

Trajan's Canal: River Navigation from the Nile to the Red Sea?*

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Commercial contacts between the Indian Ocean and the Mediterranean Sea have followed various land and sea routes over millennia. Since 1869, all ships have gone through the Suez Canal, built by the French after decades of planning and construction. The c.160-km long waterway used by steam- or fuel-propelled ships over the last century and a half makes one forget that during most of history the land of Egypt (and other territories in the Near East) constituted a major obstacle on the passage between East and West. Sailing around the African continent was hardly an option in Antiquity and the Middle Ages, and in so far as it was ever chosen, it was a choice made by adventurers rather than traders. Consequently, goods had to be carried overland from the Mediterranean shore to Red Sea harbours or vice versa. The overland journey was shortened thanks to the Nile, which could be accessed through several of its branches.

We also know of various ancient roads running across the Eastern Desert.¹ One of the best-attested ones connects the Red Sea port of Quseyr, currently identified as the ancient Myos Hormos or, possibly, Leukos Limen, with the Nile Valley at Coptos. While this is certainly the shortest of several roads between the Red Sea coast and the Nile Valley, it is more than 150 km long and climbs to nearly 600 m above sea level, in a deserted area poorly provided with water and vulnerable to robbers. Comparatively, the distance from the Mediterranean Sea to the Red Sea, following the course of the modern canal, is hardly longer than the desert road, and it runs through some lowlands rising no more than 20 m above sea level, between Port Saïd in the north, in the

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1 See Sidebotham 2011, 125–74, esp. 126, Fig. 8.1.

vicinity of the ancient settlement of Pelusium, and Suez in the south, close to the ancient town of Clysmā (near Ptolemaic Arsinoe or Cleopātris).²

In Antiquity, eastward-bound cargoes had to be unloaded from Mediterranean ships and reloaded onto riverboats in harbours located near one of the mouths of the Nile,³ possibly at Alexandria, then shipped upstream to Middle or Upper Egypt, unloaded from the riverboats and loaded onto pack animals (camels, mules, donkeys) or carts for the desert stretch, and then unloaded and reloaded onto oceangoing ships.⁴ By comparison, the crossing on land over the Isthmus of Suez would have saved the trip up-river, one transfer, and the uphill-downhill stretch in the Eastern Desert. Logistical supply was also easier to provide because of the proximity of the above-mentioned settlements and others located in the Eastern Delta and the Wadi Tumilat.

The question is why ancient traders would have chosen the more difficult desert road across the hills while an easier albeit longer path was available.⁵ This question becomes even more relevant considering the fact that some ancient sources report—or allude to—the existence of a man-made waterway running from the Nile to the Gulf of Suez, known in Roman times as Trajan's Canal. These written sources, epigraphical,⁶ literary,⁷ and papyrological,⁸ are supported by some rather ambiguous archaeological evidence spread over

2 For the location of this/these settlement/s, see Mayerson 1995b and 1996; and Cohen 2006, 308; Nappo, in this volume, points out that according to Strabo (16.4.23) Arsinoe/Clysmā was the main hub for the Red Sea fleet from the time of Augustus onward. See also Sidebotham 2011, 51 and 178–79.

3 All mouths were not equal in this respect. Cf. map in Bietak 1975, 176, Ab. 43 and in Butzer 1975, 1047, Fig. 2.

4 Such a combination of land- and river-transport for trading purposes between the Mediterranean world and the East is attested in the context of the Nabataean perfume and aromatic trade, as discussed by Terpstra in this volume.

5 This question is discussed in detail by Cooper 2011.

6 Four stelae found *in situ* and set up by Darius (/Xerxes?, c.518 BCE) and one by Ptolemy II Philadelphus (c.270) commemorate work done on the eastern stretch of the canal. Cf. Aubert 2004a, 225–27, based on previous work by G. Posener. Some of the texts are translated in Cooper 2009, 197.

7 Hdt. 2.158 (c.460 BCE) and 4.39; Arist. *Mete.* 1.14 (352b) (c.335 BCE); Diod. Sic. 1.33.8–12 (c.60 BCE) and 3.43–44; Strabo 1.2.31; 16.4.23; and 17.1.25–26 (c.24 BCE–24 CE); Plin., *HN* 6.165–167 (mid first c.); Ptol., *Geog.* 4.5.54 (mid. second c.); Lucian, *Alex.* 44 (c.180 CE); Egeria, *Peregrinatio* 1.7–8 (381–384); Gregory of Tours, *Hist. Francorum* 1.10 (c.575); Dicuil, *Liber de mensura orbis terrae* 6.12–20 (late eighth/early ninth c.); El-Maqrizi 202–3 (1364–1442).

8 *SB* VI 9545.32 = Ostrakon, in W. Müller, *APF* 16 (1956) 211–12, no. 32 (Thebes, Memnonia?, 112 CE); *O.Marb.priv.* (Thebes, Memnonia? 112) = Jördens 2007, 478–80; *O.Cair. GPW* 99 (Thebes, Memnonia? 112) = P. Heilporn in Jördens 2007, 480–82; possibly some Elephantine ostraca

a long period of time,⁹ namely from the late sixth century BCE to the early Middle Ages. The purpose of this paper is to examine and answer this specific question.

Trajan's Canal or *Traianos Potamos/Diôruux*, as it is known in Ptolemy's *Geography* (4.5.54) and a handful of Greek papyri, ran from Babylon/Memphis—or Phakoussa, further down the Pelusiac branch—to the Gulf of Suez, near the city of Arsinoe/Cleopatris/Clysmā.¹⁰ The partly man-made (at times demonstrably navigable) canal followed an ancient branch of the Nile running through the Wadi Tumilat, and along—rather than through—Lake Timsah and the Bitter Lakes. The name refers to the work commissioned by the emperor Trajan (98–117 CE) to reopen an existing (though silted up) channel, or to modify its path in its western section, or both. The project was financed by a special tax, seemingly levied on an exceptional basis, in Upper Egypt (and possibly elsewhere), as shown by a few receipts on ostraca found in the vicinity of Thebes and dated to September 112. Scarce papyrological evidence from the third to the eighth century CE suggests that maintenance work was at times carried out by liturgists (*tektones*) or contractors (*potamitai*). Papyri and ostraca strongly suggest that throughout its existence the project initiated by Trajan was of more than local importance, since taxes were levied in, and liturgists summoned from, various areas of Egypt, at times quite removed from the Eastern Delta. In Trajan's time, the canal may have been considered of more strategic than commercial importance, in view of the emperor's planned campaign against Arabia and Persia.

As was said before, Trajan's Canal was not a new project, in spite of its occasional name (*kainos potamos*). The ancient tradition, based on Herodotus and

(*O.Wilck.* 89–92; *O.Bodl.* II 871; *O.Eleph. DAIK* 18–19, all in 114) = R. Duttonhöfer in Jördens 2007, 483–85; *P.Oxy.* LX 4070 (Arabia 208); *P.Bub.* 4.69.2 (Boubastis 221); *P.Cair. Isid.* 81 (Karanis 297); *P.Oxy.* XII 1426 (Oxy. 332); *P.Oxy.* LV 3814 (Oxy. III/IV); *PSI* I 87 (Oxy. 29.6.423); *PSI* VI 689 (Oxy. 420/1–423); *P.Wash.Univ.* 7 (Oxy. V/V1); *P.Lond.* IV 1346 (Aphrodito 710); *P.Lond.* IV 1465 descr. (Aphrodito 710?).

- 9 First and foremost, the multi-volume *Description de l'Égypte ou Recueil des observations et des recherches qui ont été faites en Égypte pendant l'expédition de l'armée française* (Jomard E.-F. (ed.), Paris 1809–1928). Modern work is represented by Bruyère 1966; Bietak 1975; Holladay 1982 and 1999ab; Redmount 1989 and 1995; Sonnabend 1999; and Cooper 2009.
- 10 The scholarly literature on the subject is growing: Posener 1938; Calderini 1940; Sijpesteijn 1963; Oertel 1964; Tuplin 1991; Redmount 1995; Mayerson 1996; De Romanis 2002; Aubert 2004a, 2004b, and 2013; Jördens 2007 and 2009; Trombley 2009, with a translation of documents from the Arabic period; Cooper 2009, with an interesting study of the landscape and archaeological remains of the canal in the Eastern Delta; and Sidebotham 2011, 179–82.

expanded by Aristotle, Diodorus Siculus, Strabo, and Pliny the Elder, reports that the canal was originally designed by the Egyptian Pharaoh Necho II (610–594 BCE) in the late seventh/early sixth century BCE—not by Sesostris in the early second millennium BCE—and completed by the Persian king Darius I (521–486 BCE). The claim that it was started two and a half centuries later by Ptolemy II Philadelphus (285–246) is misleading. These literary reports are supported by a series of sixth- and third-century BCE multilingual inscriptions found *in situ* along the eastern section of the canal, where heavy work (locks, sluices, *diaphragmata*) had to be done to restore, or supplement, the ancient waterway.

If in the early history of the canal civil engineering seems to have been restricted to the easternmost section, east of the Wadi Tumilat, maintenance, remodelling, and extension in the Ptolemaic, Roman, and mostly late antique period took place in the western part. Provided that ancient authors and the drafters of papyrological documents had a precise and accurate knowledge of the area, it seems that the western end of the canal was repeatedly redesigned in its relationship with the Pelusiac branch of the Nile.

A key to understanding the making of the canal lies in the geological and hydrological structure of the Eastern Delta.¹¹ In a distant past the Nile had an ‘eighth’ branch flowing down into the Gulf of Suez, through the Wadi Tumilat and the Bitter Lakes. This branch may even have been navigable in case of high—not to say exceptional—flood. The rapidly changing geological and hydrological conditions of the Nile Delta, due to the accumulation of alluvial deposits and the proximity of the juncture of continental plates in the Suez area, suggest that the outflowing of the Nile water all the way into the Red Sea must have become increasingly rare. This natural development also affected other branches of the Nile to the west, such as the Pelusiac branch. Riverboats may have used it travelling upstream from the Mediterranean during the first millennium BCE. As the Pelusiac branch progressively dried up in the Hellenistic period, the eighth branch had to be reached further south, through another branch running further west, such as the Sebennitic or the Bolbitine branch.

At this point, let us focus on the situation in the Roman period. Numerous modern historians claim that, on the basis of the existing written evidence, from Pharaonic, Persian, or Ptolemaic times down to the Arab conquest, or at least for extended periods within these limits, ships loaded with goods and

11 Posener 1938; and Aubert 2004a, 241–44.

people travelled on a regular basis from the Mediterranean to the Red Sea.¹² Such a practice would have stopped only when the canal was intentionally filled up in 767/8 by the Abassid Caliph Abou Jaafar Al-Mansour, according to the later writer El Maqrizi (1364–1442) in his fifteenth-century *Topographical and Historical Description of Egypt*. As a matter of fact, there is only one piece of written evidence that supports this view, a passage in the short story *Alexander or the False Prophet* (ch. 44) by Lucian of Samosata, dated to 180 CE: ‘The young man cruised up (ἀναπλεύσας ὁ νεανίσκος εἰς Αἴγυπτον) the Nile as far as Clysmā, and as a vessel was just putting to sea, was induced to join others in a voyage to India.’¹³ Interestingly, the young man was thought to have died during the boat trip on the Nile or at the hands of bandits (*lestai*), a common plague in those days. The nature of the source, a fictional narrative by a Greek satirist, lends little credit to the information—similar claims of through-navigation had been made by narcissistic rulers such as Darius I or Ptolemy II Philadelphus, and since they are self-serving, they do not weigh much on the scale of history.¹⁴

However, the dearth of written evidence might not be convincing enough to discard all possibility that Trajan’s Canal was indeed used, at times, for river navigation in the context of long-distance trade. At this point I would like to introduce two arguments. One is based on the evidence of the ‘Muziris’ papyrus, the other on the respective schedules of river and sea navigation. The combination of the two will lead to the consideration of an alternative scenario that should be checked against the known archaeological record of the Isthmus area.

The Muziris papyrus contains on one side the terms of a financial arrangement between a trader and a businessman for the transport by camels of luxury goods from an unspecified Red Sea port, be it Myos Hormos, Leukos Limen, Berenice, or any other one, to Coptos:

And I will weigh and give to your cameleer another twenty talents for loading up for the road inland to Coptos, and I will convey [sc. the goods] inland through the desert under guard and under security to the public warehouse for receiving revenues at Coptos, and I will place [them]

12 For instance: Raschke 1978; Sidebotham 1986a; De Romanis 1996; Young 2001. Sidebotham 2011, 179–82, esp. 181, is somewhat more cautious.

13 Trans. by A.M. Harmon, LCL 1936.

14 Sidebotham 2011, 51 rightly sees Ptolemy’s claim in the Pithome stele to have imported elephants through the Eastern canal as ‘a onetime public-relation stunt.’

under your ownership and seal, or of your agents or whoever of them is present, until loading [them] aboard at the river, and I will load [them] aboard at the required time on the river on a boat that is sound, and I will convey [them] downstream to the warehouse that receives the duty of one-fourth at Alexandria and I will similarly place [them] under your ownership and seal or of your agents, assuming all expenditures for the future from now to the payment of one-fourth—the charges for the conveyance through the desert and the charges of the boatmen and for my part of the other expenses.¹⁵

The document is dated, on palaeographical grounds, in the mid second century CE, slightly earlier than Lucian's text quoted before. In addition, it is probably less than half a century later than Trajan's alleged major makeover of the canal (c.112 or within a few years after). The westbound cargo is made up of nard, garments, and ivory—all very expensive items likely to attract bandits. The arrangement alludes to security and existing accommodation along the road. There can be no doubt, then, that at the very time when the newly restored canal could have offered an interesting alternative route for the kind of commodities that would benefit from a shorter and safer trip up the Gulf of Suez and across the Eastern Delta by water, goods were transported overland through the Eastern Desert.¹⁶ The argument that goods had to go through Coptos for fiscal reasons is unconvincing, as the administration would have had several decades to equip the Suez area with similar infrastructure, as seems to have been the case in a later period with the Arabarch of Egypt and Augustamnica.¹⁷ Let us note finally that the shipment is westbound, which leaves open the possibility that Trajan's Canal was used concurrently for eastbound shipment, a scenario to be explored further on.

The second argument is based on known conditions of navigation on the Nile, in the Red Sea, and across the Indian Ocean.¹⁸ First, on the Nile: if Trajan's Canal was indeed using stretches of an ancient branch, hydrological conditions were linked with the annual flood, with water rising in July and receding

15 *PVindob.* G 40822 = SB XVIII 13167, translated by Casson 1990.

16 For some evidence for the transport of pearls through the wadis, see Schörlé's contribution in this volume.

17 Cf. Aubert 2004a, 239, n. 68; and Trombley 2009, 109, with reference to M. Sartre, *Inscriptions grecques et latines de la Syrie* XIII.1 (Paris 1982) no. 9046 (about a *kommerkiarios* stationed at Clysma/Augustamnica, under the jurisdiction of the *dux* of Palaestina). See also Mayerson 1996, 123.

18 Cooper 2011.

in November. Assuming that the eastern section of the canal was at all sensitive to hydrological variations, it is likely that it was the last to see the effect of the flood and the first to feel its withdrawal. If the canal was indeed open to navigation throughout, i.e. from one end to the other, riverboats using the canal could not have started before July, possibly late July, and could have carried on only until early November,¹⁹ for an active period of three to three and a half months, which actually would have been more than sufficient since the trip along the canal lasted only a few days. Eastbound goods arriving at Clysma could have been transferred onto large seagoing ships or kept in storage space while waiting for the next ship to come by.²⁰

Secondly, in the Red Sea: thanks to Federico De Romanis' seasonal maps,²¹ we can visualize how difficult navigation in the Red Sea can be, given the dominant winds and currents at two different periods of the year. In July, both winds and currents seem to favour south-bound navigation for Indian Ocean-bound vessels, at least in the Red Sea if not in the Gulf of Suez. By comparison, in January, when ships would return from India, winds, though not currents (except in the Gulf of Suez), would run opposite to north-bound navigation. At all times, shallow waters and reefs made navigation in the Red Sea problematic at best; it seems that the situation must be even more difficult now than in Antiquity, the Red Sea having since receded to a level some 2.6 m lower than in Roman times.

Thirdly, across the Indian Ocean: ships departing from the Red Sea in July were able to take advantage of the southwest monsoon,²² which occurs from June through September, while those returning from India with the north-east monsoon, occurring in the fall and early winter, arrived in the Red Sea and, eventually, in the Gulf of Suez at the worst time to sail northward toward

19 The evidence of *P.Lond.* IV 1346 (710 CE) suggests that the canal was expected to be navigable as late as the month of February. Cf. Cooper 2009, 204–5, who cites counter-evidence to the effect that the canal was closed earlier (December). Sidebotham 2011, 181 rightly notes that 'use of the canal would not have been in sync with departure times of ships from the Red Sea ports for destination in India.'

20 It is not certain that seagoing ships rather than flat-bottomed boats were used in the Red Sea, as Nappo (in this volume, ad nn. 28–30) found evidence (*O.Petr.* 279, Myos Hormos, 52 CE) for *liburnae* in the context of the Roman Red Sea fleet. The evidence for big ships involved in the pepper trade from India in the first-third centuries CE is collected by De Romanis (in this volume, ad nn. 26–28, with reference to the *Periplus Maris Erythraei* 56; Philostr., *VA* 3.35; and a graffito from Alagankulam/Tamil Nadu discussed by Tchernia 2011a).

21 De Romanis 1996, 24–27, maps 2–5. See also Cooper 2011.

22 On the history of the discovery of the monsoon by the Greeks, see Plin., *HN* 6.100–106.

Clyasma and, in addition, up a more or less dried-up canal. The difficulty and the delay incurred by these unavoidable circumstances may very well have been the decisive factor in keeping the desert road open over the centuries.

If Trajan's Canal were indeed navigable, at least during the flood season (July through November) or part of it (August through October), Indo-Mediterranean trade would have suffered from the imbalance imposed by nature as a result of the lack of synchronization between the flood of the Nile and the respective monsoons. Therefore eastbound trade would have benefited from a navigable canal, while westbound trade would have to have used the desert road. This is what I would call *the one-way scenario*. It deserves some consideration, especially in view of the fact that eastbound goods were of a different nature than westbound goods. If the Mediterranean world exported wine, cereal, and metal, in coins or bullion, in exchange for spices, perfumes, and slaves, it can be argued that eastbound cargoes were more bulky than their westbound counterparts. I believe such a hypothesis to be fallacious, just as a pound of feather is no lighter than a pound of lead. If the one-way scenario is adopted, we have to imagine what the return cargo would have been on either route. The answer comes easier for the desert road: pack animals may have brought back food supply, especially grain, to the Red Sea ports.²³ I have no suggestion for returning riverboats on Trajan's Canal. Empty riverboats getting back from Clyasma to Heliopolis cannot be ruled out, as the price of labour—for that is all it took—was certainly not prohibitive.

However, there are two more arguments against the regular use of Trajan's Canal for commercial river transport from the Mediterranean to the Red Sea, or the one-way scenario. The first is that river maintenance is costly, just like the supplying of the relay-stations along the desert road, and even more so if several desert roads were operational at the same time. Even with the input of liturgists and army personnel, cleaning waterways from silting, building watch-towers and cisterns, operating facilities for food and lodging, and providing security for travellers was probably more than what the thin population of the concerned areas could shoulder. The provincial government must have been eager to cut down on unnecessary expenses and focus on one land route rather than a canal plus one or more land routes.

The second argument against the regular use of Trajan's Canal is that, in so far as we can tell, transiting international trade over several centuries left surprisingly little mark in the Wadi Tumilat and the Isthmus of Suez, either in the

23 See the first century CE Nikanor archive from Coptos, with Ruffing 1993.

area of Clyisma/Quhzum,²⁴ Ismailia, or Pithom/Heroonpolis/Tell El-Maskhuta. The passage of massive quantities of valuable goods attracts people and fosters settlement, such as early seventeenth-century New York City experienced to a high degree. However, there are no remains of any significant settlement on the course of the canal or in its immediate vicinity.²⁵ It is true that further archaeological excavations or surveys could still contradict this observation, although the urban development of the Eastern Delta from Cairo to Ismailia in the last century and a half makes major archaeological discoveries somewhat unlikely.

An ancillary argument could be adduced: Trajan's Canal would have had a negative ecological impact, had it been open to navigation throughout. Strong Red Sea tides would have brought salted seawater and possibly sea species into the Wadi Tumilat, at least for that part of the year when the flood was receding, which Aristotle seems to have been well aware of. One could object that sluice gates built by Ptolemy Philadelphus (according to Diodorus Siculus and Strabo) may have prevented such contamination, but they were unlikely to have been 100 per cent efficient.

My conclusion is obvious, but runs against the *communis opinio*, recently reiterated by Andrea Jördens, and to some extent Federico De Romanis, at least for late Antiquity. In my view, Trajan's Canal, just like its forerunners, the canals of Necho, Darius, and Ptolemy, was not in service for any significant period of time, if ever, provided that the term 'canal' was used to designate a navigable through-waterway connecting the Nile Valley with the Red Sea. There is no reason to doubt that some megalomaniac, such as one of the aforementioned rulers, may have entertained the hope of success where others had notoriously failed, but nature was bound to prevail. Some maintenance work was certainly carried out on a recurrent basis and on some parts of the canal, probably in the western part during the Roman period. The Nile kept reaching the Wadi Tumilat, at least during flood season. This phenomenon is accidentally attested by the pilgrim Egeria passing through in the 380s. It is likely,

24 Nappo (in this volume, ad n. 48, with reference to Ward 2007) sees a different picture, which I fail to recognize. See Mayerson 1996, esp. 123, whose overall conclusion I fully embrace.

25 Mayerson 1996, esp. 124–26, rightly underlines the relative importance of Clyisma in late Antiquity and early Byzantine period in the context of religious tourism/pilgrimage mostly using land-roads from the eastern Delta toward the Sinai, Medina, and Mecca, through the fort/port of Clyisma. Sidebotham 2011, 178–79 about the dearth of archaeological evidence for 'international connections' and the prospect of further surveys and excavations in the area.

but not proven, that this truncated branch of the Nile served mainly for the purpose of irrigation and fresh-water supply, and for local transportation. If long-distance trade indeed passed through the region, it must have been over-land, on a north-south rather than east-west axis. Just as today the fresh-water canal built by the French before the construction of the modern Suez canal contributes to the agricultural development of the Eastern Delta, Trajan's Canal should be counted as one more example of that emperor's concern for water-management.²⁶

26 This interpretation does not necessarily contradict Nappo's contention (in this volume) that Trajan's canal could be part of a larger eastern policy, with far-reaching military, administrative (including fiscal, I may add), and economic purposes.

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