Chrestus the boat belonging to my son, who is a minor, Aurelius Aphrodisius also called Philantinous,

[52] *Sel.Pap*. 2.365 (trans. Hunt and Edgar 1943: 458-459) = *P.Hib*. 98.ii.6-21.
[53] Khalil 2010.
[54] *P.Mich*. 1.103.
[55] E.g. *P.Mich*. 1.60; *Sel.Pap*. 2.323 (trans. Hunt and Edgar 1943: 358-359); *P.Oxy*. 1.86.

> likewise of Antinoe, being a Greek boat of 250 artabae burden having for a sign a multiform god, of which I am the pilot".[56]

Public boats owned by the state are also attested in Greek papyri. For example, Aurelius Papnouthius served as the 'pilot of the many-oared public ship in the Oxyrhynchite nome' in the mid third century AD.[57] In Roman Egypt, the owners of boats or their agents were obliged to register the boats in their possession, and to notify the epistrategos of the burden, sign, and pilot of the boat. It appears that every boat had a particular burden determined according to its capacity that it could not exceed for safety reasons.[58]

Textual evidence also confirms that there was a corporation of pilots or boat-captains operating in the Roman Period, and perhaps earlier. In a letter dating from AD 118, Papiris, a transporter of government corn, informed his friend Apollonius, strategos of the Apollonopolite-Heptacomia nome, that he had been commissioned to go to his nome alone with a boat of about 4000 artabae burden. After receiving his commission, he was detained by the procurator to act as priest to the pilots' corporation.[59] This was probably the corporation, under government control, of pilots or boat-captains employed in government service. The office of priest was a very common one in Egyptian organisations of all kinds.[60] The priest of the pilots' corporation perhaps managed its religious affairs.

Essential heavy cargoes such as barely and corn were transported by the Nile boats, which embarked on the Nile ports and harbours built for this purpose. In 252 BC, Dionysius, a boat-captain, acknowledged that 'he [Dionysius] has embarked upon the transport of Xenodocus and Alexander, of which Ekteuris son of Pasis, of Memphis, is pilot, through Nechthembes the agent of the royal scribes, for conveyance to Alexandria to the royal granary, with a sample, 4800 artabae of barley, being pure, unadulterated, and sifted grain, by the measure and smoothing-rod which he [Nechthembes] himself

[56] *Sel.Pap*. 2.323 (trans. Hunt and Edgar 1943: 358-359).
[57] *P.Oxy*. 1.86.
[58] *Sel.Pap*. 2.323 (trans. Hunt and Edgar 1943: 358-359).
[59] *Sel.Pap*. 2.423 (trans. Hunt and Edgar 1943: 576-578).
[60] Hunt and Edgar 1943: 577.

brought from Alexandria, with just measurement; and I [Dionysius] make no complaint'.[61] In a census return datable to AD 132-133, Polydeukes served as 'a secretary in the metropolis and the harbour' at Herakleopolis under Hadrian.[62] In AD 220-221, Aurelius Ammonius son of Ammonius, shipmaster in the administration of Noapolis of three boats carrying 15,000 artabae, signed a receipt to Aurelius Sarapion, sitologus of the Sko district of the upper toparchy, in which he confirmed that he has received and has had measured out to 'at the harbour of Satyrus on the great river, of wheat from the produce of the past third year, pure, unadulterated, free from earth and barley, not twice-trodden, sifted, by the public half-artaba measure according to the prescribed measurement…which I will carry down to Alexandria and deliver to the administration in Neapolis an entire and undamaged cargo'.[63]

In Graeco-Roman Egypt, almost everything was transported through the Nile, including animals such as horses,[64] papyrus rolls,[65] and reeds for heating the baths.[66] A cost was paid for the transportation of the cargo on board. Apparently, the price was determined in accordance with the distance between the place of shipping and the designated destination of the cargo in addition to the amount of the load.[67] In AD 196, Heron, an agent, paid to Apion, the nomarch of the Arsinoite nome, 124 drachmae 'for the boats of the image-bearers', apparently the cost of transporting certain cargo.[68] Due to the importance of their profession, the river pilots and boatmen were granted certain privileges. For example, they were given unconditional access to cities in times of crisis. This is evidenced in a letter from Caracalla, from AD 215:

> All Egyptians in Alexandria, especially country folk, who have fled from other parts and can easily be detected, are by all manner of means to be expelled, with the exception, however, of pig-dealers and the river boatmen and the men who

[61] *Sel.Pap*. 2.365 (trans. Hunt and Edgar 1943,458-459) = *P.Hib*. 98.ii.6-21.
[62] *P.Oslo* 3.98
[63] *Sel.Pap*. 2.373 (trans. Hunt and Edgar 1943: 474-477) = *P.Oxy*. 17.2125.
[64] *P.Ryl*. 2.223.
[65] *P.Mich*. 1.22.
[66] *Sel.Pap*. 2.215 (trans. Hunt and Edgar 1943: 90-93).
[67] *P.Ryl*. 2.196.
[68] *P.Ryl*. 2.196.

> bringing down reeds for heating the baths. But expel all the others, as by the numbers of their kind and their uselessness they are disturbing the city.[69]

Irrigation-related Offices

The Nile conservancy also administered and supervised a certain class of men, who in Greek papyri are called sailor-divers (*nautokolymbētai*). These were public officers in the service of the Nile water administration and in attendance on the shore guards and cultivation inspectors.They were relieved of all head-taxes and all public services, and were also fed at the public expense, but were forbidden to take up any other employment.[70] The sailor-divers thus enjoyed important economic and social privileges, especially taxation concessions.

River-workers (*tōn ergatōn potamou technē*) are also attested in Greek papyri. These were associated with the work on the embankments and canals under the supervision of the Nile conservancy. In AD 128-129, the individuals wishing to serve as river-workers had to apply for the profession:

> To Diogenes also called Hermaeus, ex-exegetes, scribe of the city, from Dioscorus, freedman of Sarapion son of Sarapion son of ..., inhabitant of Oxyrhynchus in the quarter of the Hermaeum. I wish, beginning from the current thirteenth year of Hadrianus Caesar the lord, to practice the trade of a river-worker; wherefore I present this application as above.[71]

It seems that the Nile conservancy equally supervised the sluice guards (*aphesophylakas*), the irrigation guards (*hydrophylakas*), and the shore guard (*aigialophylax*). The construction of sluices was an important activity for the preservation of the Nile water resources, since sluices enabled the government officials to store and release the water of the Nile for irrigation purposes. If needed, and under the supervision of the inspectors of sowing, the gates of the sluices were lifted to allow the release of more water, in order to meet the demands of the cultivators. Cultivators were required to

[69] *Sel.Pap*. 2.215 (trans. Hunt and Edgar 1943: 90-93).
[70] *P.Mich*. 3.174.
[71] *Sel.Pap*. 2.317 (trans. Hunt and Edgar 1943: 350-351) = *P.Oxy*. 17.1263.

apply to the komogrammateus, who in turn petitioned the strategos about this matter. The sluice and shore guards were thus selected and appointed to carry out this task. In AD 107, Theon, the shore guard, wrote to Claudius Erasus, the strategos of the division of Themistes:

> The gates of the sluices, as you know, were lifted when you were present, as much as the inspectors of sowing wished, and they are nearly all out of the water, as you know; for I gave the inspectors of sowing the conduct of the whole matter, instructing them through you to draw off as much water as they need, and I urged you through the centurion Iulius ... I hear that the komogrammateus of Apias has petitioned you for a further supply of water for the fields of the village, when all the time the inspector of sowing for the district (?) was at the village and ought, if he required water, to have remembered my order given when you were present to come up in order to draw off as much water as he wishes or to send somebody for this purpose. It is evident from this that nobody wants it, nor has any one of the cultivators applied to you about this till now...[72]

Due to the importance of the sluice gates for the management of the amount of water released into the various arable lands in Egypt, a large number of guardians were appointed for the protection, supervision, administration, and, if necessary, repair of the sluice gates. In AD 25 at Tebtynis, four priests submitted an oath to the inspector of sowing of the Arsinoite nome to act as guards of two sluice gates, which opened onto temple land. The priests Marepsemis, son of Marepsemis, and Pecheus, son of Psyphis, were responsible for guarding the priests' sluice to the west of the bridge, while Sokonopis, son of Sokonopis, and Phanesis, son of Pastoous, guarded the priests' sluice to the east. In the month Sebastos/Thoth, the four priests had to swear by the emperor Tiberius that they 'will each guard his own sluice in addition to all expenses and attend it every hour so that no loss may ensue; and if any collapse or break should occur, we ourselves will be responsible for all damage that follows'.[73]

The protection of the sluice gates was the personal responsibility of the appointed guards. It is clear that the sluice guards bore the financial burden of the repair of the sluice gates

[72] *P.Ryl*. 2.81.
[73] *P.Mich*. 5.233.

in case of any damages. The irrigation of the arable lands was similarly a critical issue in the Graeco-Roman period. In the first century AD, the irrigation guards were usually selected through the elders of the villages. This is evidenced in an official letter which asks the elders of the villages of Skar, Thathis, Temenkorkis of the Shepherds, Sinageris, and Telbonthis each to send out 100 irrigation guards to the banks of the Upper Patemite district in the month Sebastos.[74] It is no coincidence that the appointment of the sluice guards and the irrigation guards occurred in the month Sebastos, which corresponds in Egyptian calendar with the month Thoth and in Julian calendar with the month Augustus, by the middle of which the Nile flood would reach its peak.Such appointments were closely connected with the inundation and were meant to ensure the safety of the water constructions by letting the inhabitants bear and share the responsibility with the state. Given that the sluice guards bore the financial burden of repairing any damage to the sluice gates, it is unlikely that they were provided with public clothing, which was normally assigned to military soldiers and guards.[75]

The Inspectors of Fishing (*epitērēseōs apo thēras ichthuas*)

The government regulated fishing on the Nile river and other bodies of water, such as lakes. However, it remains uncertain whether the administration of fishing and fishermen fell under the direction of the Nile conservancy. Archaeological evidence of fishing tools like hooks and nets has been found at a variety of sites, which were excavated along the Nile Valley, for example Akoris, as well as elsewhere in the Graeco-Roman world.[76] The inspectors of fishing supervised both fishing and fishermen. Three papyri from the second century AD give revenue accounts from the inspectors of fishing at Theadelphia in the Arsinoite nome.[77]

Greek papyri also confirm that the state or the individuals who owned the land that abutted the water controlled the right to fish. Sale contracts often indicate that fishing rights were

[74] *P.Ryl*. 2.80.
[75] *P.Ryl*. 2.189.
[76] See the discussion in Bekker-Nielsen 2002, 216, and the catalogue of visual depiction of net-fishing.
[77] *P.Oslo* 3.89, *P.Oslo* 3.90, *P.Oslo* 3.91.

treated as property that could be sold or rented. In 46-47 BC at Tebtynis, for example, a deed of sale lists the sale not only of a vineyard with all of its equipment, but also the irrigation canal, the dyke, a half-share of the reeds, and an *ichthua*,[78] which Kloppenborg has rightly interpreted as the right to fish on the canal.[79] In the same year, Psyphis, also called Harpochration, and his wife Tetosiris, also called Dionysia, divided their property among their four children and one grandson. Their two sons, Onnophris and Psyphis, and their grandson, Psenkebkis, each received, among other things, a one-third share of a storehouse, well, dyke, watchtower, water and fishing rights (*ichthuas*).[80]

An official license to fish in particular areas was usually issued to fishermen. By law it was forbidden to fish in areas beyond those approved in the license. It was also banned to catch certain species of fish, apparently for religious reasons. In the early second century AD, Plutarch narrated:

> as for sea-fish, all Egyptians do not abstain from all of them, but from some kinds only; as, for example, the inhabitants of Oxyrhynchus abstain from those that are caught with a hook; for, inasmuch as they revere the fish called oxyrhynchus (the pike), they are afraid that the hook may be unclean, since an oxyrhynchus may have been caught with it. The people of Syene abstain from the phagrus (the sea-bream); for this fish is reputed to appear with the oncoming of the Nile, and to be a self-sent messenger, which, when it is seen, declares to a glad people the rise of the river.[81]

Due to religious considerations, it was forbidden to catch or attempt to catch the divine oxyrhynchi and lepidoti fishes. Plutarch makes it clear that 'of the parts of Osiris's body the only one which Isis did not find was the male member, for the reason that this had been at once tossed into the river, and the lepidotus, the sea-bream, and the pike had fed upon it; and it is from these very fishes the Egyptians are most scrupulous in abstaining'.[82] This is why in AD 46, the elders of the fishermen of the villages of Narmouthis and Berenicis Thesmophori, swore, to the agents of Sarapion, son of

[78] *P*.Mich. 5.74-75.
[79] Kloppenborg 2018: 581.
[80] *P*.Mich. 5.322.7, 24.
[81] Plutarch, *De Iside et Osiride* 7.
[82] Plutarch, *De Iside et Osiride* 18.

Ptolemaeus, nomarch and superintendent of the revenues and the distribution of imposts of the Arsinoite nome, by Tiberius Claudius Caesar Augustus Germanicus Imperator, that they 'never have been or be privy to fishing or dragging a net or casting a net to catch the images of the divine oxyrhynchi and lepidoti, in conformity with the public engagement signed by us and the other fishermen'.[83]

Water Transportation and Reservation for Personal and Public Use

The Water Carrier (hydrophoros) and the Water Provider (hydroparochos)

Drinking water from the Nile and its different channels were secured for domestic structures and public buildings through the water carriers.[84] In 221 BC, Eutychos, who served as a water carrier (*hydrophoros*), petitioned the Ptolemaic king for an assault with beating on him and his wife at Magdola. Water wells (*phrēar*) were present in the courtyards of many houses at Oxyrhynchus.[85] The water transported by water carriers for domestic and personal use was kept in jars (*amphorae*), or, as papyri confirm, roofed water-coolers (*hydro psycheion*) within the house.[86] Unfortunately, no domestic water-cooler has been archaeologically identified so far. It seems that the overseers of the supply of water supervised water carriers.

Water providers (*hydroparochois*) similarly supplied public buildings with their daily needs of water in return for some money.[87] In AD 113, the four overseers of the supply of water for the reservoirs and fountains of a metropolis submitted to Demetrius, ex-gymnasiarch and auditor, an account of receipts and expenses of the water supply from Pachon of the past sixteenth year of Trajan to the thirtieth of Phaophi of the current seventeenth year:

> For the reservoir of the grove, having sixteen Shadufs worked each by one and a half men (per day) who draw up water from morning till evening: sixteenth year of Trajanus Caesar the lord, Pachon: to Aphrodisius, hirer of the water-drawers, as his own wage for Pachon, fourty drachmae, and to distribute to the water-

[83] *Sel.Pap*. 2.329 (trans. Hunt and Edgar 1943: 372-375).
[84] *P.Enteux* 78.
[85] *P.Oxy.* 3.502.17-18.
[86] *P.Ryl*. 2.233.
[87] *P.Oxy.* 4.529.13; *P.Oxy*. 17.2128.2.

> drawers from the first to the thirtieth, comprising seventy-nine men at the reservoir and the machine of the canal and 320 night-workmen likewise, making altogether 1103 men, at a wage of fourty drachmae for thirty men, 1170 drachmae, and to distribute to the labourers employed on the Archimedean screws, comprising 200 men, at the rate of ten obols each, 2000 obols, equal to 276 drachmae, and as the price of oil burned in lamps for the night-workmen twelve drachmae two obols, and as the price of earthen-ware buckets one drachma, total for the month 1799 drachmae two obols... Wage of the ox-drivers for the reservoir of the grove, which employs two water-wheels and six drivers; Pachon, to Peteeus son of Patunis, herdsman, as wage for Pachon, thirty-two drachmae, and to six ox-drivers likewise for Pachon, three at sixteen drachmae each, fourty-eight drachmae, other two at fourteen drachmae each, twenty-eight drachmae, another one at twenty-four drachmae, total for the month 132 drachmae.[88]

The account gives details on water supply to different structures and buildings within the metropolis. The cost of the supply of water for the Severian baths amounted to eighteen obols per day, for the dromos fountain to nine obols per day, for the Cleopatreum fountain to nine obols per day likewise, for the Serapeum beer-shop to thirteen obols per day, and from the rulers of the synagogue of Theban Jews to 128 drachmae per month.[89] Together, Archimedean screws (Shadufs) and waterwheels (Saqiyas) were used to draw up water from lower water streams or channels to the agricultural lands. Labour work, tremendous effort, and heavy financial burden were all necessary for lifting up water and secured its distribution to the arable lands as well as the inhabitants for daily use. Unfortunately, the name of the metropolis is not stated in the account, yet the mention of the Capitol and the warm baths of Antinous in the document may suggest Oxyrhynchus or Ptolemais Euergetai. In the late second or early third century AD, a municipal account attests that 3383 drachmae, two obols were paid to the providers of water, presumably as the cost of supplying water to the different buildings and facilities of the metropolis.[90]

Papyrological documents also confirm that water guards (*hydrophylakes*) were appointed in Roman Egypt to serve as guard of the water channels or inspectors of the irrigation

[88] *Sel.Pap*. 2.406 (trans. Hunt and Edgar 1943; 536-541).
[89] *Sel.Pap* 2.406 (trans. Hunt and Edgar 1943: 536-541).
[90] *Sel.Pap* 2.407 (trans. Hunt and Edgar 1943: 542-543).

works.[91] The position of *hydrophylakes* was not a liturgy under the Roman Empire since it was a job for which men were hired, either by private persons or by state bodies. The word *hydrophylakes* only appears in the Roman period, while in the Ptolemaic period one encounters in Greek papyri the 'guardian of the dykes (*chomatophylakes*)', who were paid in cash or in wheat.[92] In AD 177, Sarapion, son of Achilleus, and [Her]aklas (?), son of Melas and Mysthes, who served as water guards of the Poime[ni]kos canal, wrote to the sitologoi of Karanis that they had received and measured from him from the produce of year nine the (artabae?) which were ordered to be given to them by Potamon, the strategos, and Asklepiades, the royal scribe of the division.[93]

The supply of water for the agricultural lands was secured through water channels, waterwheels, shadufs, water-drawers, and reservoirs. In AD 135, Eudaemonis, also called Tetes, and Soëris, also called Souerous, both daughters of Herodes, also called Tiberius, son of Heron, divided between themselves the domain-land vineyard which they held on lease at the village of Thrage in the toparchy of the Upper Suburb in the Hermopolite nome:

> Each of us shall irrigate her own portion by means of … and men working at the waterwheel and regulating the channel, taking the water from our common reservoir which is in our private plot bordering the western wall of the domain-land plot …, the cost of keeping and repairing the wooden water-wheel and likewise the reservoir and of cleansing it being borne by us both. The recipient of the southern portion shall permit the recipient of the northern portion entrance and exit through the eastern wall by her northern boundary during the time of the vintage only, and likewise the recipient of the northern portion shall allow the recipient of the southern to conduct water by means of the existing channel by the western wall of the plot in order to water all the southern portion, and likewise, if need arises at the inundation to water the same southern portion with the foot, the recipient of the northern portion shall give the right of conducting water through it.[94]

[91] See e.g. *P.Oxy.* 4.529.7.
[92] Bonneau 1993: 189-197.
[93] See *BGU* 2.621.
[94] *P.Ryl.* 2.157.

The domain-land vineyard once had a wooden water-wheel and a common reservoir. Workmen were hired to keep the water-wheel running. The water-wheel was utilized to take the water from the common reservoir and regulated the distribution of the water through the channels and onto the arable lands of the vineyard. The owners of the vineyard bore the financial burden of keeping and repairing the water-wheel and likewise the reservoir and of cleansing it.

Conclusion

The river Nile was the cornerstone of ancient Egyptian culture. Its annual flood brought prosperity and welfare for the ancient Egyptian life. The government and the inhabitants could develop an interrelated system of administrative offices, whose primary duty was to manage the water assets of the Nile and make the most of its water capacities. The administrative positions related to the Nile guaranteed an outstanding utility of the Nile and its water resources, which were efficiently and effectively used for the transportation of different cargoes and objects, whether heavy or light, for agricultural usage and irrigation of arable lands throughout the country, for fishing, and for drinking.

Bibliography

The Duke Databank of Documentary Papyri (DDbDP) and the *Select Papyri, Volume II: Public Documents* are digitally available online. They can be respectively accessed on https://papyri.info/browse/ddbdp/ and http://www.attalus.org/docs/select.html#2.1 (last accessed on 21/3/2022).

Abdelwahed, Y. E. H. 2016. *Houses in Greco-Roman Egypt: Arenas for Ritual Activities*, Archaeopress Archaeology, Oxford.

Adams, C. 2016. 'Migration in Roman Egypt: Problems and Possibilities', in L. De Ligt and L. E. Tacoma (eds.), *Migration and Mobility in the Early Roman Empire*, Studies in Global Migration History, Vol. 23/7, Brill, Leiden, 264-284.

Bagnall, R. S. and Rathbone D. W. 2004. *Egypt from Alexander to the Early Christians*, Los Angeles.

Bekker-Nielsen, T. 2002. 'Nets, Boats and Fishing in the Roman World', *Classica et Mediaevalia* 53, 215-33.

Bietak, M. 2017. "Harbours and Coastal Military Bases in Egypt in the Second Millennium B.C. Avaris, Peru-nefer, Pi-Ramesse", in H. Willems and J.-M. Dahms (eds.), *The Nile: Natural and Cultural Landscape in Egypt*, Mainz Historical Cultural Sciences 36, Mainz, 53-70.

Bonneau**,** D. 1964. *La Crue du Nil: Divinité Égyptienne. À Travers Mille Ans d'Histoire, 332 av.-641 ap. J.-C., d'Après les Auteurs Grecs et Latins, et les Documents des Époques Ptolémaïque, Romaine et Byzantine*, Paris.

Bonneau**,** D. 1971. *Le fisc et le Nil: incidences des irrégularités de la crue du Nil sur la fiscalité foncière dans l'Égypte grecque et romaine*, Paris.

Bonneau**,** D. 1993. *Régime administratif de l'eau du Nil dans l'Egypte grecque, romaine et byzantine*, Leiden and New York.

Bunbury, J. 2019. *The Nile and Ancient Egypt: Changing Land- and Waterscapes, from the Neolithic to the Roman Era*, Cambridge University Press: Cambridge.

Habachi, L. 1975-1976. 'Two More Stelae of King Tiberius Unearthed in the Eastern Side of Luxor Temple', *OLP* 6/7, 247-52.

Hart, G. 2005. *The Routledge Dictionary of Egyptian Gods and Goddesses*, London and New York.

Hassan, F. 2007. 'The Aswan High Dam and the International Rescue Nubia Campaign', *African Archaeological Review* 24(3), 73-94.

Holleran, C. 2021. 'Information Asymmetry and the Roman Labour Market', in C. Rosillo-López and M. G. Morcillo (eds.), *Managing Information in the Roman Economy*, Palgrave Studies in Ancient Economies, Palgrave MacMillan, 159-202.

Hunt, A. S. and Edgar, C. C. 1943. *Select Papyri* II: *Non-Literary Papyri, Public Documents*, Cambridge, Mass. And London.

Khalil, E. 2010. 'The Sea, the River and the Lake: All the Waterways Lead to Alexandria', *Bollettino di Archeologia online*, volume speciale B / B7 / 5, 33-48.

Kloppenborg. J. K. 2018. 'Jesus, Fishermen and Tax Collectors: Papyrology and the Construction of the Ancient Economy of Roman Palestine', *Ephemerides Theologicae Lovanieses* 94/4, 571-99.

Okasha, S. 2010. 'Rameses Recrowned: The International Campaign to preserve the Monuments of Nubia, 1959-68', in S. D'Auria (ed.), *Offerings to the Discerning Eye: An Egyptological Medley in Honor of Jack A. Josephson*, Leiden, 223–244.

Pinch, G. 2002. *Egyptian Mythology: A Guide to the Gods, Goddesses, and Traditions of Ancient Egypt*, Oxford.

Rathbone, D. W. 1990. 'Villages, Land and Population In Graeco-Roman Egypt', *PCPS* 36:216, 103-142.

Redford, D. B. 2002. *The Ancient Gods Speak: A Guide to Egyptian Religion*, Oxford.

Rost, S. 2017. 'Water management in Mesopotamia from the Sixth till the First Millennium B.C.', *WIREs Water* 4/5, 1-23.

Sandri, S. 2017. 'Nilometers – or: Can You Measure Wealth?', in H. Willems and J.-M. Dahms (eds.), *The Nile: Natural and Cultural Landscape in Egypt*, Mainz Historical Cultural Sciences 36, Mainz, 193-213.

Smith, M. 2009. 'Resurrection and the Body in Graeco-Roman Egypt', in F. V. Reiterer, P. C N. Calduch-Benages, and B. G. Wright (eds.), *Deuterocanonical and Cognate Literature Yearbook*, Berlin, 27-42.

Sutcliffe, J. V. and Parks, Y. P. 1999. *The Hydrology of the Nile*, IAHS Special Publication no. 5, Oxfordshire.

Sutcliffe, J.V., Hurst, S., Awadallah, A. G., Brown, E. and Hamed, K. 2016. 'Harold Edwin Hurst: The Nile and Egypt, Past and Future', *Hydrological Sciences Journal* 61:9, 1557-1570.

Spence, L. 1990. *Ancient Egyptian Myths and Legends*, New York.

Tvedt, T. 2000. *A Bibliography on the River Nile Vol. I The River Nile and its Economic, Political, Social and Cultural Role: An Annotated Bibliography*, University of Bergen, Bergen.

Watterson, B. 1996. *The Gods of Ancient Egypt*, New York.

Wilkinson, R. H. 2003. *The Complete Gods and Goddesses of Ancient Egypt*, London.