



Emad Khalil

## **The Sea, the River and the Lake: All the Waterways Lead to Alexandria**

### **Introduction**

Economic and social activities in the Alexandria region were influenced by three main water bodies throughout its history; the Mediterranean Sea, the River Nile and Lake Mareotis, which extended to the south and west of the city. Almost everybody travelled to Alexandria by means of water. From Alexandria, Egypt was very much accessible via Lake Mareotis and the Nile<sup>1</sup>. Ancient Alexandria was located on the north-western edge of the Nile Delta, opposite to, and protected by, a relatively large offshore island, the Pharos Island, which had made the area suitable for being utilised as a harbour since the pre-Hellenistic period<sup>2</sup>. Such a unique location has played a significant role in the foundation and development of the city throughout its history. However, the main privilege of the site of Alexandria was not its location in relation to the sea coast but to the River Nile.

The Nile was the main water body that affected most aspects of life in Egypt. It was the spine of the transport system in Egypt until the early 20th century. Virtually, all movable articles travelled by means of the Nile, which was the principal and cheapest means of internal transport. From Aswan in Upper Egypt to the Nile Delta in the north, a distance of about 1100km, the Nile ran without any substantial obstacles, except for the shoals that were occasionally formed from the accumulation of Nile sediments. Moreover, the river was navigable in both directions, particularly during high flood when protruding rocks and shallows were submerged beneath the water. The water flowed from south to north, enabling river vessels to drift northwards, while boats sailing upstream were aided by the prevailing northerly and the north-westerly winds<sup>3</sup>. Accordingly, the Nile enabled water transport to link virtually all the inhabited areas of the country.

It is known from many historical sources that the ancient Nile Delta had several tributaries that flowed into the Mediterranean Sea. However, during the past two millennia there has been substantial alteration in the number and position of these<sup>4</sup>. Herodotus, the Periplus of Scylax, Diodorus Siculus, Strabo, Pliny the Elder and Ptolemy in addition to several Arab authors, all spoke of these<sup>5</sup>. Yet despite variations in their accounts about the exact number, names, nature and routes of these branches, which indicate that they were in constant change, it is quite clear that most of them were navigable, and that they contributed significant-

<sup>1</sup> CASSON 1994, 257-258.

<sup>2</sup> EL-FAKHARANI 1963; MORCOS 1993; 2000.

<sup>3</sup> SAID 1993a, 45; MOHAMED 2001, 107-118.

<sup>4</sup> SAID 1990; HASSAN 1997.

<sup>5</sup> HAMDAN 1980, 189-206.

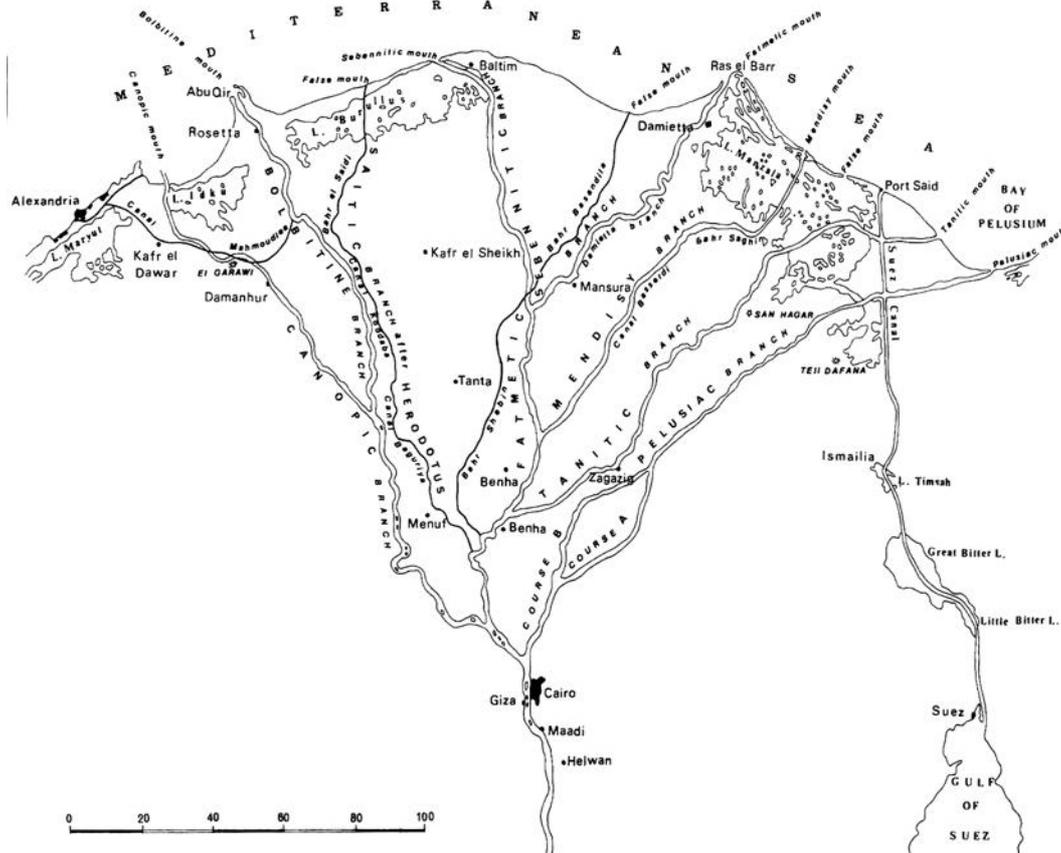


Fig. 1 – The Nile Delta and branches based on Strabo's account (After SAID 1981, 82, fig. 52b).

tly to the development of the internal transport system in Egypt. Moreover, the widest and the most important of them within the internal transport system was the Canopic Branch. This was the westernmost of the Nile Delta distributaries that flowed into the bay of Canopus (present Abukir) east of Alexandria (fig. 1)<sup>6</sup>.

The Canopic Branch of the Nile bifurcated at the head of the Delta and took a westerly route, passing by a number of towns and settlements until it reached the town and harbour of Schedia (present Kom El-Giza) south-east of Alexandria<sup>7</sup>. Here it split into two routes, the main one continuing to Canopus where it discharged, while the secondary route formed what was known as the Schedia Canal, and which flowed towards Alexandria in the north-west (fig. 2). This canal was to play an important role in riverine transport to and from the city during the Hellenistic and Roman periods. It subsequently silted up gradually during the 5th century AD and stopped flowing into the Canopic Bay before the Arabs reached Alexandria in the 7th AD<sup>8</sup>.

Before the foundation of Alexandria, the entrance to Egypt from the Mediterranean Sea was through harbour towns at the mouths of the Nile distributaries, particularly the Canopic Branch. However, large quantities of Nile sediments were discharged into the Mediterranean Sea during the Nile flood every year in the summer months. This meant that harbours located at the Nile mouths were more vulnerable to silting by the deposited sediments, eventually leading to their decline<sup>9</sup>. This was not however the case with Alexandria which was located west of the westernmost branch of the Nile. The eastward long-shore drift, accelerated by

<sup>6</sup> ABD EL-FATTAH & FRIHY 1988.

<sup>7</sup> EL-ZOUKA 1979, 75; EMPEREUR 1998, 225.

<sup>8</sup> SAID 2002.

<sup>9</sup> BLACKMAN 1982, 186.



Fig. 2 – A map of Alexandria by M. Al-Falaki (1866) based on Strabo's description and the survey that Al-Falaki conducted in the city. Note the suggested course of Schedia Canal (After JONDET 1921, pl. XXXVII).

violent winter waves, prevented Nile silt from accumulating along the coasts of Alexandria, by shifting much of the silt deposited at the Nile mouths eastwards<sup>10</sup>; this was a phenomenon that contributed significantly to the flourishing and continuity of Alexandria's harbour.

### **Lake Mareotis and the Canal Network**

Lake Mareotis, precursor of the present Maryut Lake, represented one of the most distinctive geomorphological features in the north-west coast of Egypt during the Holocene period<sup>11</sup>. It was, and still is, quite unique compared to other lakes along the north coast of Egypt. At present, there are four coastal lakes in Egypt; they are from east to west Al-Manzala, Al-Borolus, Idco and Maryut<sup>12</sup>. All except Maryut Lake were formed as a result of the sea inundating the north coast of the Delta; Maryut was created solely by the Nile<sup>13</sup>.

At present, Lake Maryut is a body of shallow brackish water. It consists of two sections; the main body south of Alexandria and the arm to the west of the city. The former covers an area of about 90km<sup>2</sup> south of Alexandria, with no direct link to the sea<sup>14</sup>. An extensive network of irrigation canals and drainage channels extends across the eastern section of the lake and is considered to be the main source through which the lake obtains its water supply<sup>15</sup>. The canals and drainage channels carry to the lake industrial and domestic wastes from the Alexandria region, as well as agricultural runoff from the cultivated lands to the east and south. The lake also receives water from groundwater seepage and rainfall<sup>16</sup>. The western arm of Maryut Lake is a complex of sabkhas and shallow marshes 35km long and 2-5km wide and is delimited from the north and south by coastal calcareous ridges<sup>17</sup> and it is separated from the lake's main body by a

<sup>10</sup> SESTINI 1989, 102; WARNE & STANLEY 1993, 34.

<sup>11</sup> WARNE & STANLEY 1993.

<sup>12</sup> GOUDA 1994, 67.

<sup>13</sup> SAID 1993b, 69-77.

<sup>14</sup> HEMDAN 1980, 818-841; EL-RAEY ET AL. 1995, 34.

<sup>15</sup> Warne & Stanley 1993, 36.

<sup>16</sup> FRIHY ET AL. 1996, 291.

<sup>17</sup> EL-SAYED & KHADR 1999.

number of causeways, canals and roads. However it is a closed basin with no constant supply of water, as it is fed from groundwater seepage, agricultural runoff and rainfall.

In antiquity, Lake Mareotis was a fresh water lake fed by the Canopic Branch of the Nile. This meant that besides being a fresh water lake it also provided access to the Canopic Branch and hence to the whole of Egypt (Fig. 3). When Strabo speaks of the water supply for the lake he states that '...it is filled by many canals from the Nile, both from above and on the sides'<sup>18</sup>. And on another occasion he speaks of '...several canals, which empty into Lake Mareotis'<sup>19</sup>. The lake was thus fed by means of several canals, which branched off the Canopic Branch of the Nile and flowed into it from the south and east sides. Some of these were navigable<sup>20</sup> enabling merchandise to be easily transported to and from the hinterland. Although these canals were mentioned in a number of ancient sources, there is a considerable degree of uncertainty about their exact number and location and the routes that they followed.

Since Lake Mareotis was indirectly connected to the Nile, the latter determined its water level. Strabo states that '... at the beginning of summer the Nile, being full, fills the lake'<sup>21</sup>. Thus when the Nile flooded the water level in the lake would rise, and when it dropped so did that of the lake. In the flood season when the lake's level rose, it could have threatened to inundate the land around it<sup>22</sup>. Nevertheless, there is no reference in ancient literature to such inundation events, suggesting that an artificial overflow canal was dug between the lake and the sea in order to prevent Lake Mareotis from overflowing and endangering the Alexandria region during periods of flooding. The canals that connected Alexandria's western harbour to the lake could have performed such a function.

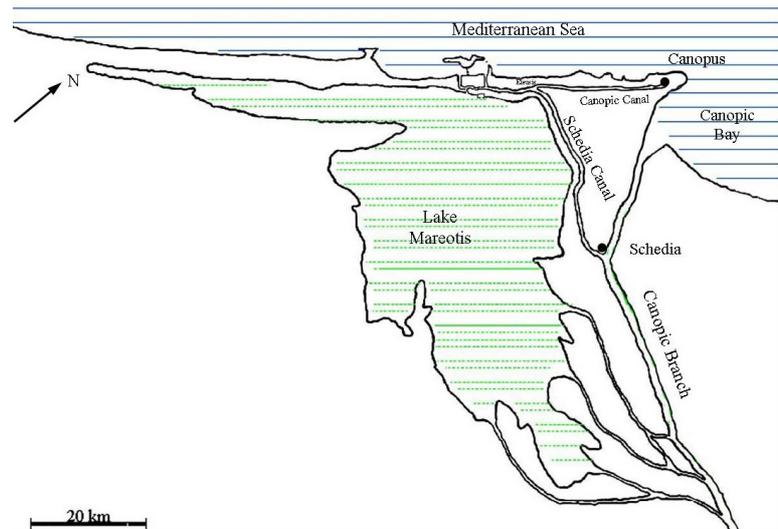


Fig. 3 – A visualisation of the connection between the Nile, Lake Mareotis and the Sea at Alexandria during the Hellenistic and Roman period. Lake Mareotis is fed from the Canopic Branch of the Nile through a number of canals. The Schedia canal bifurcated from the Canopic Branch and flowed towards Alexandria.

Lake Mareotis in antiquity extended far beyond the present limits of Lake Maryut. According to Strabo it had '...a breadth of more than 150 stadia and a length of less than 300'<sup>23</sup>. Many scholars<sup>24</sup> believe that Strabo was using the Alexandrian stade as his unit of measurement, which is about 167m, almost 10m less than the average stade used in other Greek cities. Based on that, the lake's dimensions would be about 25km x 50km. On the other hand, Pliny mentions that the lake was '... 30 miles across and 250 miles in circumference'<sup>25</sup>. Since Pliny expresses the distances in Roman miles – 1 Roman mile = 1.48km<sup>26</sup> – the lake would therefore be about 45km across, presumably from north to south, which is not that different from the figure that Strabo provides for the length of the lake. Pliny also suggests that the lake is about 370km in circumference. On the other hand, according to a recent sedimentological and petrological study of the

<sup>18</sup> STRABO 17.1.7.

<sup>19</sup> STRABO 17.1.22.

<sup>20</sup> STRABO 17.1.22.

<sup>21</sup> STRABO 17.1.7.

<sup>22</sup> DE COSSON 1935; EL-ZOUKA 1979, 98, 101.

<sup>23</sup> STRABO 17.1.14.

<sup>24</sup> AL-FALAKI 1966, 186; EMPEREUR 1998, 57; 2002, 15.

<sup>25</sup> PLINY 5.11.63

<sup>26</sup> HUMPHREY ET AL. 1999, xxiv.

north-west Delta region, which involved an attempt to define the extent of Lake Mareotis<sup>27</sup>, the circumference of the Lake was estimated at c. 360km, a figure that is very close to that given by Pliny.

In the early 5th century AD St. Palladius writes that he sailed across Lake Maria<sup>28</sup> that extended between Alexandria and the monastic settlement of Mount Nitria<sup>29</sup> in a day and half. This sailing trip would have extended between the northernmost limit of the lake south of Alexandria, to its southernmost navigable limit, with the direct distance between Alexandria and Mount Nitria being about 60km. It is thus quite possible that the navigable distance across Lake Mareotis from north to south was in the region of 50km. The western arm of the lake, on the other hand, which was c. 3km wide from north to south, ran parallel to the coastline and was separated from it by a calcareous ridge that ran for 40km to the west of Alexandria.

As mentioned earlier, Lake Mareotis was fed indirectly from the Canopic Branch of the Nile through canals that approached the lake's main basin from the south and the east. In other words, the lake had an indirect connection to the Nile through these canals. Therefore the main basin of the lake had the advantage of not being affected by large quantities of Nile sediments since these canals would have carried only a fraction of the sediment load of the Canopic distributary<sup>30</sup>. As a result, the main body of Lake Mareotis remained deep enough to enable relatively large boats and barges to sail on it. The central area of the main basin of the lake was the deepest part, while its coasts were subject to a number of factors that resulted in their instability.

The sediment that was carried by the canals that fed the lake, particularly during periods of flood, was deposited on the eastern and southern coasts of the lake, making these areas most vulnerable to silting. The accumulation of sediments on the relatively shallow coasts of the lake gradually reduced their depths and eventually led to them being merged with the western Deltaic region. On the other hand, since the western arm of the lake was relatively far from any possible effect of Nile sediments, it was more stable than the main basin. Moreover, its extent has not changed significantly since the Hellenistic and Roman periods.

The relationship between Lake Mareotis and the Nile terminated by 12th century AD due to the silting of the Canopic Branch and all the canals that had fed the lake<sup>31</sup>. As a result the supply of fresh water to the Alexandria region diminished and the level of Lake Mareotis fell, so that the lacustrine depression became a series of salty marshes and sabkhas. Mareotis thus became a closed lagoon without a constant supply of water, and due to increasing evaporation, its size decreased significantly and the once-rich fertile regions to the south and west of Alexandria disappeared<sup>32</sup>. It was not until 1892 when the major irrigation projects in the western Delta were established, that the depression started receiving agricultural runoff and irrigation water carried by a number of canals and drains, filling the depression and creating the present Maryut Lake<sup>33</sup>.

While the Nile enabled riverboats to travel through Egypt along a north-south axis in antiquity, the situation in the Delta was quite different. The river and its main distributaries were not adequate to provide access to the whole Deltaic region so that there was always a need for artificial canals to supplement the river's natural waterways<sup>34</sup>. On the other hand, with the annual flood regime, constant human effort was required to maintain a reliable supply of irrigation water. Accordingly, canals were built in Egypt for different purposes: irrigation, drainage, overflow, navigation and multi-purpose canals. They were always a fundamental part of the Egyptian economic and transport systems, particularly in the Delta<sup>35</sup>.

Under the Roman administration in particular, special attention was paid to both irrigation and navigation canals, in order to guarantee a reliable supply of Egyptian grain. It is suggested that Augustus set

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<sup>27</sup> WARNE & STANLEY 1993.

<sup>28</sup> *Historia Lausiaca* 7.1.

<sup>29</sup> Present day Al-Barnugi village (DE COSSON 1935, 152-153; BAGNALL 1993, 20-22).

<sup>30</sup> Warne & Stanley 1993, 53.

<sup>31</sup> SAID 2002.

<sup>32</sup> WARNE & STANLEY 1993, 58.

<sup>33</sup> FRIHY *ET AL.* 1996, 291.

<sup>34</sup> CHARLESWORTH 1974, 18-20.

<sup>35</sup> BUTZER 1976, 46; WHITE 1984, 110-112; WIKANDER 2000, 321.

his soldiers to work in maintaining and clearing canals that had fallen into decay under the late Ptolemies<sup>36</sup>. Thus the main canal infrastructure was largely in place when the Romans arrived, although it required maintenance and repair. Strabo states that: '...the whole Delta has become navigable, canals on canals having been cut, which are navigated with such ease that some people even use earthenware ferry-boats'<sup>37</sup>.

The main canal in this system was the Schedia Canal, also known as the Alexandria Canal<sup>38</sup>, which deviated off from the Canopic Branch of the Nile at the town of Schedia, which currently houses the villages of Kom El-Giza, Kom El-Nashw and Kom El-Hamam, some 30km south-east of Alexandria<sup>39</sup>. While the Canopic Branch continued northwards to flow into the Canopic Bay, the Schedia Canal turned north-west towards Alexandria<sup>40</sup>. Strabo describes Schedia as: '...the station for paying duty on the goods brought down from above it and brought up from below it; and for this purpose, also, a schedia (float) has been laid across the river, from which the place has its name'<sup>41</sup>.

Also there was a large garrison stationed in the area<sup>42</sup>. Accordingly, Schedia was the main Nile emporium, customs harbour and checkpoint east of Alexandria, where custom duties were imposed on imported and exported goods<sup>43</sup>. Moreover, it seems that the Canopic Branch at Schedia, which was about 250m wide<sup>44</sup>, was obstructed by some kind of a pontoon that prevented boats from sailing past it until duties were paid on merchandise travelling both ways. Additionally, it was at Schedia where exported commodities brought from upriver were transferred from large Nile boats to smaller boats that could travel easily through the canals to Alexandria<sup>45</sup>.

As it approached towards Alexandria, the Schedia Canal bifurcated into two branches at the Alexandrian suburb of *Eleusis* (El-Nozha). The first branch turned towards the north-east leading to Canopus, east of Alexandria, while the other branch continued south of Alexandria and parallel to the lake's northern shore, until flowed out into the western harbour<sup>46</sup>. However when Strabo speaks of this canal<sup>47</sup>, he makes it clear that it flowed into Lake Mareotis at a point located outside the city rather than extending until the western harbour. Accordingly, by the time of Strabo, it seems that the Schedia Canal flowed into the lake south-east of Alexandria. Thus the extension of the outflow of the canal into the western harbour was a later development although there is little evidence for the exact date.

In addition to the Schedia Canal, which extended in an east-west direction, other canals played the vital role of connecting Lake Mareotis and Schedia Canal south of the city, to the seaports of Alexandria, in other words traversing the city from the south to the north. However, the exact number, dates of construction and courses of these canals are not clearly defined in the ancient sources, leaving considerable room for speculation<sup>48</sup>.

The first of these transversal canals extended between the lake and the western harbour of Alexandria. Its seaward outlet lay in the vicinity of an artificial basin, which Strabo<sup>49</sup> calls the *Kibotos*, or 'box-shaped', and which was located inside the western harbour (fig. 4). However he does not give this canal a name, calling it only a navigable canal. It also seems that at his time the Kibotos Canal had no connection with

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<sup>36</sup> LEWIS 1983, 111; ALSTON 1995, 79.

<sup>37</sup> STRABO 17.1.14.

<sup>38</sup> EMPEREUR 1998, 130-131.

<sup>39</sup> BERGMANN & HEINZELMANN 2005.

<sup>40</sup> LINDSAY 1968, 127.

<sup>41</sup> STRABO 17.1.16.

<sup>42</sup> BERGMANN & HEINZELMANN 2003.

<sup>43</sup> EMPEREUR 1998, 225.

<sup>44</sup> BERGMANN & HEINZELMANN 2005.

<sup>45</sup> PROCOPIUS 6.1.3; HAAS 1997, 365, n. 13.

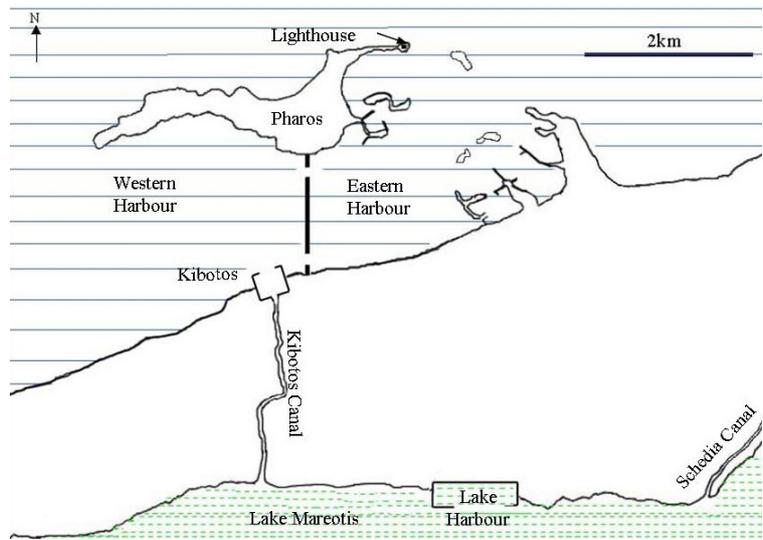
<sup>46</sup> BRECCIA 1914, 67; AL-FALAKI 1966, 145-147.

<sup>47</sup> STRABO 17.1.16.

<sup>48</sup> RODZIEWICZ 1983, 200.

<sup>49</sup> STRABO 17.1.10.

Fig. 4 – The harbours of Alexandria by the time of Strabo (25BC). The Schedia Canal flowed into Lake Mareotis at a point located outside the city, while the Kibotos Canal was the only link between Lake Mareotis and Alexandria seaports.



Schedia Canal, but that it was a separate stretch of water that cut through the western side of Alexandria carrying traffic between the lake and the sea. However, ancient documents are obscure about the location of the point where this canal enters the Lake Mareotis<sup>50</sup>. Nonetheless during the Napoleonic campaign in Egypt, Le Père<sup>51</sup> was able to investigate the remains of a tributary lying to the south-west of the hill of the Serapeion in Alexandria (Kom Al-Shoqafa) that could have linked the Kibotos Canal and Lake Mareotis (fig. 5). Thus all Alexandrian imports and exports had to pass through this canal since it was the only link between the harbours and the internal transport system. River vessels would have travelled along the Schedia Canal until they reached Lake Mareotis, and would then have travelled across the lake until they entered the Kibotos Canal to reach the western harbour of Alexandria.

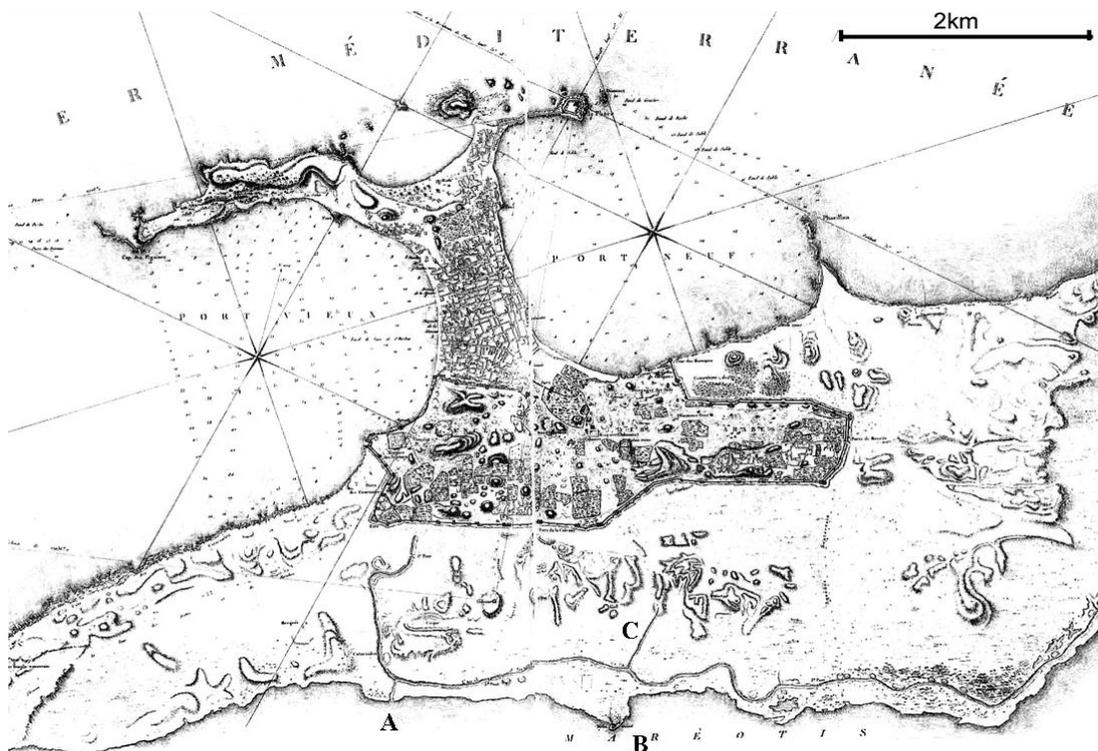


Fig. 5 – Alexandria and the course of the Canal which flowed south of the city. Note the location of a tributary (A) that could have linked the Kibotos Canal and Lake Mareotis. Also note the location of the remains of harbour quays (B) on the lake about 2km east of the tributary. The map also shows what could be the remains of the Neapolis Canal (C) that linked the Schedia Canal to the Eastern Harbour. (Modified from *Description De l'Égypte*, Vol. II, pl. 84, after NÉRET 1997: 658).

<sup>50</sup> FRASER 1972, II. 79-80, n. 184.

<sup>51</sup> 1809, 322.

This canal was re-Roman in origin since a 3rd century BC document implies that merchandise was carried through it from the lake to the sea<sup>52</sup>. However, with the dramatic increase of exports from Egypt under Roman administration, the Kibotos Canal was not sufficient to handle the large number of riverboats shuttling between the Nile and the harbours of Alexandria. There was therefore a substantial change in the network of Alexandrian canals, and therefore in its seaports, in the Augustan period.

Two bilingual inscriptions in Greek and Latin found in Alexandria state that in 10/11 AD Augustus '...led a canal called Sebastos from Schedia through the entire city'<sup>53</sup>.

While these suggest that Augustus constructed a new canal that cut through Alexandria, Breccia<sup>54</sup> and Fraser<sup>55</sup> believe that what Augustus in fact did was to connect the Schedia Canal to the Kibotos Canal transversally thus creating one navigable waterway through which river vessels could travel directly from Schedia to the western harbour without having to sail on the lake. Nevertheless as the Schedia Canal passed to the south of Alexandria and flowed into the western harbour, it flowed outside the walls of Graeco-Roman Alexandria<sup>56</sup> and not 'through the entire city' as the inscription suggests. On the other hand, both Breccia<sup>57</sup> and Fraser<sup>58</sup> believe that another canal, which the latter calls the Neapolis Canal, crossed the city from the south to the north linking between Lake Mareotis and the eastern harbour. This would allow grain boats heading for Alexandria along the Schedia Canal to pass through it in order to deliver their shipments at the central granaries of the Neapolis in the vicinity of the eastern harbour. It is thus reasonable to suggest that the inscription mentioned above records the building of a canal that connected the Schedia Canal to the eastern harbour; the main centre for maritime activities in Roman Alexandria, rather than a transversal link between the Schedia and the Kibotos Canals. In any event it seems feasible to suggest that the network of canals at Alexandria was completed during the early Roman period, and that it was a network that linked the Nile, through the Schedia Canal, to both Lake Mareotis and the sea<sup>59</sup>.

### ***Navigation in the Lake***

As mentioned earlier, Lake Mareotis was fed from the Nile by a number of canals, which approached it from the south and south-east<sup>60</sup>. The exact number and location of these canals is unknown and it is likely they changed through time as a result of the general instability of the Western Delta. Pliny states that 'Lake Mareotis, which lies on the south side of the city, carries traffic from the interior by means of a canal from the Canopic mouth of the Nile'<sup>61</sup>. It is therefore evident that some of these canals were navigable in the Roman period, and they were used for moving between the lake and the Nile. Accordingly river traffic heading from the Nile to Alexandria, either travelled through the Schedia Canal to Alexandria, or entered the lake through one of the other canals and thence to Alexandria. However there must have been specific parameters that would have made the owners of riverboats choose one route over another. To better understand this there follows a discussion of the factors that influenced navigation on Lake Mareotis in the Graeco-Roman period.

The first of these are the environmental parameters that governed sailing on the lake. Travelling on Lake Mareotis from the south or south-east to Alexandria would have meant sailing against the prevailing wind. Given the great size of the lake this would not have been impossible, with sailing vessels being able to tack during their northward journey; it would, however, have taken them as much as three or four times as

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<sup>52</sup> FRASER 1972, I. 144.

<sup>53</sup> FRASER 1972, II. 80, n. 184; EMPEREUR 1998, 131.

<sup>54</sup> BRECCIA 1914, 68.

<sup>55</sup> *IBID.*

<sup>56</sup> AL-FALAKI 1966, 64-66; EMPEREUR 1998, 53.

<sup>57</sup> *IBID.*

<sup>58</sup> FRASER 1972, II. 79, n. 184.

<sup>59</sup> HAAS 1997, 348.

<sup>60</sup> STRABO 17.1.7.

<sup>61</sup> PLINY 5.11.63.

long as it would have done with favourable winds<sup>62</sup>. The return trip, on the other hand, would have been easy and relatively fast.

The second factor that influenced vessels travelling on the lake was security and control. Piracy was rife in Lake Mareotis throughout the Hellenistic and Roman periods<sup>63</sup>. The marshes and islands of the lake provided excellent hideouts for groups of bandits and their vessels<sup>64</sup>. Also, the large extent of the lake made it quite difficult to guard and control. Accordingly if the river vessels were carrying items that had to go through the checkpoint of Schedia to be taxed or transferred into smaller boats, such as grain or products from India and East Africa, it would have been necessary to sail along the Canopic Branch to Schedia and then along the canal to Alexandria.

We have no clear evidence of the exact routes plied by specific types of river vessels. However it seems feasible that most of the traffic bound northwards to Alexandria followed the Schedia Canal. On the other hand, most of the southbound traffic, such as vessels carrying products imported from the Mediterranean, could have crossed the lake to avoid any possible congestion in the Schedia Canal. However, it is worth noting that travelling on the Schedia Canal from east to west would have been against the prevailing north-westerly winds. This probably required laden vessels to be towed by men walking along the sides of the canal or by oared vessels.

The system of harbours at Alexandria included not only the two basins on its seaward frontage but also an internal harbour on Lake Mareotis. Strabo states that '...the harbour on the lake was, in fact, richer than that on the sea'<sup>65</sup>, a statement which has been interpreted as describing the Alexandria Lake Harbour that existed south of the city as being busier than the seaports of Alexandria throughout the Hellenistic and Roman periods. However there is an important point that is worth considering when examining Strabo's statement. It is that at his time the Schedia Canal actually flowed into the lake south of Alexandria, which means that all northbound traffic passing through Schedia Canal would have entered the Lake Harbour before moving onwards through the Kibotos Canal and into the western Harbour. Moreover the Lake Harbour probably also received vessels carrying such Egyptian products as wine, papyrus and textile. These would have been shipped to Alexandria from settlements and production centres along the shores of the lake, and from there these products were dispatched onwards to the city for local consumption or for trade. Finally, the Lake Harbour would have been the departure point for river vessels in their southbound journey from Alexandria through Lake Mareotis. While the size and facilities of the Lake Harbour must have been substantial to have handled all this traffic, no traces of them have yet been discovered.

### ***The Lake Mareotis Survey Project***

It is evident that Lake Mareotis contributed significantly to the economy of Alexandria and Egypt as a whole during the Hellenistic and Roman periods. Not only was it a vital maritime link between the Mediterranean Sea and the Nile, but also it is known to have supported various agricultural and industrial activities around its shores. Therefore archaeological investigation has been carried out along the shores of the lake for years. However the role played by Lake Mareotis in the economy of ancient Alexandria has never been fully appreciated. Previous archaeological research conducted along the shores of Lake Mareotis has been largely limited to specified areas and specific issues, such as the investigation of Marea and Taposiris Magna<sup>66</sup> and the production of amphorae in the Mareotis region<sup>67</sup>. Accordingly, substantial areas along the shores of Lake Mareotis remained unexplored and the relationship between the Mareotic region and

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<sup>62</sup> WHITE 1984, 154.

<sup>63</sup> ACHILLES TATIUS 4.12; HELIODORUS 1, 14.

<sup>64</sup> HAAS 1997, 37.

<sup>65</sup> STRABO 17.1.7.

<sup>66</sup> EL-FAKHARANI 1974; 1983; PETRUSO & GABEL 1982; RODZIEWICZ 1990; 1998; 2003.

<sup>67</sup> EMPEREUR & PICON 1986; 1992; 1998.

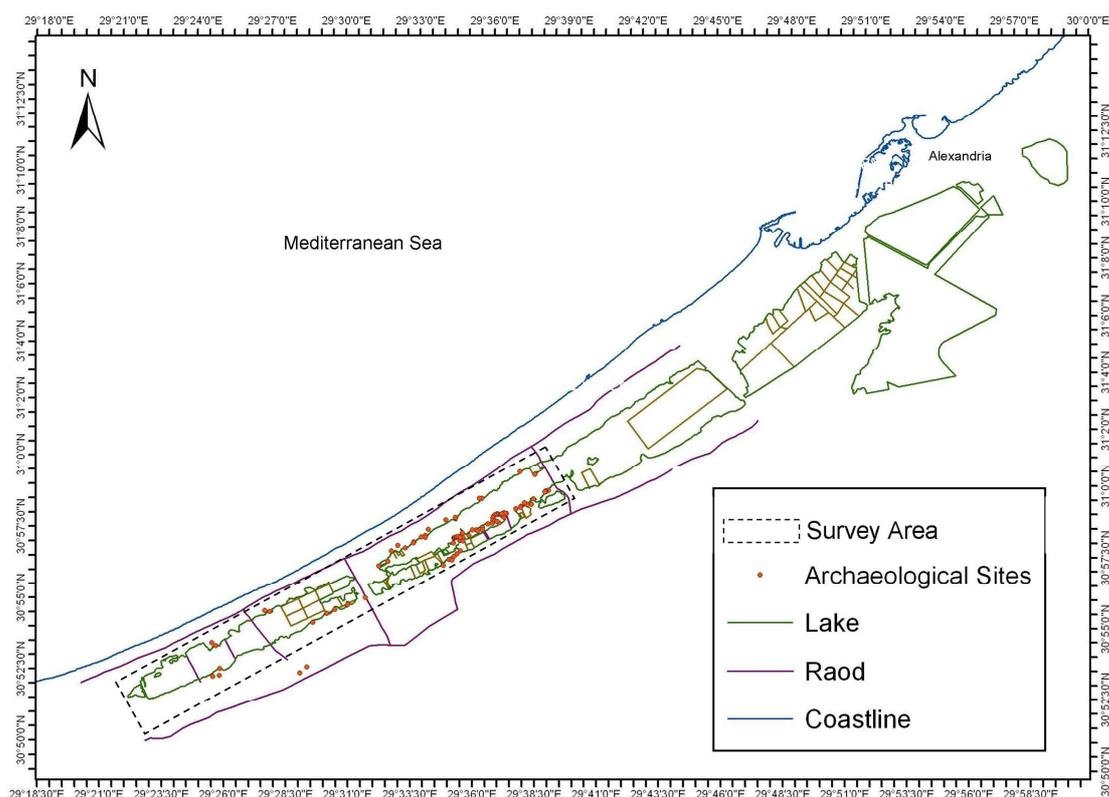


Fig. 6 – The current extent of Lake Mareotis. The survey covered the shores of the western arm of the lake. Note the archaeological sites discovered during the survey.

the Alexandria harbours system has never been investigated in a comprehensive manner. Therefore, between 2004 and 2009 a systematic archaeological survey was carried out along the northern and southern shores of the western arm of Lake Maryut, to the west of Alexandria, in order to comprehensively understand a vital part of Alexandria's hinterland and its relationship to the ancient city's economic system<sup>68</sup>. This western arm of the lake reflects the extant remains of the original lake that have not been subject to dramatic change since antiquity (fig. 6).

The survey resulted in the discovery and recording of more than seventy archaeological sites, which range in date from the early Hellenistic to the late Roman periods and attest to the intense occupation of the western arm of Lake Mareotis during the Graeco-Roman period. The sites discovered included waterfront installations, such as quays and jetties which were associated with residential areas as well as zones of industrial and economic activity (fig. 7). Another type of coastal structure took the form of several multi-roomed buildings that could have been used for storage purposes or as workshops. Many of these have undergone different phases of construction and some of them were used for an extended period of time, probably from the Hellenistic to the Late Roman period. There were also industrial and domestic sites, such as those involved in the production of amphorae. An early Roman amphora kiln together with numerous mounds of Hellenistic and Roman amphora wasters were recorded along the shores of the western Mareotic arm. In addition, several wineries, mostly of late Roman date, were located on land set back from the shore (fig. 8). Last, but not least, there were numerous traces of installations involved in water management throughout the Mareotic region, including the remains of wells, cisterns and animal driven water-wheels (Sakkia) (fig. 9).

<sup>68</sup> The survey was a joint project between the Centre for Maritime Archaeology of the University of Southampton and Department of Underwater Archaeology of the Egyptian Supreme Council for Antiquities.



Fig. 7 – The eastern quay of a box-shaped harbour that was recorded on the southern shore of the lake. This harbour appears to have gone through several phases of use, however, its original date is not established (Photo by E. Khalil).



Fig. 8 – An early Roman winery on the southern shore of Lake Mareotis. (Photo by E. Khalil).

The shores of the main body of Lake Mareotis also contained many towns and settlements in antiquity, which are now totally landlocked and located within the cultivated areas of the western delta. These settlements would have been the focus of human activity along the eastern and southern shores of the lake. However, these areas would have been affected by Nile sediments deposited through the canals particularly during the flood season. Archaeological remains at these sites included several wineries, baths and millstones, while the pottery samples collected provided evidence for activity ranging from the Ptolemaic through to Late Roman periods. These sites could have functioned as centres for the production of vines, linen, papyrus, grain and other crops<sup>69</sup> used in Alexandria. Nevertheless it seems reasonable to suggest that the western Mareotic arm, rather than the shores of the lake itself, was the main provider of products to Alexandria. Therefore commercial traffic from east to west across Lake Mareotis was probably more intense and more regular than that from north to south.

### ***Alexandria: The Crossroads***

Alexandria was neither an agricultural nor an industrial city, and its economy was primarily based on commerce, administration and the services that the city and its harbours provided for internal

and overseas transport<sup>70</sup>. Moreover, it is evident that the countryside played an inevitable role in the economy of ancient Alexandria during the Hellenistic and Roman period. Commercial activities in Alexandria were directly related to agricultural and industrial activities that took place in the countryside. The continuous

<sup>69</sup> WILSON 2008.

<sup>70</sup> LUKASZEWICZ 1998, 109.



Fig. 9 – The remains of one of many water wheels used for lifting water for irrigation purposes and domestic uses.  
(Photo by J. Cooper).

supply of staples, raw materials and manufactured products from the countryside to Alexandria was vital for the survival of the city itself, as well as for its commercial role as an *entrepôt* for trade<sup>71</sup>. One of the main regions that supplied Alexandria with agricultural and industrial products for the city's local consumption, as well as for external trade, was the Mareotic region. This has been attested by evidence for large-scale industries that took place around Lake Mareotis, and the several maritime installations that existed along the shores of the Mareotic arm.

Alexandria not only received products for local consumption from its hinterland, but also for transshipping to other Mediterranean harbours. Probably the most significant of the latter during the Roman period was Egyptian grain. Thousands of tons of grain-tax travelled annually through the Nile to Alexandria to be shipped to Rome during the early Imperial period<sup>72</sup>. In addition to the Egyptian products and tax grain that were shipped to Alexandria, quarried stones from the Egyptian Eastern Desert<sup>73</sup> were carried on boats down the Nile to Alexandria and from there were loaded on to seagoing vessels which carried them to other Mediterranean ports.

Alexandria also received valuable imports from Arabia, East Africa and India, such as incense, ivory, gems, spices, tortoise shell and silk<sup>74</sup>. The *Periplus Maris Erythraei*, generally considered to have been written in the 1st century AD, mentions that ships sailing from Egypt to Africa and India departed from and

<sup>71</sup> BOWMAN & RATHBONE 1992, 125.

<sup>72</sup> RICKMAN 1980, 231-235.

<sup>73</sup> PEACOCK 1992, 5-7; 2002, 426-427.

<sup>74</sup> CHARLESWORTH 1974, 58-64; YOUNG 2001, 38-79; PEACOCK 2002, 432-433.

returned to the harbours of Myos Hormos and Berenike on the Egyptian Red Sea coast<sup>75</sup>. When they arrived, the eastern commodities were offloaded and transported across the Eastern Desert by beasts of burden to the Nile town of Coptos. Here they were loaded onto Nile boats which transported them down-river to Alexandria. Of the various eastern imports, a small amount remained in Egypt while the greater part was transhipped from Alexandria to Rome and other Mediterranean harbours<sup>76</sup>. Alexandria not only imported products meant for transshipment to the Mediterranean, but also received merchant vessels from the Mediterranean laden with products such as wine, oil and metals intended for local consumption and for trade with the East<sup>77</sup>.

It is thus evident that Alexandria functioned as an entrepôt for an extended maritime trade network which involved the internal and external transport of different products and commodities. By looking at the transport system that focused upon Alexandria, and by addressing the city's maritime capacity, it becomes evident that one of the main factors that influenced Alexandria's unique status as a crossroads for maritime transport, particularly in the Roman period, was that it was integrated into a network of internal waterways which enabled goods to be transported between Alexandria and the interior of Egypt. Therefore the indirect link between Alexandria and the Nile, by means of a series of canals and the Lake Mareotis, influenced the economic potential of the city throughout its history.

In AD 102 the Greek orator Dio Chrysostom visited Alexandria and spoke of its merits and advantages, and how it was perceived by traders and travellers of the early Imperial period. He stated that: '...not only have you a monopoly of the shipping of the entire Mediterranean by reason of the beauty of your harbours, the magnitude of your fleet, and the abundance and marketing of the products of every land, but also the outer waters that lie beyond are in your grasp, both the Red Sea and the Indian Ocean, whose name was rarely heard in former days. The result is that the trade, not merely of the islands, ports, a few straits and isthmuses, but of particularly the whole world is yours. For Alexandria is situated, as it were, at the crossroads of the whole world, of even the most remote nations thereof, as if it were a market serving a single city'<sup>78</sup>.

**Emad Khalil**

Centre for Maritime Archaeology  
Faculty of Arts  
Alexandria University  
Hussein Sobhi Street  
El-Shatbi 21526  
Alexandria  
Egypt

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<sup>75</sup> CASSON 1989, 13.

<sup>76</sup> CASSON 1989, 13.

<sup>77</sup> CASSON 1980; 1991, 162; PEACOCK 2002, 432-433.

<sup>78</sup> DIO CHRYSOSTOM 32.36.

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