The Grain Transport to Kerke Harborin Roman Egypt

Abstract:

Kerke harbor-on the borders of Arsinoite and Memphite nome- was one of the Nile harbors which had an important role in transporting the grain from *Chora* to Alexandria. The aim of this article is to investigate the grain transport process to Kerke in Roman Egypt by examining the documents of Kerke. These documents furnish three matters of interest which are: Kerke harbor was the destination of grain cargoes from Karanis, Philadelphia and other villages, the grain transport process was most likely done by donkey, and the cultivators had to pay some supplementary charges along with the grain tax.

Introduction:

Nile harbours and its tributary canals played a significant role in transporting the grain tax from *chora* to Alexandria, The grain transport process depended mainly upon the cultivator who was asked to move his grain from the field to the harbor under the control of the local officials, because the ultimate goal of the whole process was to ensure its efficient transport to Rome.

Transporting grain, from the fields to the harbor, was the main issue for some academic works(1), and while the process was discussed in various studies accessed the issue from various aspects(2); none have been concentrated on the role of Kerke harbor, it is believed that the study of the role of Kerke harbor would help get a clear view of the process.

(1) e.g: Rostovtzeff, M. 1906. "Kornerhebung und Transport im grieschisch-römischen Ägypten." APF 3: 201–224; Thompson, H. 1929. *The Transport of Government Grain in Ptolemaic and Roman Egypt*, Ph D thesis, Michigan University.

(2) Most important is: Adams 2007: 159-195; Reiter 2001:191-207; Mayerson 1999:189–192; Mayerson 1998:189-194; Cuvigny 1984: 123 –35; Youtie, L. C. and Youtie, H. C. 1979 :201-206; Husselman 1952:56-73;Youtie, H..C. 1950: 99-116; Boak, A.E.R. 1947:24-33.

The paper's main purpose is to identify more precisely the grain transport process to Kerke harbour. This paper will investigate all points of interest in the light of the documents of Kerke which include correspondences(1), grain tax receipts(2), reports(3), accounts(4), mummy labels(5), census roll(6),and a List of nominees for *sitologos*(7).

Based on this collection of texts; the paper will access some points of interest such as the location of Kerke, the grain transport process, the transport animals, and the supplementary charges which cultivators had to pay together with the tax itself.

The Location of Kerke:

The harbor of Kerke (modern *El-Riqqa* or *Gerza*- Beni Swif Provence), located on the borders between Arsinoite nome and Memphite nome about 4 km. north-east of the Meydum pyramid.

Due to this location, There was strong relationship between Kerke and both Philadelphia and Memphis, So in some documents, Kerke was connected with Memphite nome(8), while in other ones, it was connected with Philadelphia in Arsinoite nome(9).

Administratively, it is thought that from the end of the second century C.E and the beginning of the third century C.E, Kerke related to Arsinoite nome rather than Memphite nome(10).

The location of Kerke on the Nile not on a navigable canal, made it suitable for the grain transport to Alexandria, in the same time, it was the terminus of an overland route from Philadelphia in Arsinoite nome and possibly at the northern end of the canal

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(1) Correspondences: P.Cair-Zen I 59107= SB III 6725, Philadelphia, (18th Nov.257 B.C.E); III 59393, Kerke, (mid 3rd cent B.C.E); IV 59593, Kerke, (mid 3rd cent B.C.E); PSI IV 443 = P.Cair-Zen III 59507, Philadelphia, (mid 3rd cent B.C.E).

(2) Tax receipts: P.Tebt.III.1.823, Kerke, (8th Dec. 185 B.C.E); P.Warr 5 = SB V 7534, Arsinoite nome, (154C.E); P.Cair.Isid 47= SB VI 9070, Kerke, (26th Aug. 309C.E); P.Cair.Isid 50, Kerke, (16th Mai 310 C.E); O.Mich. I 521, Karanis, (3rd Feb 311 C.E); 522, Karanis, (6th Feb.311 C.E); 506, Karanis, (311 C.E); 528, Karanis, (12th March 312 C.E); 527, Karanis, (27th Janu.312 C.E); 515, Karanis, (4thMarch 312 C.E); III 1081, Karanis, (312-313 C.E); IV 1135 = SB XIV 11522, Karanis, (10th Feb 316 C.E); I 534, Karanis, (early 4th cent C.E).

(3) Reports: SB XVI 12564, Arsinoite nome, (146 C.E); P.Cair.Isidor.16, (Karanis, 19th Feb. 314 C.E).

(4) Accounts: P.Mich.I 61, Philadelphia, (248-247 B.C.E): P.Mich II 123, Tebtynis (45-47 C.E).

(5) Mummy labels: SB I 2053, Kerke, (1st cent); 5140, Kerke, (1st cent C.E); 5143, Kerke, (1st cent C.E); 2052, Kerke, (3rd cent C.E); 2054, Kerke, (3rd cent C.E); VI, 9126, Kerke, (3rd cent C.E); I 5145, Kerke, (?).

(6) Census roll : P.Corn 22, Philadelphia,(early 1st cent C.E).

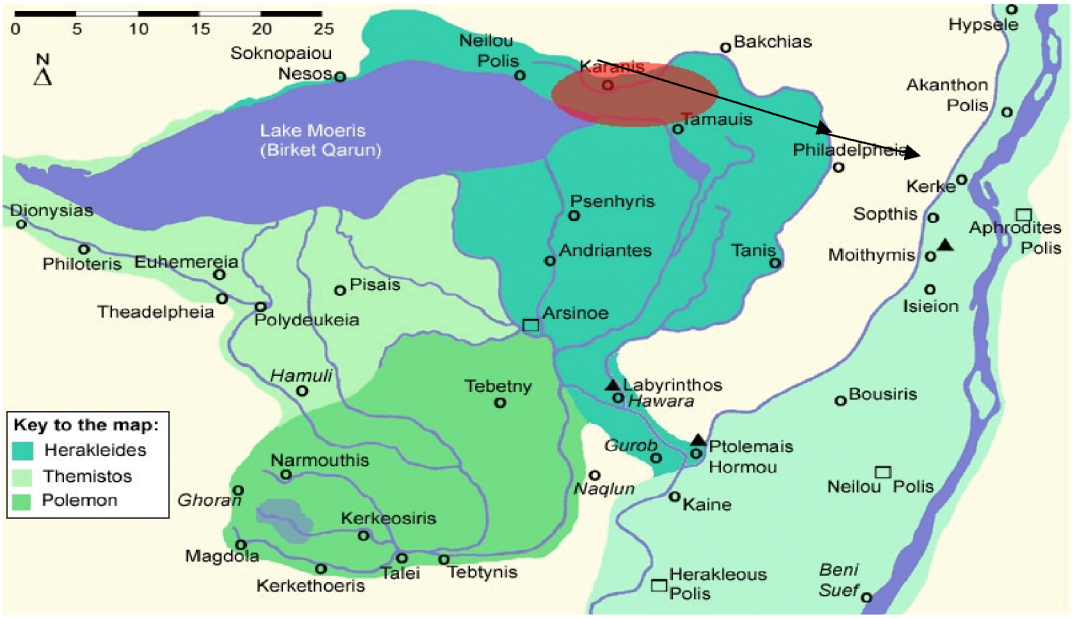
(7) A List of nominees for sitologos: P.Col. VIII 230, Karanis,(3rd cent C.E).

(8) C.f. P.Cair-Isid 50; P.Cair-Zen III 59393; SB 1 2052; 2053; 20 54; 5140; 5143.

(9) Cf. SB.6.9126; P.Heid. 6 368

(10) Reiter 2001:192 no 10.

running northwards from the vicinity of Ptolemais Hormou (*Illahcun*) to the main stream of the Nile(1).



Grain transport to Kerke harbor:

In fact; the transport process from its starting point in the fields, to its destination to harbours on the Nile was a liturgy upon the cultivator(2), after the harvest, which normally took place during the months of Pharmouthi and Pachon (April and May), each cultivator was asked to transport his grain to the village threshing floor under the surveillance of the harvest guards, γενηματοφύλακες(3), whose main duty was: "guarding the crops".(4)

The cultivator had to move the grain by his own animals or by the public animals, in the later case, he had to pay a tax called σακκηγία(5) (transport of sacks) to cover the cost(6).

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(1) Boak 1947: 24.

(2) Reiter 2001:191.

(3) Under the Ptolemies, the harvest guards were performing this function as a compulsory duty under oath that they will fulfill their task correctly. They were nominated by the village scribe. It seems likely that the same practice was continued under the Romans. For Ptolemaic times see: P.Tebt III.1 731. 3-6, 153-152/142-141 B.C.E; I 27, II 3-9, 113 B.C.E; cf. PSI VI 344,8-9, 256/255 B.C.E;P. Hamb. I 27.2, 250 B.C.E; PSI V 490, 258/257 B.C.E; P. Tebt. IV 1135.6, 112 B.C.E; H. Cuvigny1984:123-135; There seem to be only two references to these officials from the Roman period: P. Petaus 70 (second century C.E) and P. Ryl. II 90 = Sel. Pap. II 343 (early third century C.E), which also mentions a no-doubt similar liturgy, the ἀλωνοφυλακία; Adams 2007: 161-162.

(4) P.Tebt. III. 1. 831. 6: [φ]υλακιτῶν τῶν καὶ γενη(ματο)φυ(λακούντων) τὸν σπόρον

(5) Cf. P.Tebt.II,356.5, 108 C.E; 375.25, 110/111 C.E; 277. introduction, 3rd C.E ; BGU VII,1636.39, 155/ 156 C.E; O.Mich I 9.3, 212 C.E.

(6) Wallace 1938: 34

Probably from the second century C.E, if not before, persons were asked to supply their private animals for grain transport tax on behalf of the state, each person should provide at least three donkeys for a year in the field of the village in which he resided(1). Donkeys engaged in the grain transport were known as: δημόσιοι ὄνοί (public donkeys), while their owners and drivers were styled as: δημόσιοι ὀνηλάται (public donkey-drivers).(2)

At the threshing floor, representatives of the government were present in order to reserve the state's share of threshed grain, they had to make sure that the grain paid for taxes was of the first quality, accordingly, it is thought that the cultivator was not allowed to remove his grain from the threshing floor until the government payments (taxes or rent) had been reserved(3). The most illuminating document for the present conclusion is *P. Oxy. X 1255*, dated to 292 C.E, in which the two *comarchs* of the village of *Ision Panga*[4], gave an oath to Claudius Dioscurides the strategus of the Oxyrhynchite nome that they would undertake to keep in safety the crops at the threshing-floors until the government's officials-the *dekaproti-* have received payment in full of the public taxes from each person(5)-, moreover, they would also permit no one one to touch the produce until each person has paid the amount due from him to the local decaproti.(6) However, we have to consider that procedures which existed in the Oxyrhynchite nome need not necessarily apply to the Arsinoite nome.(7)

The threshed grain was then transported- by the cultivator himself or his representative- to the village granary θησαρός or to the granary of the nearby metropolis. At the granary, the grain was cleaned κάθαρσις and sifted κοσκίνευσις, then it was stored in bins according to the year of harvest in order that older grain could be transported to the river first.(8)

The next step was, the transportation of the grain cargoes from the villages or metropolis granaries to the Nile harbors(9), such as Kerke.

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(1) BGU I 15, 197C.E; Johnson 1936; 417-418. This compulsory service required financial property or income qualification of 1200 or 2000 drachmas in the course of the second C.E. cf. PSI XII 1229, (Herakleopolis, 217 C.E); P.Oslo III 135,(Oxyrhynchus,286-93 C.E); Lewis 1982:38; Maravela-Solbakk 2004:180 no 4.

(2) Adams 2007: 173.

(3) This was the practice in the Ptolemaic times, and it may have been revived in the time of Diocletian as an emergency. Wallace1938: 369-370.

(4) The village of *Ision Panga* was located in the Oxyrhynchite nome, see; P.Thomas 12. 2, 167/168 C.E; C.E; P.Mich.XI 610.15, 282 C.E; P.Oxy 60 4092.8,355 C.E.

(5) LL 6-11: ἐπειθεμένου σου ἡμῖν ὥστε ἐν ἀσφαλεῖ ἔχειν τοὺς καρποὺς ἐν ταῖς ἀλωνίαις <ἕν> τοῖς ἡμετέροις παιδίοις ἄχρις ἂν πληρωθῶσι οἱ δεκάπρωτοι τῶν ἑκάστου δημοσίων τελεσμάτων ἐκ πλήρους.

(6) LL 14-18: καὶ μηδενὶ ἐπιτρέψαι ἐφάψασθαι ἕως ἂν ἕκαστος τὸ ἐποφιλόμενον μέτρον ἀποπληρώσῃ πρὸς τοὺς τῶν τόπων δεκαπρώτους.

(7) Adams 2007: 169

(8) Adams 2007:161.

(9) This process was called the καταγωγή or 'carrying down', and this term continued to be used in the Roman period. Adams 2007:162; Youtie 1950: 100.

Kerke harbor was the destination of grain cargoes from Karanis, Philadelphia, and other villages, and there were some state officials stationed at the harbor to deal with the received grain, like:

1. The *Sitologoi* σιτολόγοι, their duty was to receive the grain cargoes, and prepare them for the shipment to Alexandria. It is well known that the post of *Sitologos* was made liturgical with a financial property or income qualification (*poros*), between 700-800 drachmas, the number of the *sitologoi* varied greatly presumably in proportion to size and population of tax-collection unit.(1) *P.Col.VIII. 230*, dated to the early third century C.E, listing names for local *Sitologoi* (σιτολόγ[οι ἐπὶ τόπων), names are given for Karanis and Kerke, each with his *poros*, which is in every case either 700 or 800 drachmas.(2)
2. A number of liturgical harbor guards.(3)
3. An office for *sitiologoi* from Philadelphia resided at the harbor of Kerke; *P.Warren 5*, dated to 154 C.E, proves the presence of an office for the *Sitologoi* of Philadelphia. They were responsible for the measuring and loading the grain tax of Philadelphia, which was about four thousand five hundred and three (4503) artabae of wheat, together with $1\frac{1}{2}$ artabae extra for every hundred[4].
4. An officer with the title ἀποδέκτης κριθῆς ὅρμου Κερκὴ, which means: the receiver of barley for the harbor of Kerke, it seems likely that he was an assistant to the *sitologoi.*(5)
5. A committee of εὐσχημονες, these officials supervised the loading process of the grain cargoes which sent from Kerke to Alexandria, and took certain responsibility.(6) responsibility.(6)

After receiving the grain cargoes, the s*itologoi* –or their assistants- drew up reports, these reports should contain all transactions made in grain:

1) The grain which was being taken into the granaries, and, what was going out.
2) The charges made for cleaning and sifting.
3) The payments made for transport (φόρετρα).(7)

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(1) Lewis 1982: 47.

(2) It is surprising that Karanis is linked with Kerke, rather than Philadelphia. The list includes about 21 names for the harbor of Kerke, each name is accompanied with the *poros* as the post was still liturgical post; LL 46-68.

(3) P.Petaus 69, 184-7 C.E.

(4) LL 16- 21: σερήνου γρα(μματέως) μεμέτρημαι καὶ ἐμβέβλημαι ἀφ' ὅρμου κερκὴ σιτολ(ογίας) Φιλαδελφίας τὰς τοῦ πυροῦ σὺν ἑκατοστῇ καὶ ἡμαρταβίῳ τετρακισχειλίας πεντακοσίας τρεῖς. The presence of an office for the *sitologoi* of Philadelphia at Kerke may refer to the importance of the grain sent from Philadelphia to kerke in the earlier times, however, there is no mention for grain cargoes from Philadelphia to kerke in later Roman Egypt.

(5) P.Cair-Isid.47. I.1,II.15, III.39; Boak 1947:30, the same official was found at the harbor of Leukogion Leukogion in the same time, P.Cair-Isid.46.1, 307 C.E, P. New York 4a.2, 312 CE.

(6) P.Warren 5, 6.

(7) Adams 2007:162.

Sometimes such reports were drawn at the point of departure; *SB. **16**. 12564* dated to about 146 C.E, is a report drawn by Nemesas and the associate *Sitologoi* of the village of *Philopator*(1) to unknown official, but he was presumably the strategos. The report provides valuable evidence for the grain transport to Kerke. The *Sitologoi* listed some receipts of transportation charges on wheat moved from the granary of their village to Kerke harbor(2), they directed the following cargoes to Kerke harbor:

Text	Date	Cargo	Taxpayer	Type of taxed land
SB.**16** 12564	Pauni 22 L13: Total for the day, $41\frac{1}{3}$ art. of wheat	L8: 5 $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{24}$ art. of wheat; for diaphoron $\frac{1}{3}$ art ... of wheat	Heron, son of Theabennis	Land of the temple of Hephaistos
		L9: 6 $\frac{1}{2}$ $\frac{1}{12}$ $\frac{1}{24}$ art. of wheat; extra charge $\frac{1}{2}$ $\frac{1}{24}$	Tauris, daughter of Chairemon	catoechic land at Karanis
		L 10: 5 art. of wheat; for diaphoron…..	Apol. . ., son of Orsenouphis	land of the temple of Hephaistos
		L 11: . . . art. of wheat	Anch (…), son of Onnophris, acting through Apol (.), son of Orsenouphis	Public land at Karanis
		L 12: . . . art. of wheat	estate of Pallas: the same, acting through the same….	--------
	Pauni 23	L 14: 21 ... art. of wheat	…. son of Sabinus	Public land at Karanis
	Pauni 24 L 18: Total for the day, 17 $\frac{1}{4}$ art. of wheat	L 15: 6 $\frac{1}{24}$ ..art. of wheat	Zenon son of Deios	land of the temple of Hephaistos
		L 16: 7 $\frac{1}{2}$ $\frac{1}{12}$... art. of wheat	Petonopsios, son of Petonopsios	…….
		L 17: 2 $\frac{1}{3}$ $\frac{1}{24}$ art. of wheat; extra charge $\frac{1}{3}$ $\frac{1}{12}$	Didymos, son of Menelaos	Catoechic land at Karanis

(1) Φιλοπάτωρ ἡ Θεογένους (Φιλοπάτωρ, Θεογένους) κώμη, the village of *Philopator* also called *Theogenes* was in the Heraklides division in the north-east part of the Arsinoite nome, not far from Karanis and Socnopaei Nesus, with which it is frequently connected. The village was first mentioned in P.Amh.II 59,151/140 B.C.E; 60 151/140 B.C.E. It was probably founded in Euergetes I's reign (246-221 B.C.E) rather than in that of Philopator(221-204 B.C.E), P.Tebt.II, pp. 407-408; see also: P. Gen.I 71.16, 3rd B.C.E; P. Amh.II 44. 28,138-137 B.C.E ; P. Gen.I 81. 10, 138-161 C.E.

(2) Youtie, H.C.1979: 201-4.

It is noted that some of the taxed land (Catoechic land LL 9&17; Public land LL11,14) located in Karanis, this may indicate that citizens of the village of *Philopator* owned or leased lands in of Karanis.

For the first half of the fourth Century C.E, we have exceptionally detailed information about the grain transport process to Kerke harbor. The process is well documented by a group of receipts, these receipts were formal documents acknowledging that the cultivator had discharged his duties toward the state. The receipt does not ordinary specify the rate of taxation, but it frequently gives the total amount of grain paid for taxes, and occasionally specifies the supplementary charges προσμετρούμενα, and the various additional charges.(1)

Among these receipts, six receipts(2) were issued the ἀποδέκτης κριθῆς ὅρμου Κερκὴ to the *sitologoi* of Karanis for grain transported from Karanis to Kerke. The receipts stated that Aurelios Sumeios, the ἀποδέκτης κριθῆς ὅρμου Κερκὴ received the tax-grain of Karanis (about 1011 $\frac{1}{4}$ artabas) in two separate days, on Pauni 24 and 29(3), from Aurelius Isidorus(4) and his colleagues -*sitologoi* of *Karanis*-. After receiving the grain, Sumeios issued the first six receipts(5), which proved that Karanis made the following six deliveries to the harbor of Kerke:(6)

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(1) Wallace 1938: 35-36.

(2) P.Cair.Isid. 47, is a series of seven receipts for delivery at the harbor of Kerke (six receipts, cols i-ii, LL 1-37) and Leukogion (one receipt, col iii, LL 38-54) of grain collected by Isidoros and his colleagues as part of the canon , or grain levy, imposed on the village for the year 308/309, the receipts were issued by the receivers of barley grain in both two harbors; Boak 1947:23-33.

(3) Similar deliveries of grain by donkey caravans between September and November 309 C.E are listed in P.Cair.Isid. 15 & 144.

(4) Aurlius Isidorus, the owner of the well known Archive, served in all liturgical posts of the village of Karanis except the village scribe, among the liturgical works he undertook: was the post of the *sitologos* of Karanis together with other colleagues. Isidorus and his colleages were responsible for the delivery of the barley of the *canon* to the harbor of Kerke and Leukogion. They functioned not merely for the village of Karanis (I, 3 ; 10), but also for a part of its administrative district *horiodiktia* ὁριοδικτία, so Karanis was called "*the village of Karanis and its horiodiktia*". P.Cair.Isid. 47 II.17 ; III.41, 45. The archive of Aurelius Isidoros contains some 180 texts came from Karanis dated between 267 and 324 C.E. Most of them are published in *P.Cair.Isid.* and *P.Col.* VII. Not all the texts related to Aurelius himself, some of them belonged to Isidoros' father Ptolemaios (267-283 C.E), and came into Isidoros' possession after his father's death, others are concerned with the affairs of Isidoros' brothers, and five texts belong to Atisios son of Hatres.
www.trismegistos.org/arch/archives/pdf/34.pdf

(5) The seventh receipt (col III.38-54) was issued at the harbor of Leukogion, which located in Heracleoopolite nome (modern *Inhnasya el-Medina*) and served Fayum as a southern port on the Nile (Youtie 1976:111). The harbor of Leukogion received grain cargoes from Karanis as it is evidenced from tax receipts from Karanis: P.Cair-Isid 46.2,307 C.E; 47.iii 39, 42,309 C.E; P.NUN 1 4a. 2,7,312 C.E; O.Mich.I 179.3, 297 C.E;254. 2-3, 3rd-4th C.E;524.3, 312 C.E; 525.3, 312 C.E; 526.2-3, 312 C.E ; 532.3, 318 C.E; 541.4, 314 C.E;545.5, 4th C.E; 254.3, 4th C.E; II.927 .4, 312 C.E;930.4, 313 C.E; 931.3, 4th C.E; III. 1080.3, 304 C.E; 1079.4, C.E 312, in addition; there are some receipts dated to the seventh century and eighth century C.E: P.Gen.I 50.6, 575-625C.E; IV 189, 600-699 C.E;P.Mich.12 647.3, 674 C.E; SB 20 14234.2, 716 C.E; 15092. 5, 650-699 C.E.

(6) This table after Boak 1947:26.

Date	*Text*	*Cargo*	*Total*
Pauni 24	Col I, 3-8	Barley delivered including the 10%, 260 $\frac{1}{2}\frac{1}{3}$	260.83 artabas
		Levy of 5%	14 .00 (13. 04) art.
		Total	274. 83 art.
	col II, 17-22.	Barley delivered including the I0%, 78 $\frac{1}{2}\frac{1}{4}$	78.75 artabas
		levy of 5%.	4.00 (3.94) art
		Total Total for the day 24 Pauni	82.75 art.
Pauni 29	col I, 9-14	Barley delivered including the 10%, 85 $\frac{1}{3}$	85.33 artabas
		Levy of 5 %	4.33 (4.27) art.
		Total	89.66 art.
	col II, 23-7	Barley delivered including the 10%	6o artabas
		Levy of 5%	3 artabas
		Total	63 artabas
Epiph I2	col II, 28-31	Barley delivered including 2% tax	379 artabas
Epiph 16	col II, 32-36	Barley delivered including 2% tax	122 artabas
Grand Total			1011.24= 1011 $\frac{1}{4}$ artabas

There are also three receipts[(1)] issued by different shipmasters to *Ision*, *Pamiton*, and their associate receivers. Each receipt acknowledges that the shipmaster received the grain and transported it to Kerke harbor (παρέλαβον καὶ ἐν[εβαλόμην παρ' ὑ]μῶν ἐν ὅρμῳ Κερκὴ),[(2)] the delivered cargo was a part of the levy of Karanis for the year 308/ 309 C.E.

Perhaps the most important group of texts for Kerke is eight Ostaca to be found in *O.Mich.I,III*, and *VI*. As general, the Ostraca from Karanis are tax- receipts. Most important that, the forms of these receipts have varied in details, however, they repeated the same information,[(3)] these pieces of information- according to Reiter[(4)]- may be classified into four groups;

1. Essential information, like: The name of the tax payer; the volume of the transported grain (often in donkey with the load of the 3-artab sack); the date of the receipt; the place of loading the grain (often from the Granary of Karanis); and the year of the crop.

(1) P. Cair. Isid. 50, May 16th 310 C.E.

(2) P. Cair. Isid. 50, ll 6-7,22-24 and 38-39.

(3) Reiter 2001:191.

(4) Reiter 2001:192-193.

2. Some details, like: the transport animals (the donkey was used widely and the word κτήνη usually used to denote it); their sources or ownership (private or government animals).
3. Moreover, there were some voluntary information such as: the representatives of the grain transport; the official who issued the receipt (usually the *Sitologus*/ *decaproten*); the name of donkey-driver; and the nature of the transported cargo (grain, wheat).
4. From the beginning of the 4th century, some tax receipts have additional information like: the use of the verb ἐνεβάλεν or μετεβάλεν which means: shifted, transported or handed in; and the destination of the cargoes (usually the Nile harbors of Kerke or Leukogion).

The eight Ostraca of Kerke present some valuable details about the grain transport process, the following table collects the deliveries of grain cargoes from the granary of Kararnis as recorded in the eight ostraca:

No	Text	Year of the crop	Date	Taxpayer	Cargo
1	O.Mich . I 506	18=309-310	Mecheir 4= January 29th , 303 C.E.	Παλήμ(ων) Παλήμ(ονος)(1)	??
2	O.Mich .1 521	18=309-310	Mecheir 9= Febr 3rd 311 C.E.	Πτολεμαῖος Πτολ(εμαίου)	6 donkeys of wheat.
3	O.Mich .I 522	18=309-310	Mecheir 12= Febr 6th 311 C.E.	Πτολλᾶς Σαραπίωνος	2 donkeys of wheat.
4	O.Mich .I 527	19=310-311	Mecheir 1= January 27th 312 C.E.	Σαραπάμμων ὡρίωνος	2 donkeys of barley
5	O.Mich .I 515	19=310-311	Phamenoth 8 , 299 or 308 C.E.	Πτολεμαῖος Πτολ(εμαίου)	4 donkeys of barley.
6	O.Mich .I 528	19=310-311	Phamenoth 16= March 12th 312 C.E.	Κοπρῆς Πρίσκου	4 donkeys of barley
7	O.Mich .III 1081	8th /6th year	312/313[?]C.E.	Κοπρῆς Παννοῦς	4 donkeys of barley
8	O.Mich .6 1135 =SB14, 11522	??	Mecheir 15= Febr 10th 316 C.E.	Πρίσκος Εὐδέμων	three donkeys

In such receipts, some points of interest are worthy mentioned, like:

- It is noted that seven receipts (*O.Mich.I 506,521, 522, 527, 515,528* and *III 1081*) out of eight begin with the formula: ἐν θησαυρῷ Καρα(νίδος), which means: in the granary of Karanis.

(1) After Reiter 2001:196

- The receipts indicted that Karanis had a central granary. This granary was consisted of ten large granaries and seven smaller ones, the larger granaries were used to store the grain for taxes to Rome, and were guarded by Roman soldiers, as it is indicated from their barracks which were erected adjacent to at least one of them(1). There were separate parts of this granary belonging to some of the neighboring villages such as Ptolemies Nea. The documents of Ptolemies Nea(2) suggest that the village did not have its own granary, but used a separate part μέρους Πτολεμαίδος of that in Karanis instead, this may be reasoned by what was called: "*the village of Karanis and its horiodiktia* " κώμης καὶ ὁριοδικτίας. Κ̣αρ̣ανίδος καὶ ὁριοδεικτίας". In the fourth century C.E, Karanis was the center of an administrative district contained some neighboring villages, Ptolemies Nea may have been one of them, the nature of this *horiodiktia* was likely an administrative district dependent on Karanis, and physically adjacent.(3)
- There is no mention for the supplementary or transportation charges, this may be reasoned that all the grain cargoes were calculated in donkey-load not in artaba, in such cases these supplementary charges were included within the dokey-load.
- It is noted that there is no mention for the type the land as usual in the earlier times (*SB* ***16*** *12564*), that means that the old divisions of land had faded away.
- The name of the donkey-driver was mentioned in these receipts; he was Ouenaphris in *O.Mich.I 527* ; Sotas in *O.Mich.* I 528; Dioskoros in *O.Mich.I 522*; Sarmates in *O.Mich.I 521*, and in *O.Mich.I 515* the tax collector, Ptolemaios(4) son of Ptolemaios directed the grain tax through a donkey driver whose name is Antonius, but in *O.Mich. 3 1081* Eudaimon the owner of the donkey was mentioned instead of the donkey driver.
- Sometimes the donkeys ὄνους of Karanis were not sufficient, so hiring beasts κτηνῶν ναυλωσίμων from the neighboring villages was possible: *O.Mich.4 1135*,

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(1) Ten large granaries and seven smaller ones revealed by the excavators underscore the dominant role that grain production played in the local economy. All of the large granaries at Karanis were constructed along lines similar to Roman military storehouses. Rooms used as offices or living quarters fronted onto the street. Behind them was a central courtyard, three sides of which were lined with storage bins or, more often, chambers with vaulted ceilings that reached a height of about three meters above the floor. The interiors of these chambers were subdivided into four or six bins, each about a meter deep. A small window high in the arch provided ventilation. More discussion of granaries of Karanis in Roman Egypt see: P.Mich. IV. 223—225; Husselman1952: 56-73; http://www.umich.edu/~kelseydb/Exhibits/Karanis83/KaranisExcavation/TheRuralEconomy.html .

(2) Economic activities in Ptolemais Nea are mainly documented for the transport of grain to the granary at Karanis: O. Mich. I 398.1,(Karanis, 270 C.E); 544. 2,(Karanis, 316 C.E); II 907.3, (Karanis, 297/8 C.E); 913.2,(Karanis, 299 C.E); 914. 1, (Karanis, 299 C.E); III 1082. 2,(Karanis, 313 C.E); P. Cairo Isid. 45 =SB VI 9045. 6 ,(Karanis, 307 C.E); 59. 10, 20,(Karanis, 316-318 C.E); P. Col. 7 137. 25, 35.84, (Karanis, 301-2 C.E).

(3) Bagnall 1985:290.

(4) The taxpayer, *Ptolemaios* son of *Ptolemaios*, is probably the man known as early as 293 CE (O.Mich. II 894.3) and as late as 311 C.E (O.Mich. Iv 523.7) and even 314 C.E (P.Cair.Isid. 17. iv. 110); Bagnall 1979: 223.

recorded that Priscus, son of Eudaimon moved his grain tax through beasts of Hiera Nesos.(1)

The harbor of Kerke received grain cargoes not only from Karanis , but also from Soknopaiu Nesos; *P. Lond. II378=SB 22.15623* dated in the second century C.E, recorded that Stotais the ἐπίπλοος of Soknopaiu Nesos loaded to Kerke harbor about 12.722 artabas of wheat into the ship formerly belonging to Papirios son of Hermas.(2)

It is worthy to note that all the above mentioned receipts proved the grain transport to Kerke harbor, but there is no evidence-as far as the evidence goes- for grain transportation from Kerke to the royal granaries at Alexandria in the Roman times, while, there is only one evidence from Ptolemaic period.(3)

In fact, Grain supply to Rome was an important issue for the prefect of Egypt in order to ensure an efficient transport for tax-grain to Rome, the prefect Quintus Aemilius Saturninus (191–193 C.E) blamed the *strategoi* of the seven nomes and Arsinoe for neglecting the grain transport and accused them with the complicity with the donkey drivers in delaying the grain transport.(4)

Grain transport animals:

The transport of grain from Karanis to the harbours of Kerke and Leukogion was most likely done by donkey, The donkey was the most widely used form in grain transportation from the field to the threshing floors, then to the granaries and from there to the local harbours. This conclusion is justified not merely by the location of the two harbours- Kerke and Leukogion- in relation to Karanis, but by the large number of receipts which were issued in this period at the granary of Karanis to individuals for the delivery of donkey-loads both at Kerke(5), Leukogion(6), and even to unknown distinction.(7)

Since the grain cargoes from Karanis reached Kerke overland by donkey and in a donkey load, it would be useful to ask about the distance between Karanis and Kerke,

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(1) Similar cases were attested in Karanis from other villages such as: the village of *Psenyris*: O.Mich.I 401. 3-4(camels not donkeys were engaged in the grain transport), 283 C.E; 408.4-5, 285/6? C.E; 409.3 ,286 C.E; 468.1-2, 299/307 C.E?, from *Arsinoe*: O.Mich.I 363.3 , 3rd C.E; II 891.3-4, 290 C.E; 871. 2-3, 3rd C.E; 929.5-6 , 313 C.E, From the village of *Dinnis*: O.Mich I 379.3, 3rd C.E; 415.4, 289 C.E; 426.3 ,291 C.E; 516.3-4,308 C.E; II 871. 2,3rd C.E; 878.2,3rd C.E; 890.1, 289 C.E; 902.3-4,297 C.E; III 1063.3, 289 C.E, and from *Nestou Epoikion*: O.Mich.I 413, 287/288 C.E. Also beasts from outside Philadelphia were engaged in the grain transport, from the village of *Syron*: BGU VII 1699.3, 3rd century C.E, from *Perkeesis*-after Reiter- in BGU XVI 1703= SB XVI 12789.3-4, 260-280 C.E; and from *Dennis*: BGU VII 1697.3, 3rd C.E; 1700=SB XVI 12788. 2-3, 3rd C.E, In addition to *Karanis* and *Philadelphia*, the village of *Thraso* hired beats from the village of *Syron*: SB XIV 11564.3, 260 C.E; see also: Reiter 2001:198-200 note 46.

(2) Sijpesteijn 1993:127 noted the ship cargo was over 10,000 artabas of wheat in some 3,500 sacks that had been conveyed to him by more than 185 donkey (?) Convoys over a period of 9 days.

(3) P.Tebt.3.1 823. 6-7(Tebtunis, 185 B.C.E).

(4) BGU I 15,(Arsinoe, 197C.E); Adams 2007:174 and Johnson 1936: 417-418

(5) Cf. O.Mich. I 506, 5I5, 52I, 522, 527& 528.

(6) P.Cair-Isid 47, iii.38-54; O. Mich. I 524; 525; 526; II 927; 930; 93I.

(7) SB VI 9111, 299/300 C.E; 9112, 27-28 C.E; Youtie 1950:101-3; Boak 1947: 25.

and the time in which a donkey could travel from Karanis to Kerke, and the weight of a donkey load.

Let us start with the distance from Karanis to Kerke, It seems likely that it was about 32 k, the route from Karanis to Philadelphia (through the Fayum itself) was about 20 km, and further on some 12 km from Philadelphia across the desert to Kerke at the Nile. This calculation was done in the light of the map of the *K.U.Leuven Fayum Project* [1] which gives the distance between Karanis and Philadelpheia as 4.1 cm, and between Philadelphia and Kerke as 2.1 cm, a total of 6.2 cm, with a map scale of 1cm:5km, so that would be ca. 31/32 km.[2]

This distance -from Karanis to Kerke- may be covered once a day, and each donkey could transport one load per day, *Boak* (1947:25) believed that the delivered amounts of *P.Cair.Isid. 47* imply that each of the amounts could have been delivered in a single day, perhaps by two separate caravans on the days when two receipts were issued, Pauni 24 and Pauni 29; also the wording καὶ ὁμοίως τῇ κθ[3], indicates a delivery on a specific day only, so a donkey could transport only one grain load per day from Karanis to Kerke. This view may be supported by *PSI IV 332*.21-22 (257/6 B.C.E), which implies that a day was allowed for donkey transport from Kerke to Philadelphia of garlic bulbs (25 donkey loads on the 24th and 29 on the 25th, transporting 300 artabas of garlic in all, so it is expected that grain transport to be much the same though with different loads.[4]

With respect to the donkey load, The Karanis receipts mentioned that all cargos was in donkey load not in artaba, how much the donkey load measure in artabas and how much a donkey can carry in the trip from Karanis to Kerke?

Before calculating a donkey load in artabas, it may be worthy to point out that a donkey load is determined by some factors, such as age, size, sex, strength of the donkey, length of the delivery namely, the distance to be covered, and the individual requirements of each journey: all of which go into calculating the weight a donkey can carry.[5]

In order to transport grain from threshing floors to local granaries and similarly from granaries into boats to Alexandria through Nile harbors, the thousands of artabas of grain required to be packed into sacks σάκους, Each of these sacks containing 3 artabas of grain, and when donkeys or wagons are cited as carriers, the ratio was generally one 3-artab sack per donkey or 5 per wagon, one artaba of grain would weigh between 20 and 33.65 kg, or average of about 26kg.[6] So the donkey in average could carry about 78 kg, and could cover the distance between Karanis and Kerke in a day.

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(1) http://www.trismegistos.org/fayum/fayum2/map.php?geo_id=1008

(2) I am Indebted with this valuable notice to Dr Herbert Verreth, Trismegistos - KU Leuven Belgium, he believes that the distance which is given by the map of Fayum Project is confirmed on the map of Baines/ Malek, Atlas of ancient Egypt (2nd edition), 2002, p. 121.

(3) P.Cair.Isid. 47, I 9; II 23.

(4) I should express my gratitude to Prof. Dorothy Thompson for this valuable explanation.

(5) Mayerson 1999:192 no17.

(6) Mayerson 1998:190-191.

The 3-artab sacks were the standard unit for the shipment as part of annual tribute assessed by Rome or Constantinople, why was the 3-artab sack commonly used for this transaction?

The artaba is equated with $3\frac{1}{3}$ modii, and that "a threefold artaba is filled up with 10 modii"[(1)] which made its way by donkey, wagon, and boat to Rome or Constantinople as part of the annual tribute levied upon Egypt.[(2)] So the use of the load of 3-artab sacks that equal to $3\frac{1}{2}$ modi was practical solution because it would also facilitate the calculation of both the Egyptian annual tribute and the ship maximum capacity.[(3)]

The supplementary charges:

The supplementary charges προσμετρούμενα were imposed by Augusts as compensation for differences in the content of local measures used in collecting grain duties, and those specified by the state for accepting tax payments. So, they would represent the differences between the local standard and that which the government used in accepting payments.[(4)]

They were calculated in Arsinoite nome in percentage rather than in simple fraction of one-sixth ($\frac{1}{6}$) or one seventh ($\frac{1}{7}$), and were paid by cultivators along with the tax-grain itself as additional tax. Therefore, the paid amount by each cultivator was increased in all cases with five to ten per cent.[(5)]

The harbor officials recorded carefully some supplementary charges in the receipts of the grain transportation. Therefore, these were preserved in some tax receipts of Kerke (*P.Cair-Isid.47 &50*), however, a series of ostraca from Karanis (*O.Mich. I, 506, 5I5, 52I, 522, 527and 528*) mentioned nothing about them. It is thought that they were normally included in the payment.[(6)]

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(1)This calculation is evidenced literary: Jerome,.comm.in.Dan.11.5: *frumentum artaba,quae mensura tres modios et tertiam modii partem habet* .Jerome's speech about the ratio of one artaba equals 3 1/3 came in the context of his speech about the wealth and power of Ptolemaeus Philadelphus and of number of artabs of wheat in his possession.; and documentary: P.Oxy.33 2670, a shipper's receipt for convoys of grain, records that the master of an unknown number of boats delivered to the *sitologos* of the *Thmoisepho* toparchy over 10,000 artabs of wheat in some 3,500 sacks that had been conveyed to him by more than 185 donkey (?) Convoys over a period of 9 days. Mayerson 1998: 193.

(2) Mayerson 1998:189.

(3) Mayerson 1998:193-194.

(4)Wallace 1938: 38.

(5) Wallace 1938: 39.

(6) Wallace 1938: 372 no 54.

The tax receipts of Kerke offered various kinds of supplementary charges. A general charge of 10%, on the amount collected in accordance with the *canon* κανών[(1)] was recorded in receipts from both Karanis[(2)], and Philadelphia.[(3)]

It is noteworthy that in the Philadelphia receipts the 10% is turned over to the *sitologoi* at the village granary, whereas in the receipts from Kerke and Leukogion the 10% is turned over with the grain of the *canon* by the *sitologoi* to the *apodektai* of these harbours. This levy then did not remain in the villages or in the nome but was delivered for shipment with the *annona* grain.[(4)]

Another assessment of an extra charge of $\frac{1}{20}$ or 5%, under the name of εἰκοστή[(5)], sometimes known as the διχοινικία[(6)], and usually designated in brief as κ̄[(7)].It seems likely that all grain lands in Egypt paid this charge with the amount of $\frac{1}{20}$ of an artaba per aroura.[(8)]

In addition, there was a particular charge amounted to 2% called both πεντηκοστί [(9)], and ἑκατοσταὶ δύο.[(10)] This tax may have been a charge imposed to defray handling expenses, to furnish perquisites to government officials, or to allow for shrinkage or deterioration of the barley while in storage or transit.[(11)]

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(1) The term κανών *canon* was recorded in P.Cair-Isid 47=SB VI 9070 I.4; II, 17-I8 ; III, 44; The term was used in these receiptsonce in each column to refer to the levy assessed against the village of Karanis and its *horiodeiktia* for the year in question, in other words, the amount prescribed in accordance with the current indication. Boak1947:26; Cf. Preisigke, Wörterbuch, Abs. III, 24I, s.v. κανών).

(2) This levy was mentioned under various forms: P.Cair-Isid.47 =SB VI 9070: δεκάται, (I. 4; II. I8, 25), αὶ κελευσθῆσαι δεκάται (I.11), ρ̄ δεκα□(III.43); and ἑκατοσταῖς ι in Cair-Isid.50, I.9, II. 26, III.40.

(3) P.Princ.Roll= SB V 7621, 310 -324 C.E: I. 6; II. 6-7; IV. 6,15; VI. 6, 17; X. 7, 18; XI. 5; XII. 5, I4; XIII. 5; XIV.7.

(4) Boak 1947: 26.

(5) P.Cair-Isid. 47, I. 6, I2; II. 20, 25); The εἰκοστή appeared also in a group of contemporary wheat receipts from Karanis: P. Mich. VI 399- 411C.E, all related to uncertain year: 399, 19 June; 400,20 June; 401, 25 July; 402, 2 Aug; 404, 23 Aug; 405, 28Aug; 406, 30 Aug; 407, 2 Sep; 408, 26 May-24 June; 409, 18 Aug; 410, 20 Aug; 411,17 July; O. Mich. I I71, early IV C.E; I72, early IV C.E; P.Ryl. II 202, 108C.E; 188, Early 2nd C.E.

(6) Boak 1947:27.

(7) Ryl. II pp. 234-35.

(8) Wallace 1938: 12& 361 no 10.

(9) P.Cair-Isid.47, II. 30, 34.

(10) P.Cair-Isid.47 , III. 43

(11) Boak 1947:26.

Furthermore, the *naula* ναῦλα, which was a freight charge of $2\frac{3}{4}$ % on the value of the barley made for shipment by canal boats from the village granaries to the inland ports such as Kerke,(1) or from the inland ports to Alexandria.(2) In Kerke receipts the *naula* was calculated at the rate of $5\frac{1}{2}$ denarii per artaba,(3) while the officials of the granary of Theadelphia collected the *naula* on grain payment but did not mention the rate at which these charges are calculated.(4) Sometimes, the *naula* itself might be paid in kind; for example in wheat or barley,(5) and was paid to the officials in charge of the harbor, such as overseer ἐπιμελητὴς of the harbor.(6)

Moreover, an assessment called τὸ δηνάριον τοῦ μοδίου(7), or μοδίου τὸ δηνάριον(8), "the denarius per modius", which was a special supplementary charge rather than a charge levied to defray the costs of transporting grain from the granary to the inland ports. (9)

Another type of surtax amount to $1\frac{1}{2}$ artabae of wheat per cent, is recorded(10), in fact nothing is known about the nature of this levy.

Conclusion

To summarize, it seems possibly that Kerke harbor was an important contact point from which the Arsinoeite nome and Memphite nome were connected with Alexanderia, the harbour was the destination for grain cargoes from Karanis, Philadelphia and other villages.

The grain transport process was the prime concern for the state officials in Graeco-Roman Egypt. Under the Romans, many features, however, remained the same as before- under the Ptolemies-, but with the gradual expansion of the liturgical system, the transport service became unbearable.

The process began after the harvest when the cultivators were asked to move their grain to the threshing floor of the village, then to the granary, after that to the harbor.

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(1)Johnson 1936:409.

(2) Boak 1947:27.

(3) P.Cair-Isid.47, I.6,12-13, II.20, 26, 35; P.Cair-Isid.50, I.9,II.26,III.41; PSI I 92.15, 28 March of an unknown year; P.Oxy XVII 2113.10, 316 C.E.

(4) P. Thead 26= P.Sakaon 11. 12, 296 C.E; P. Thead.27= P.Sakaon 12 .19, 21, 298 C.E; 32. 6, 17 & 25, 307 C.E; Boak 1947:27.

(5) O. Mich. I, 171(Early) Vth century CE,Mecheir 2; P.Köln.II 119.6, (Narmouthis 292 C.E).

(6) O. Mich. I 179, (Karanis, 297 C.E).

(7) From Kerke: P.Cair-Isid.47 I .7-8, 13-14, II. 21-22, 27, 36, III. 47; and from Philadelphia: P. Princ. Roll = SB V 7621, 310 -324 C.E: X. 10, 22; XI. 6; XII. a.

(8) Cair-Isid.50 I.12, II.28, III.43.

(9) Boak 1947: 27-28.

(10) P. Warren 5. 20= SB V 7534.

Once the cultivator handled his grain and received a receipt from the granary officials, he had discharged his duties toward the state.

The grain was measured at Karanis or other village then transported by land to Kerke by donkeys. The donkeys were the main transport animals across the desert of Arsinoite and Memphite nomes.

There were some state officials in the harbor of Kerke whose duty was receiving the grain cargoes and issued receipts, while others were concerned with preparing the grain transport to Alexandria.

The harbour officials received not only the grain tax but also some supplementary charges which the cultivator had to pay along with the tax, these supplementary charges raised the amount he paid with five to ten per cent.

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