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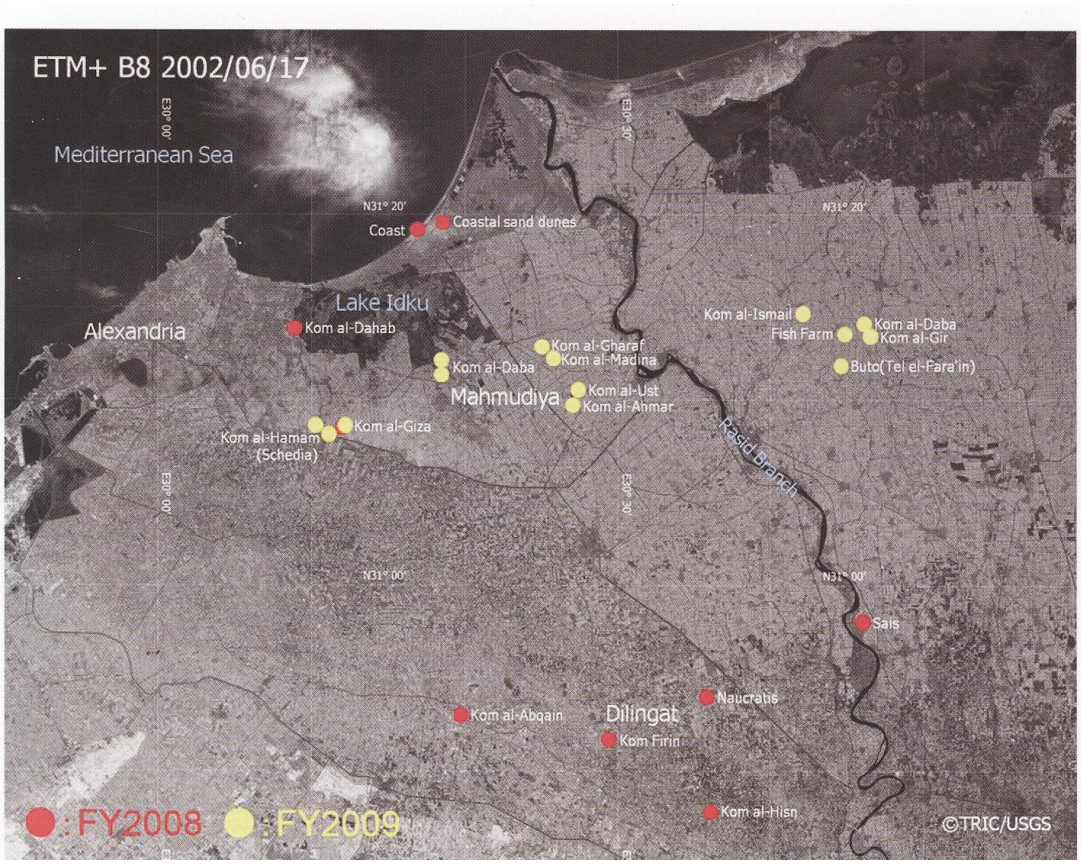
PHYSICAL GEOLOGY AND HISTORICAL SETTLEMENT IN NORTH WESTERN NILE DELTA REGION, EGYPT



PROF. EL-SAYED ABBAS ZAGHLOUL

R & D PROJECT REPORT

JANUARY, 2013, CAIRO

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I- INTRODUCTION

The present work has been carried out to different degrees in different places. Some sites were visited and, because there was nothing clearly visible there, little information was gathered. In some cases, drill cores were also made in transects across the area in order to locate and define the Canopic Branch of the Nile.

The work aimed to obtain basic information in which could be mapped and integrated with other data from published and unpublished sources to create a picture of settlement patterns, the dynamics of riverine settlement and the relationships between groups of towns over a large area. The work is preliminary in nature in order to begin to build models for the development of settlements in the North Western Delta (Fig. 1-a & 1-b). As a by-product it has also identified places with potential for future work.

The survey has two mains aims. The first is to provide a regional context for the major site at West Delta region, that is, to examine its relationship with other places in the Western Delta. The second aim is to look at individual places and their relationship to their ancient environment.

It is likely that the Canopic Branch of the River Nile in the Western Delta supported and provided a communication network for many towns and villages, but that when the branch dried up, those settlements could no longer sustain the same kind of existence.

This report consists of the following main chapters:-

- Chapter II, dealt with the climatic conditions in the study area
- Chapter III, is dealing with physical parameters mainly the topography and the geomorphic features
- Chapter IV, is dealing with the geological setting such as the stratigraphy (surface and subsurface), tectonic setting and the seismic activities.
- Chapter V, dealing with the brief description to about 50 archaeological sites known and distributed in the area under consideration.
- Chapter VI, presents the result of different drilling projects in order to detect the defunct of the Ancient Canopic Nile Delta Branch and the old settlements.

The survey was carried out within the framework of cooperation with Prof. So Hesagawa (Waseda University in Japan) and the Supreme Council of Antiquities in Egypt (SCA).

Special thanks are due to Professor Zahi Hawass, the Ex-General Secretary of the SCA, and SCA staff especially Dr. Nagy Nageib, Mr. Khaled Farahat for their kind help during the field survey.

Fig. 1a - Location map for the study area

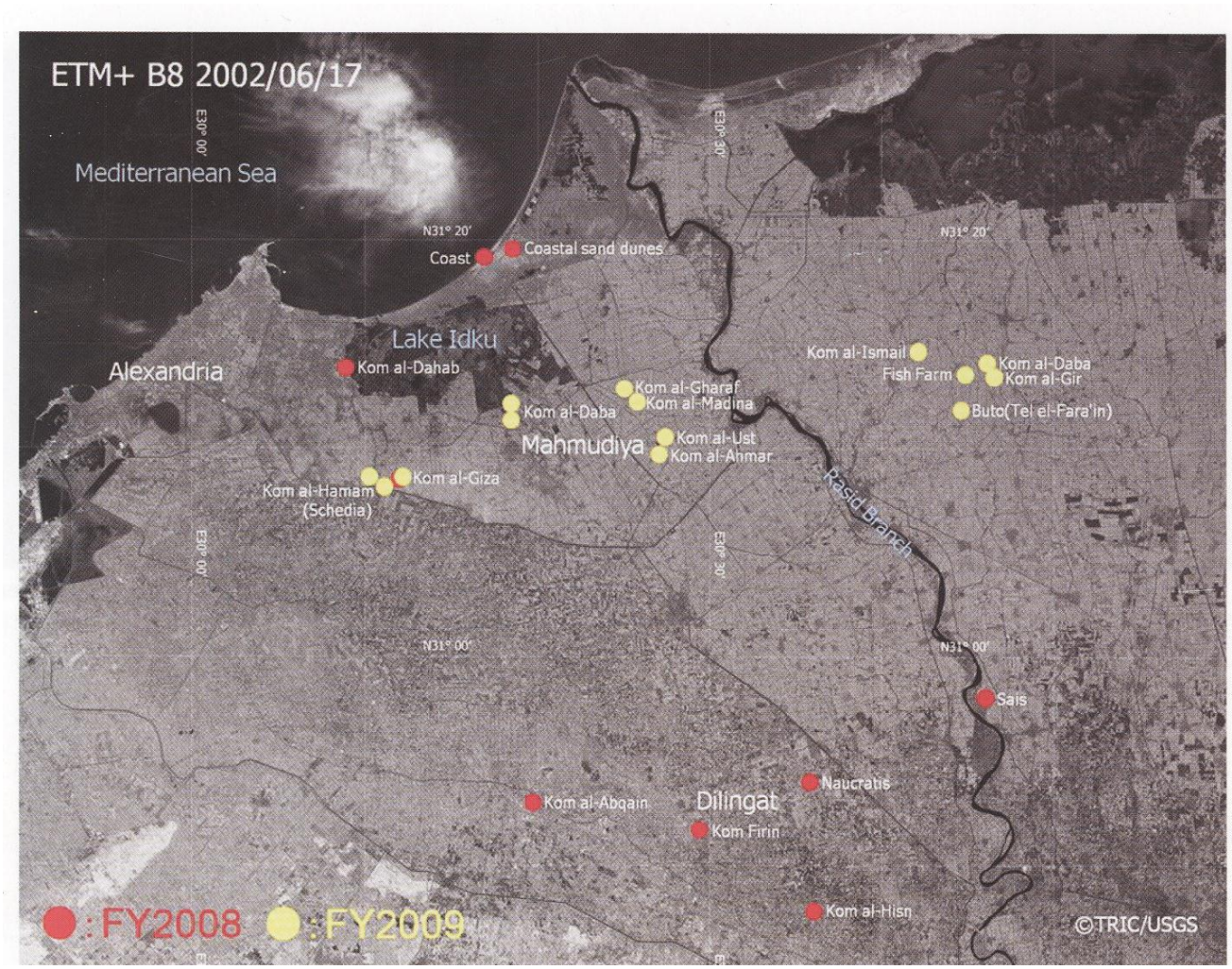


Fig. 1-b – Satellite image showing the study area

II- CLIMATIC CONDITIONS

The climate in study region is one of the mildest of the Mediterranean Sea .Winter temperature are higher than in any other part of the Mediterranean coast. Generally, this climate, however, gradually changes as one moves south and at about 40 to 50 km. inland, merges into Mediterranean Saharian climate. As far the area occupies a portion of the Mediterranean zone, it has a special climate which differs from the inland areas. It characterized by a comparatively high humidity, frequent dew formation and small diurnal temperature variations.

The following is a summary about the climate prevailing along the study area.

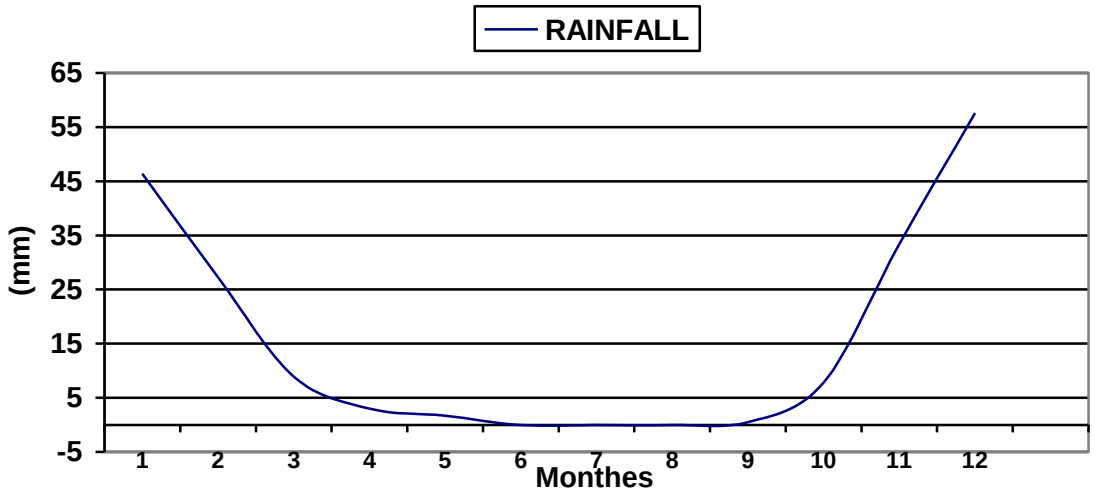
II-1- Rainfall:

The average amounts of rainfall observed in Alexandria station ranges between 00 mm. and 57.6 mm. The annual rainfall precipitation in Alexandria is about 181 mm. The rainy season begins during the second half of October. December and January are the rainiest months with an average of 33 mm./ month. Some showers are still observed in March.

The following table (Table 1) shows the average amounts of rainfall observed in Alexandria station.

Table: 1, The average rainfall

Station	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Alexandria	46.4	27.3	8.9	3.0	1.7	0.0	0.0	0.0	0.5	7.8	33.4	57.6	180.6

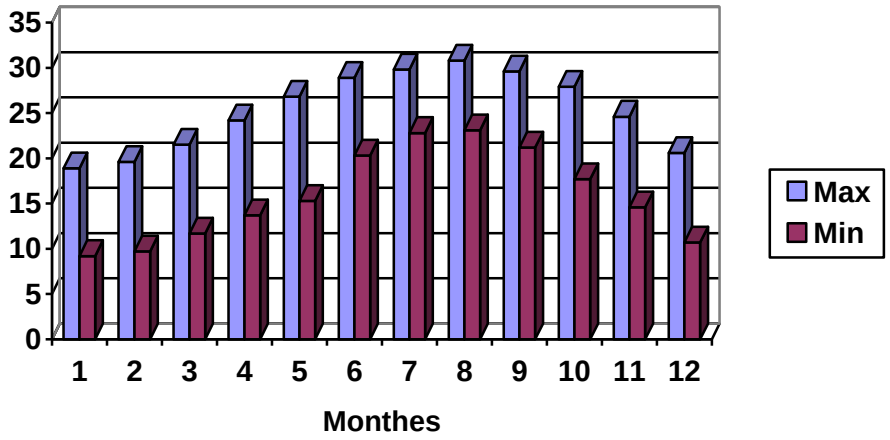


II-2- Air Temperature:

The maximum and mean temperatures recorded in Alexandria station is shown in Table 2. Air temperature could be considered as mild. Mean annual is 25 C, mean annual minimum is 15C, the mean maximum of July is 29 C and the mean minimum of January is 9 C.

Table: 2, Maximum and Mean Air temperature

Station	J	F	M	A	M	J	J	A	S	O	N	D	Ann
Alexandria M	18.9	19.6	21.5	24.2	26.8	28.9	29.8	30.8	29.6	27.9	24.6	20.6	25.3
m.	9.2	9.7	11.7	13.7	15.3	20.3	22.8	23.1	21.2	17.7	14.6	10.7	16.1



II-3- Air Humidity:

Annual mean relative humidity and saturation deficit at 600 UT & 1200 UT are shown in the following table (Table: 3).

Station	Mean % at Humidity % at		Saturate mm Deficit H at	
	0600UT	1200UT	0600	1200 UT
Alexandria	72	55	5.2	10.6

Relative humidity does not vary greatly through the year, staying between 50 – 60 % at none and between 60 – 70 % in the morning and in the evening.

The mean annual saturation deficit ranges between 8 – 11mm Hg at noon and between 5 – 6 mm Hg in the morning.

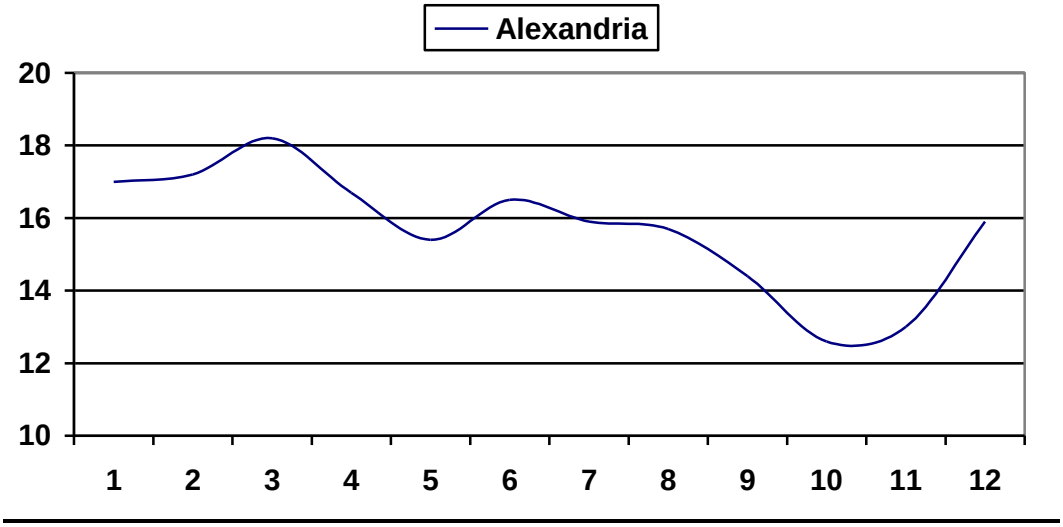
II-4- Wind Speed and Direction:

The Northwest winds prevail with a frequency of 30 – 40%.

Winds in the winter can be strong and stormy. A dry hot south west loaded with sands and dust (Khamasin wind) blows on occasions for three to four days during the spring. During the summer, the wind decreases steadily and in September many calm days.

Table: 4 Average Wind Speed km/hr

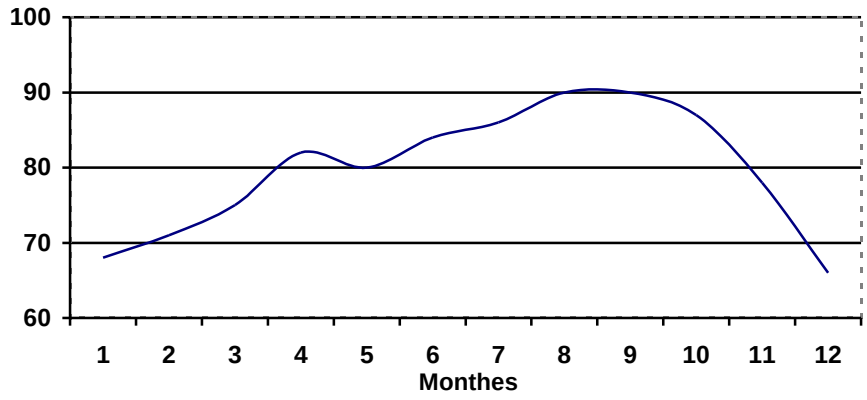
Station	J	F	M	A	M	J	J	A	S	O	N	D	Ann.
Alexandria	17.0	17.2	18.2	16.7	15.4	16.5	15.9	15.7	14.4	12.6	13.0	15.9	15.7



II-5- Sunshine Duration and Solar Radiations:

Bright sunshine duration measured in Alexandria is shown in following table (Table 5).

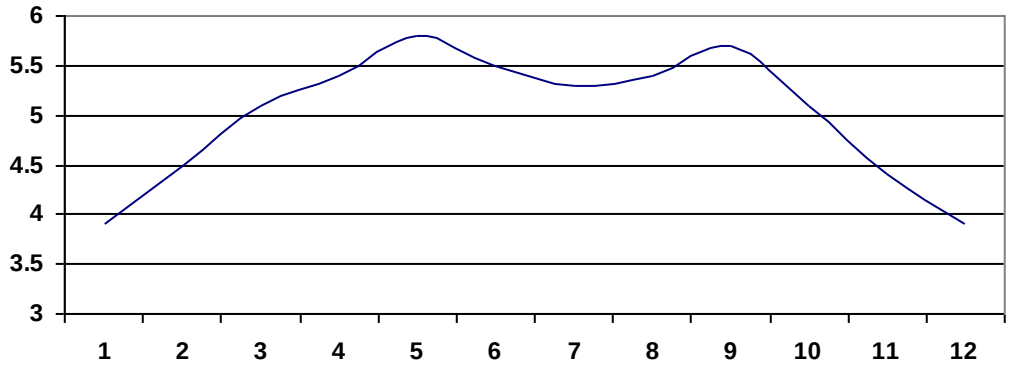
Station	J	F	M	A	M	J	J	A	S	O	N	D	Ann.
Alexandria	68	71	75	82	80	84	86	90	90	87	78	66	80



II-6- Evaporation:

Natural evaporation rate ranges from 3.9 mm/ d in January to 5.8 mm/d in May (Table 6). It means that the evaporation rate is high from March to October and is low in winter season.

Station	J	F	M	A	M	J	J	A	S	O	N	D	Ann.
Alexandria	3.9	4.5	5.1	5.4	5.8	5.5	5.3	5.4	5.7	5.1	4.4	3.9	4.5



II-7- Storms:

The study area as well the coastal zone is generally subjected to 16 storms per year, out of which 7 storms are heavy .These heavy storms (Nawat) usually occur in winter and are accompanied by strong winds and high waves.

Table: 7 Summaries of the Coastal Storms (Nawat)

No.	Local Storm name	Expected Date Of Occurrence	Approximate Duration
1	Nawat El-Saliba	September – 27	3 days
2	Nawat El-Saliba	October - 21	3 days
3	Nawat El- Maknassa	November- 26	3 days
4	Nawat Kassem	December- 4	3 days
5	Nawat El-Fida	December- 26	2 days
6	Nawat El-Ghatas	January - 11	3 days
7	Nawat El- Fida El-Kabira	January - 19	5 days
8	Nawat El-Karam	January - 29	2 days
9	Nawat El-Shams	Febrewary - 8	5 days
10	Nawat El-Hosoum	March - 10	8 days
11	Nawat El- Shams El-Kabira	March - 20	2 days
12	Nawat El- Aowa	March - 25	6 days
13	Nawat El-Khamassin	April - 30	------
14	Nawat El-Nokta	July - 18	------

III- GEOMORPHIC FEATURES

The geomorphology of the Nile Delta can be described according to the following geomorphic land forms:-

III-1- Topography:-

The Nile Delta appears as a triangle shape, its base in the north stretched between Rosetta and Dameitta while its apex in the south. The length of the delta from south to north is about 170 km. its width from east to west is about 220 km. while it covers about 50 ,000 km2. It means that, the delta comprises about 6 % of the total Egyptian lands.

The Nile Delta branches 23 km. north of Cairo at Delta Barrage (El-Qanater El-Khayria) in an area very suitable for the spreading of the deltaic deposits .The river deposits its load in the form of delta because of the gentle gradient accompanying its arrival to the Mediterranean Sea.

Topographically, the area has a very gentle slope toward the coastal shoreline. The elevation ranges from 1- 4 m. above the sea level. From the topographic contour map, we noticed that the contour lines bend southeast ward in the eastern and western parts of the delta, but in central part, the contour lines run in an eastward direction. It means that, the land in the west (Rosetta Branch region) slopes northwest ward (Fig. 2).

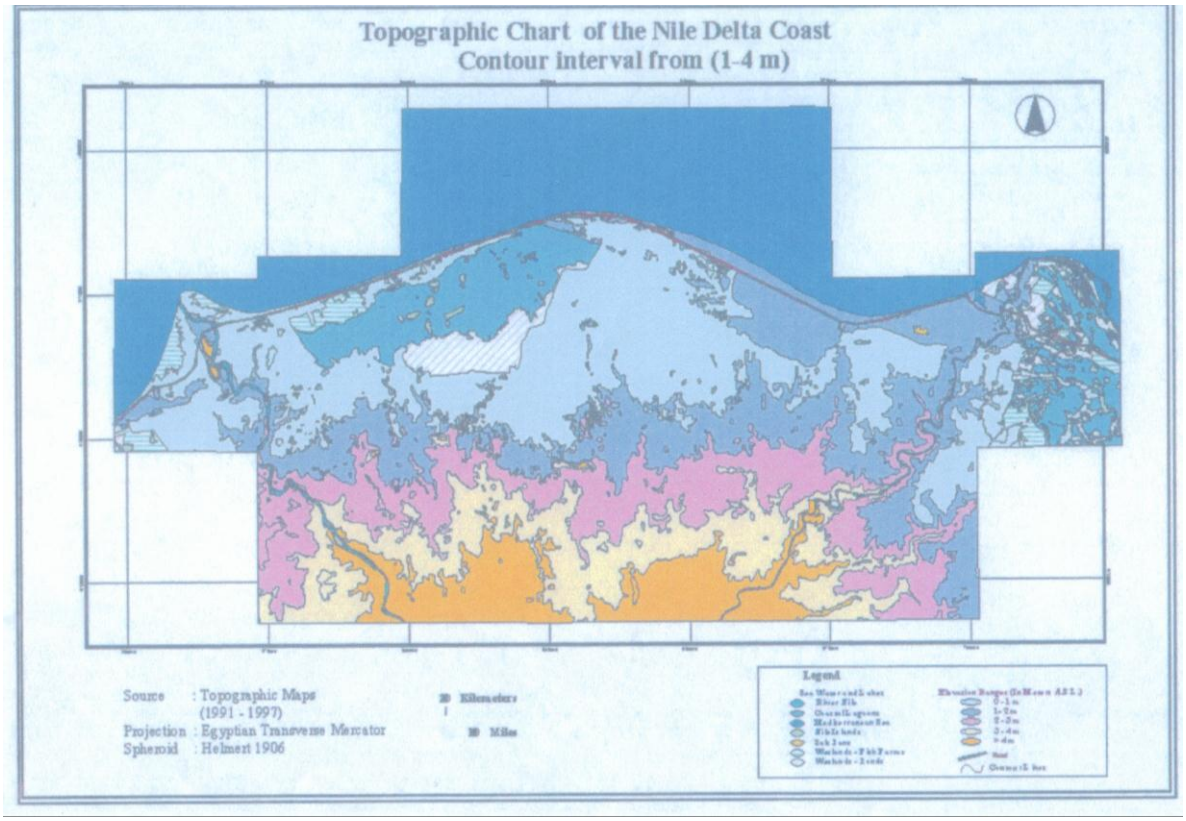


Fig. 2- Topographic map of the northern part of the Nile Delta

III-2- Geomorphic Features:

Several land forms developed along the northern part of the Nile Delta (Fig. 3). The coastal areas do not raise more than 3.0 m.a.s.l, and extend about 10 km. inland. Along the coastal area, several factors acted in the past or are acting at present, such as sea level changes, climatic variations which affected Nile flow and sediment discharge, erosional effect, human activity, prevailing winds and neo-tectonics. Due to the interaction of these various factors, numerous coastal forms developed, producing a unique environmental differing from the rest of the deltaic plain. The main forms are; the coastal plain, the lagoons, the sand dunes and the Barari (wetland) flats.

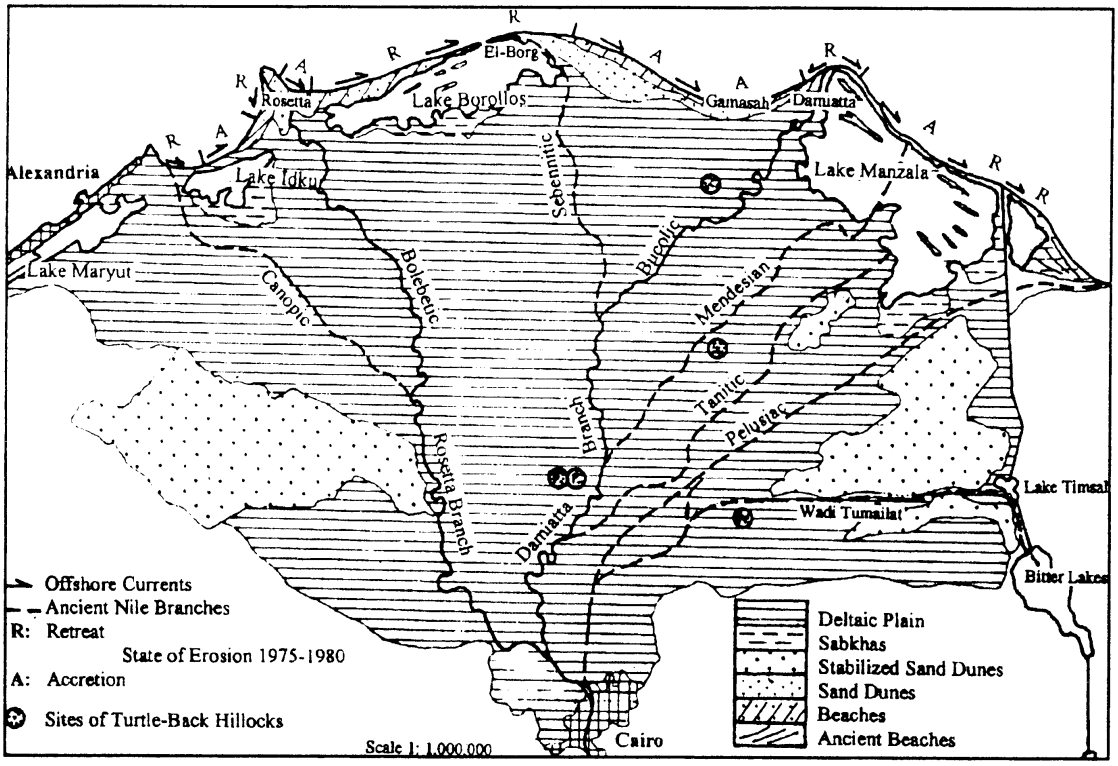


Fig. 3: The main geomorphic features in the Nile Delta
(After Embabi, 2004)

III-2- a- The Coastal Plain:

Although the present coastline is generally convex in outline, it is composed of several concave wide bays and convex promontories. The most notable features of the coastline are sand spit, beaches and cusps. Sand spits are periodically growing at Rosetta and Damietta mouth due to the erosion processes. From the shoreline, flat expanses of beach sand as sandy plains with coastal dunes extend at several localities. These plains are exposed to flooding during winter storm surges leaving traces of former shorelines which are marked by accumulations of marine shells.

III-2-b- The Coastal Dunes:

Coastal dunes are spread along the plain of the Nile Delta at disconnected localities. Dunes are forming a dune field, which is called "North Delta Dune Field ", Embabi, 2000. The dune types vary between simple barchans, complex and deformed barchans, and small linear dunes. The maximum height is about 20m but the most prevailing height is 2-3 m.

There are two generations of dunes: the first is the older and is composed of low, vegetated dunes with reddish silty sand and occur below the recent coastal dunes. Remnants of these older dunes were found on the islands of El-Burullus. The second generation is composed of recent dunes which are lighter in color, higher and sharper than the ancient stabilized dunes. Inter-dune areas appear as innumerable small depressions with flat floor, which are occupied by temporary or permanent ponds in some of them. These ponds are fed by rainwater stored in dune sands and percolate and fill the inter-dune areas. The dunes are gradually disappearing by cultivation and land use. The sands of the Nile Delta Coastal Dune Field originated from the Nile Deposits that were deposited along the northern margins of the Delta (Sestini, 1976 & Gawish, 1988) and rich with heavy minerals (Black Sands). The area of Kom El-Daba represents the southern limit of the dunes (Fig.4) which partly encroached and covered the Nile sediments which forming the Kom itself.

Fig. 4- Sand dune covering the Nile sediments in the form of mound at Kom El-Dabaa

III-2-c- El-Burullus Lagoon:

The Burullus region lies on the eastern side of the Rosetta branch of the Nile River, occupying a central position along the Mediterranean Nile Delta Coast of Egypt. It

extends between longitudes 300 30’ and 310 10’ E and latitudes 310 21’ and 300 35’N. The total area of Burullus region is about 2068km2, includes the water body of the lake. Burullus Lake is considered the second largest lake of the Nile delta, which is about 53km long, 13km wide and has water depths ranging from 0.5 to 2.5m (Frihy and Dewidar 1993). Burullus Lake is connected to the sea at its north-eastern edge through the Burullus inlet, which are about 250m wide and 5m deep.

The northern border is separated from the Mediterranean Sea by a strip of land covered with sand bars and dunes. Seven drains and fresh water canals are connected to its eastern, southern and western shores. The lake barriers are sandy and range from 0.4 to 5.5km in width. They are generally < 1.5m above mean sea level, with beach face slopes ranging between 50 and 130. Low relief backshore and fore dunes characterize the western barrier. The eastern barrier is narrow and backed by coastal barchans dunes. These dunes encroach landward onto a cultivated coastal flat. Generally, the islands subdivided the lake into several basins. The northern and southern margins of the lagoon are subjected to use for fish farming (Aquiculture).

III-2-d- Wetland (Barari) Salt Marshes:

A belt of salt and marshy flats covered with aquatic vegetation (reeds) extends along the southern margins of the lagoon. This belt is few centimeters below sea level where ground water level is high and the soil is saturated with saline water. These flats are known collectively by a local as "Barari" which means the unproductive wasteland. Due to population pressure, these areas are exposed to land reclamation for cultivation, fish farms and other land use.

The swampy area occupy most of the the border of the fertile non-cultivated and agricultural lands. They are formed by the accumulation of water seeped from the drainage system of the delta in depressed areas. The soil is covered with water all the year around and is dominated by reed swamp vegetation.

III-2-e- Cultivated Lands:

The cultivated areas located at the southern, eastern and south western parts of the area under the consideration. It forms the flat area which is a part from the northern Nile Delta plain. Many towns, cities and small villages (Ezbat / Kafr) are littered around the area.

III-2-f- Abu-Qir Bay:

Abu-Qir bay is a semicircular inlet of the Mediterranean Sea lying between Abu-Qir point in the northwest and the mouth of the Rosetta Branch in the northeast of the Nile Delta . The bay was the scene of the Battle of the Nile (1798) in which an English fleet under Rear Admiral Sir Horatio Nelson defeated the Napoleonic fleet. The Abu Qir City

is located at the mouth of the Canopic branch where the ancient Roman city (Canop) was located.

III-2-g - Rosetta branch:

The Rosetta branch had the following criteria:

Length = 239 km.	Average Capacity = 500 m.
Area = 287707 Fadden	Rate of erosion = 77.5m./year
Populations = 34,163,000	Cities = 9
Urban areas = 148	Villages = 684

Rosetta branch is 2 meters lower, nearly twice as wide as and deeper than Damietta branch. So, it carries more sand with large meanders and more point's bars.

On the other hand , the Rosetta branch is vulnerable to erosion than in the Damietta one due to the regional slope of the delta surface .The number of islands decreased from30 islands in year 1955 to 23 islands in year 1993 (Taha,1997) .

III-2-h- Nile Delta Turtle Back:

The general slope of the delta is about 18m. in 170 km. , so , the coarse materials were deposited at the apex while the fine sediments deposited at the base which stretches from Damietta to Rosetta .

Fourteau , 1915 who first used the term (Turtle Back) to describe a small , low lying hillocks with rounded crests yellowish in color a midst the recent black Nile silt .

III-2-i-The Ancient Nile Delta Branches:

Herodotus in the 5^{th} century B.C. was the first to introduce the term, Delta, applying it to the land at the mouth of the Nile. Historically, the ancient Nile Delta (Fig.5) had 7 distributaries (branches) namely from east to west:-

- The Pelusiac branch
- The Tanitic branch
- The Mendesian branch
- The Phanitic branch
- The Sebennyatic branch
- The Bolbitic branch
- The Canopic branch

They have disappeared gradually until now, only two branches are remain, i. e. Damietta and Rosetta branches

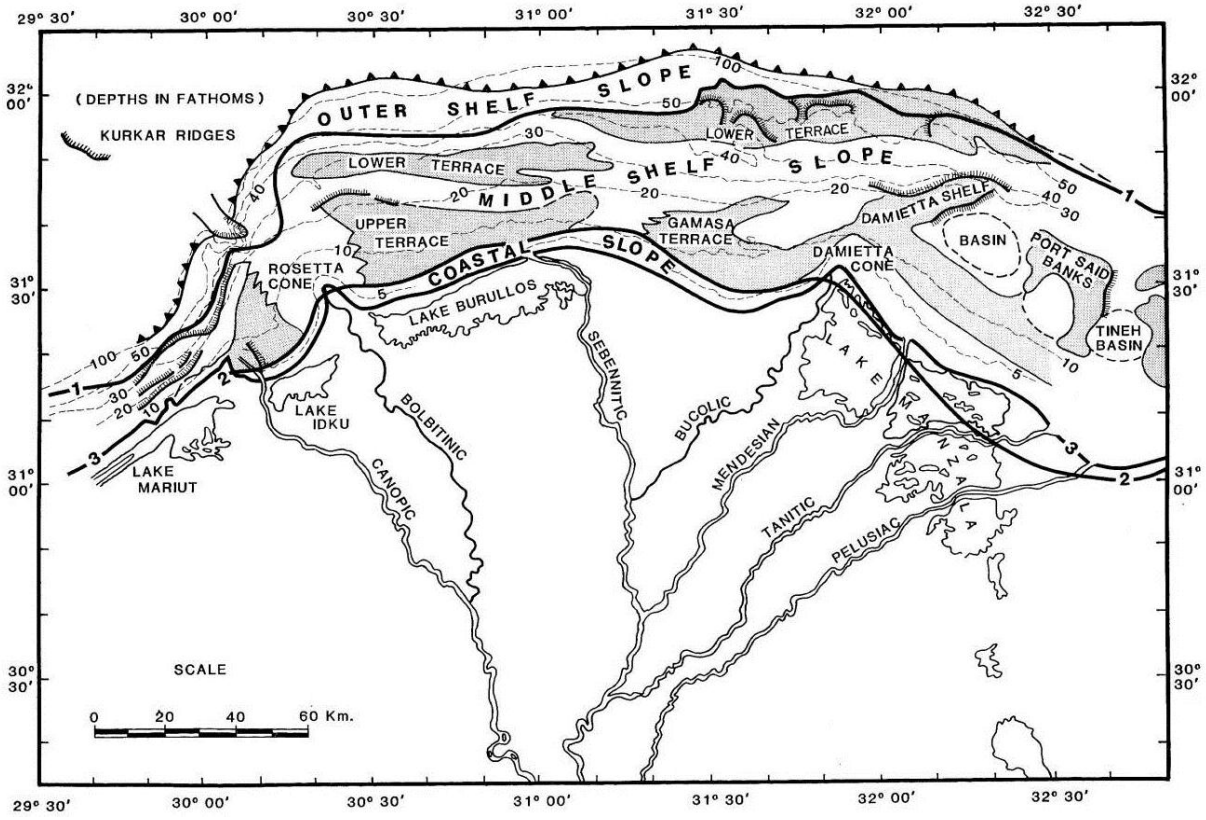


Fig. 5 - Ancient historical Nile Delta branches and ancient shore lines (after Said, 1981)

III-2-j- Lake Maryut:

Lake Maryut is a brackish lake in northern Egypt. The lake area covered 200 km² at the beginning of the 20th century, but at the beginning of the 21st century it covers only about 50 km². It is separated from the Mediterranean Sea by the narrow isthmus on which the city of Alexandria was built. The lake shore is home to fisheries and salt works. Some of the marshy areas around the lake have been reclaimed for new building as the city grows. The name derives from Mareotis or Marea, the name of the lake in ancient times. Lake Maryut, precursor of the present Maryut Lake, represented one of the most distinctive geomorpholgical features in the north-west coast of Egypt during the Holocene period. It was, and still is, quite unique compared to other lakes on the Egyptian north coast, which were formed as a result of the sea inundating the north coast of the Nile Delta.

In antiquity, Lake Maryut was formed solely by the Nile, which fed the lake through a network of canals that branched off the river's defunct Canopic Branch, and approached the lake from the south and the east. Historical, archaeological and geomorphological evidence indicate that Lake Maryut consisted of two interlinked parts; the main basin of the lake, which extended for 40-50km south of Alexandria, and a narrow arm which was about 3km wide and extends west of Alexandria for about 40km. However, it is evident

that Lake Maryut has undergone dramatic changes during the past two millennia, which significantly affected its size and nature. During the 5th century AD, the Canopic Branch started silting up and it became defunct by the 12th century AD. Accordingly, Lake Maryut lost its connection to the Nile, and the once navigable freshwater lake became a closed lagoon with no constant supply of water. Due to increasing evaporation, the size of the lagoon decreased significantly and by the end of the 18th century Maryut was almost dry, except in the rainy seasons.

Lake Maryut remained dry for almost 700 years until it was intentionally flooded with seawater twice in the early 19th century, as strategic actions, ending forever its life as a fresh water lake However, once again, Lake Maryut started drying up due to increasing evaporation until most of its basin became dry arable land. It was not until the early 20th century, 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.

At present, Maryut Lake is a body of shallow brackish water that occupies about 17% of its original size. It consists of two sections separated by a number of causeways and canals. The main body of the lake is nearly rectangular in shape, with its northern coast extending for about 20km, while its eastern coast is about 12km long. It has also been divided into many sub-basins, which are used for industrial and agricultural purposes. Moreover, its shores are subject to continuous irrigation, drainage and reclamation projects, which make it constantly changing and unstable. It is about 3km wide and is delimited from the north and south by two coastal ridges. This western arm also contains an elongated Island which is about 4km long and 500m wide.

Since the lake receives its water from groundwater seepage, agriculture runoff and rainfall; its water level fluctuates widely according to the seasons.

However, the pilot survey which we carried out in 2004 along the shores of Lake Maryut western arm revealed that there are numerous archaeological sites in the region which have not been systematically studied. Moreover, the survey resulted in the identification of over ninety sites; more than two thirds of them were new discoveries. During that initial survey about 100km of the lake shore was covered and the exact position and basic data for all archaeological features that had been constructed in close relation to the ancient shoreline were recorded in preparation for a detailed survey in the following seasons. During the subsequent seasons, in 2006 and 2007, a detailed systematic investigation was carried out for archaeological sites located along the southern shore of the Maryutic arm and the shores of the Maryut Island. The sites were prioritized for detailed survey based on their archaeological value and the degree of threat to which the sites were subject. The survey included a topographical survey of each site carried out using a GPS-based Real Time.

IV- GEOLOGICAL SETTING

The present geological studies resulted in establishing the stratigraphical setting of the sedimentary sequence in the area under the consideration and the structural elements that affected the area during the geological history.

IV-1- Stratigraphy:-

A brief description will be given to describe the different litho-stratigraphic rock units that exposed in the surface and encountered in the sub-surface as shown on (Table 8 and Fig. 6).

III-1-I- Surface Rock unit:

The northern part of the Nile Delta characterize by the occurrences of the following rock units referring to the Pliocene –Quaternary ages.

IV-1-1-a - Quaternary Rock Units:

- The Coastal Sand dune :

  Coastal Dunes are spread along the plain of the Nile Delta at disconnected localities. They appear to the west, north and south of Lake Burullus at some of the islands on the lagoon, and in mid – Delta area between Rosetta and Damitta Branches. The sands originated from the Nile sediments (Fig. 7) that were deposited along the coasts of the delta.

- Salt Marshes and Sabkha :

  A belt of salt and marshy flat covered with aquatic vegetation (reeds) extends along the southern margins of the lagoons. Most of this belt is few meters below sea level where ground water level is high and the soil are saturated with saline water (Sabkha areas).

IV-1-1-b- Pleistocene Rock Units:

- Bilqas Formation (Neonile):

  Bilqas Formation represents the top most part of the Nile Delta sediments. It consists of alternating sands and clays with plant remains and peat deposits occurred most likely in lagoons and brackish swamps interrupted by beach sands. The average thickness is about 50 m. Zaghloul E. A. (1984 and 1996) presented a compiled geological section that encountered at different areas in Egypt. Said, R. (1981) and Zaghloul Z. (2001) present the stratigraphic column for the Nile Delta region with special emphasis on the early Mesozoic onward based on data available from wells drilled by Oil Companies. This formation represents the Nile Delta flood plain and the cultivated lands.

IV-1-2- Sub-surface rock units:

According to Said (1981), Zaghloul E., 1984, Rizzini et. al,(1976) and El-Heiny and Morsi, (1992) , the sub-surface lithostratigraphic units can be described from younger to older formation as follows (Table 8 and Fig. 6) .

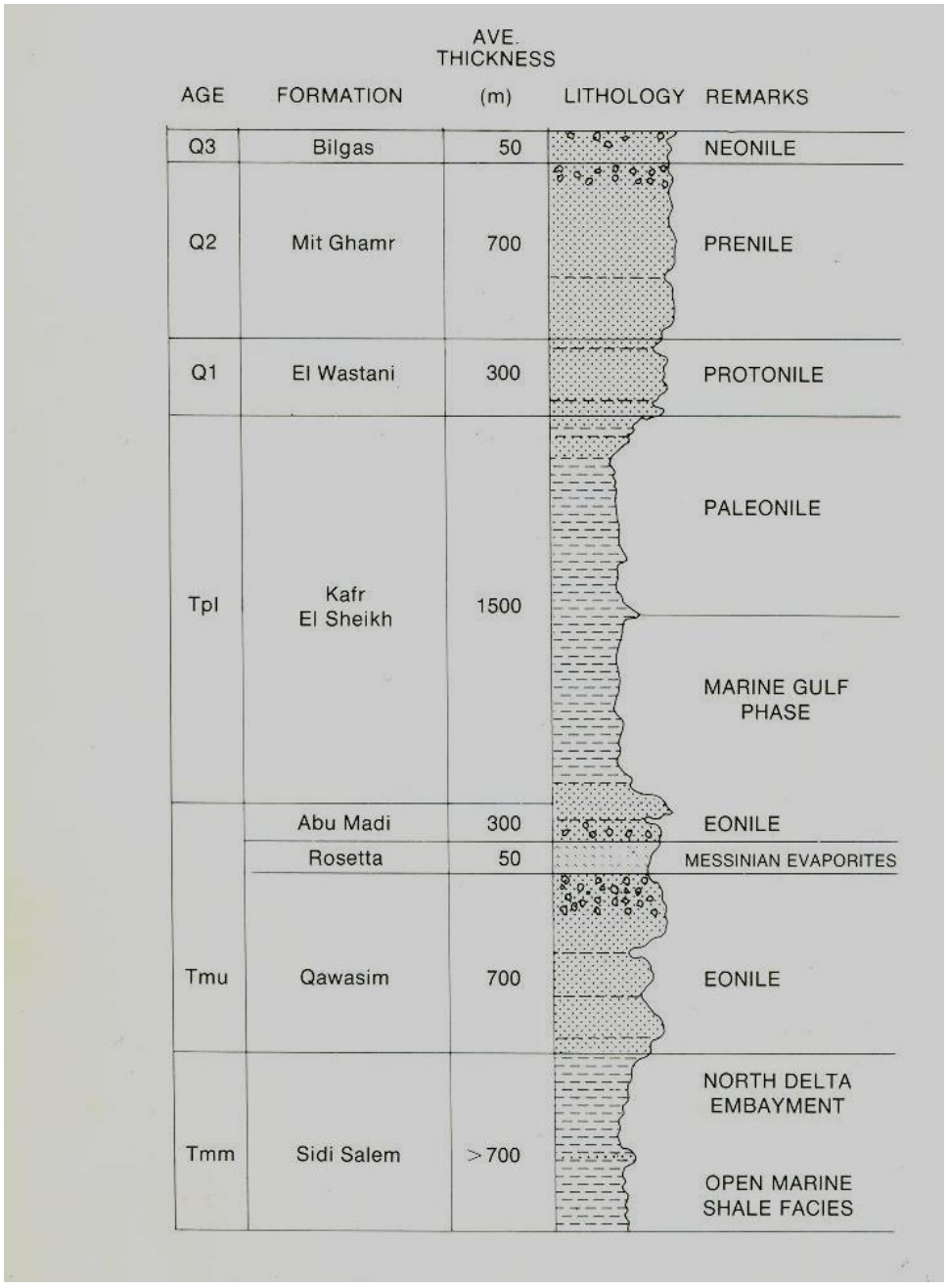


Table 8- Composite columnar section of the subsurface deposits of the Nile Delta (after Rizzini et. al. 1978)

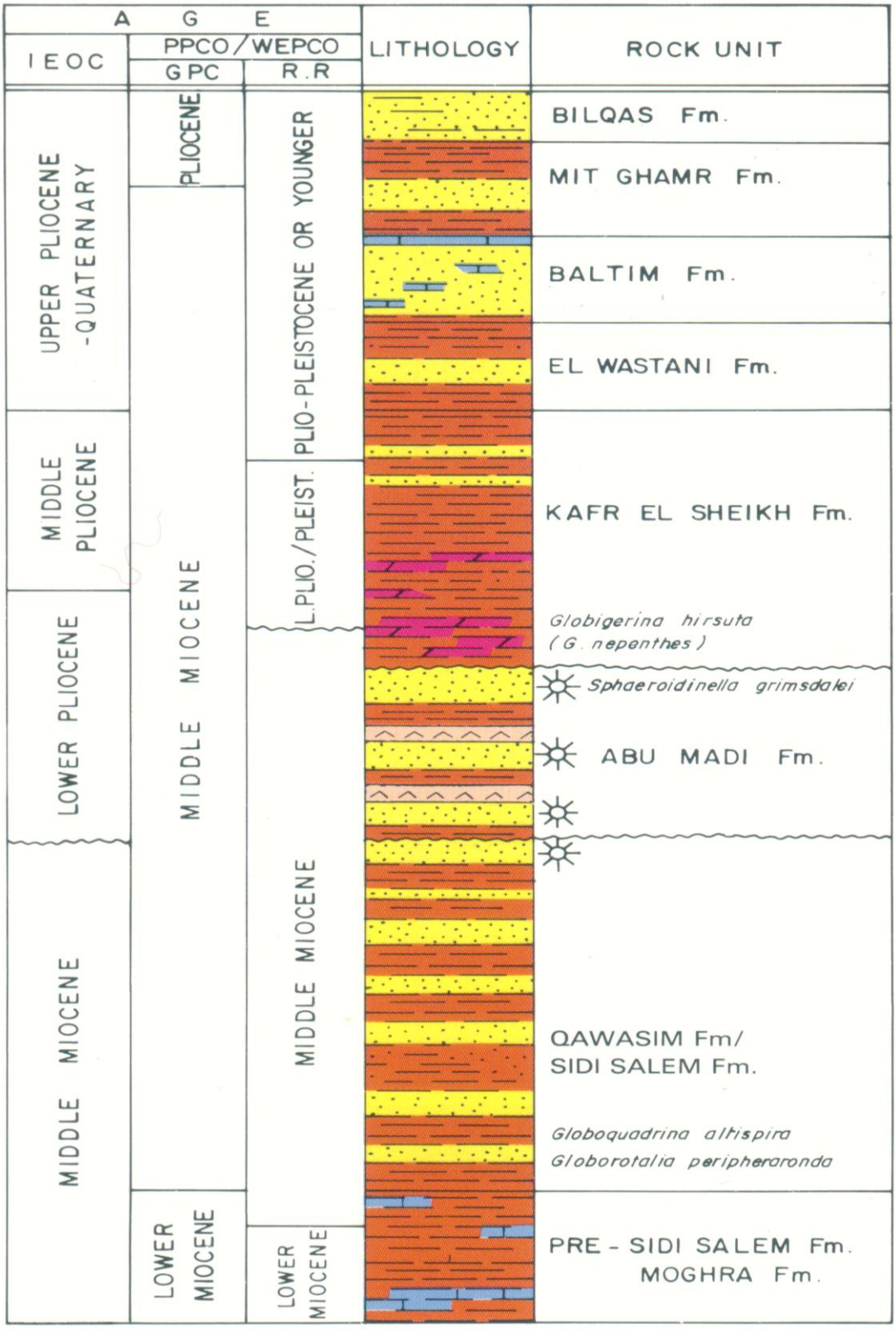


Fig.6: Stratigraphic model of the Neogene- Quaternary in the Nile Delta
(After Schlumberger, 1984)

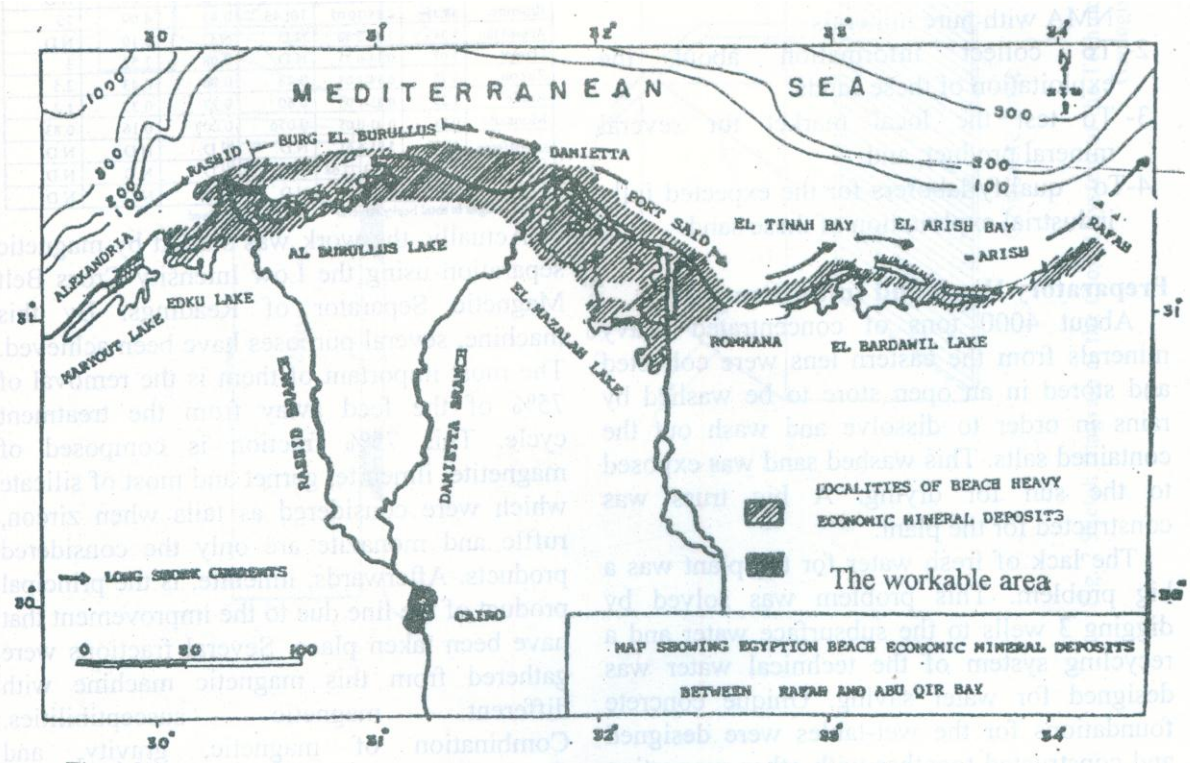


Fig. 7: Showing the distribution of the Black Sands along the Northern Beach of the Nile Delta (After El-Gemmizi et al. , 2001)

IV-1-2-a- Mit- Ghamr Formation (Neonile):

The depositional environment of this formation is probably shallow marine to fluvial. It is a typical fill-up of basin with shelly sands, Coqina beds, clay and peat. Its age is upper most Pliocene to Pleistocene.

The structure contour map presented by Zaghloul, Z et. al. (2001) shows a closed low structure around Manzala Lagoon and in El-Tina Bay. The lithofacies map indicates dominance of Deltaic sand of Stanley et. al. (1993). Most probably, the Mit Ghamr Formation is corresponding to the Prenile Sediment of Said (1981), (Table 8).

IV-1-2-b- El-Wastani Formation (Protonile):

It consists of thick quartzose sands with argillaceous interbred. The thickness ranges from 120 to 300 m. The depositional environment is transitional between the outer shelf facies of the underlying Kafr El-Sheihk Formation and the overlying Mit-Ghamr Formation. The age was assigned to Upper Pliocene and could be equivalent to Baltim Formation (Kora, 1980).

IV-1-2-c- Kafr El-Sheikh Formation (Paleonile):

The formation ranges in age from Lower to Middle Pliocene. The sequence consists of soft clays with inter-bedded poorly consolidated sands with a clayey matrix. The clays are composed in equal proportions of Kaolinite and Montmorillonite with very little Illite.

The development of this series appears to be rather constant over the entire Delta area. Its lithology and faunal content points to an outer shelf depositional environment. Its top is defined by the overlying El-Wastani Formation sand which has a typical littoral fauna. However, they have been totally penetrated in nearly all deep wells drilled in the delta.

IV-1-2-d-Abu-Madi Formation (Paleonile):

The formation is represented by a series of thick sand bodies interbedded with thin shales. The sand is cross-bedded and overlies the Rosetta Anhydrite in Abu-Maadi, El-Wastani and Abu-Qir fields while in the study area, the formation unconformable overlies the Qawasim Formation. Abu-Maadi Formation was deposited in a deltaic environment and grades up into shallow marine environment. The type section is present in the Abu-Maadi well in the depth interval from 3007 m. to 3229 m. The Abu-Maadi Formation is the Gas producing horizon in the Nile Delta region. The gas was assigned to the Lower Pliocene. The isopach map presented by Zaghloul, Z. et. al. (2001) indicates a shallow marginal basin with thickness increasing northward and decreasing southward. Rizzini et. al. (1976) described this rock unit as composed of inter-bedded sands and clay layers at the top with marine fauna of the Mediterranean Lower Pliocene Sea.

IV- 1-2-e – Qawasim Formation (Eonile):

This formation overlies the Sidi-Saleim Formation and underlies the Abu-Maadi Formation with unconformity surface due to the missing of Rosetta Formation (Anhydrite section of Upper Messinian). It comprises a thick section of sand and conglomeratic series of Middle to Upper Miocene. In any case, the development of the section marks a change in the depositional environment from fluvial- deltaic to marine.

IV-1-2-f- Sidi Salem Formation:

It is consisting of predominant shale's with few interbedded dolomitic marls and rare sandstone. The upper limit is formed by the base of the thick conglomeratic series of the Qawasim Formation. This formation was subjected to extensive facies changes both laterally and vertically. The average thickness is about 311 m. from depth 1664 m. to 1975 m. as measured in Rommana well-1.

IV -2- Tectonic Setting:-

As far the area is located in the Nile Delta flood plain, the structural and tectonic setting did not affected on the Quaternary Nile sediments and it can be only detected from the sub-surface correlations, cross-sections and geophysical works.

Many of the historic branches of the Nile had their courses determined by the preexisting structural elements (Figs.8 &9). The tectonic control is mainly evident on the Pelusiac, Anthribitic, Sebennetic and Canopic Distributaries.

The Canopic Branch is like the Pelusic Branch in being definitely controlled by tectonic elements. Its channels ran parallel to the Cairo- Alexandria fault zone (Ben Avraham et al 1987). A contrast in the Holocene lithofacies is marked on both sides of this fault zone, desert to the west and alluvium to the east (Deltaic Sediments). The historic town; Canopus; stood at the mouth of the Canopic Branch probably through the 10th century A.D. when it was destroyed by the earthquakes. It became submerged 6 meters under the water of Abu-Qir Bay. The Canopic Branch possibly had originated southwest of Cairo, passing by the complex of Abu-Roash anticline.

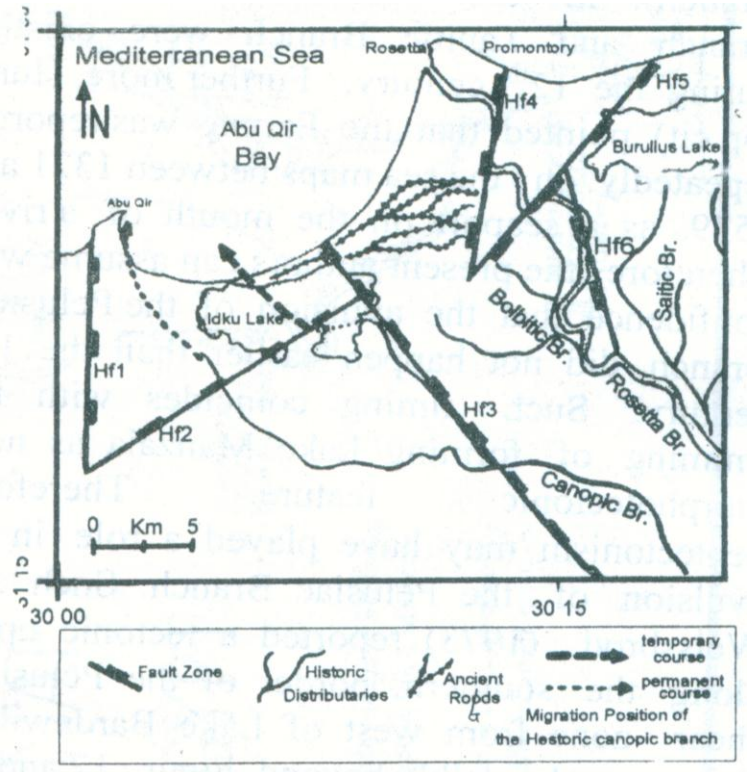


Fig. 9 - Morphotectonic features of Western Nile Delta Development
(After Zaghloul Z. et. al. 2001)

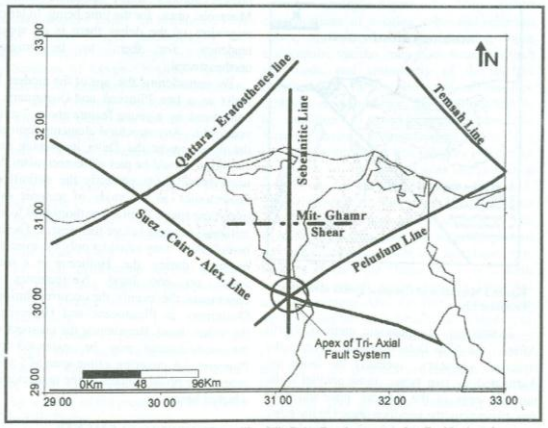


Fig. 8 – Major structure Elements Controlling Nile Delta
(After Z. Zaghloul et al., 2001)

IV-3- Seismic Activities:-

The study of the historical earthquakes is useful and constructive tool in understanding the undue consequences associated with the ancient earthquakes. It is worth to mention some ancient earthquakes that struck the area:-

- On year 726 AD / 108 H, A shock occurred in Egypt and caused the collapse of the upper part of Alexandria Lighthouse.
- On the 7 th. August year 702 H, a violent earthquake occurred in Egypt. It affected Alexandria strongly causing the destruction of its walls and towers.

Generally, the distribution of the earthquake epicenters in Egypt is mainly located along the main three trends (systems) as shown in (Figs. 8 & 9) these trends are:-

- Gulf of Aqaba – Dead Sea (Levant) trend ,
- Red Sea , Gulf of Suez , Cairo – Alexandria trend and
- Fayum – Cairo – Pleseium trend.

The area is characterized by the occurrence of shallow, micro, small and moderate earthquake. The activity is mainly due to the earthquakes attributed to the Cairo – Alexandria and Cairo – Fayum trends.

Kebeasy (1990) considered the NW trend is the major active trend affecting the western part of the Nile Delta. The clustering of earthquakes offshore Alexandria (Fig.10), a Rosetta and Damietta area is a conspicuous feature of the seismicity of northern Egypt. Other clusters of earthquakes are seen beneath the northwestern and central Nile Delta.

The shape of the Nile Delta is tectonically controlled. Beyond, the controlling structural elements are, the Pelusium Line in the east, the Cairo – Natrun Line in the west, Mit Ghamr Line in central delta and the Qattara - Eratosthenes Line in the north. The huge thickness of clay and silt of the Nile Sediments minimize and reduce the impact and the hazards of the earthquakes especially the deep one

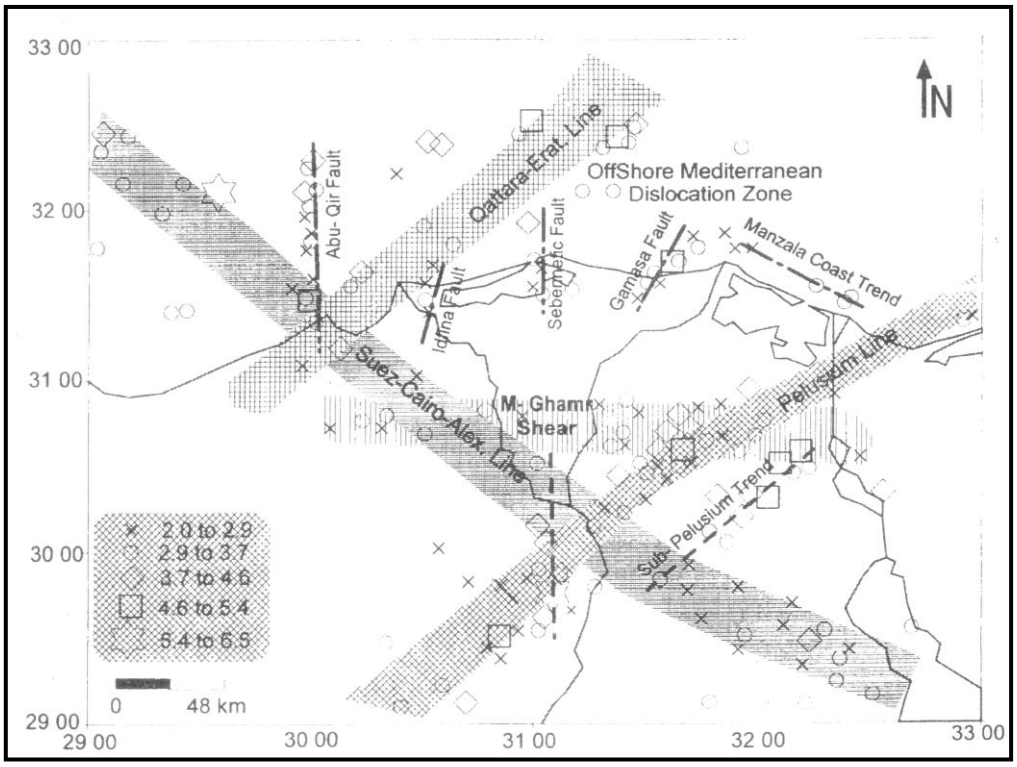


Fig. 10 : Epicenters Distribution of Instrumental Earthquackes in Northern Egypt (1900 – 1997). Modified to show the active Seismic Trends. (After Al-Ibiary, 2001)

V- ARCHAEOLOGICAL SITES

Both El- Beheira and Kafr El-Sheikh Governorates contain many archaeological sites which are not well known to Egyptologists, classical Archaeologists or tourists. The largest site in Kafr El-Sheikh is the major centre of Buto (Tell Farain) but there are numerous other tells and koms (small mounds) which represent the ruins of ancient towns and cities (Fig. 11). Many of them date to the Roman period and later, but some of them also have much longer histories. In Beheira Province, Alexandria dominates the north-western area, but again, there are numerous sites to the south, such as the Ramesside fort at Tell Abqain, the Greek city of Naukratis and Kom Geif and the multi-period site at Kom Firin.

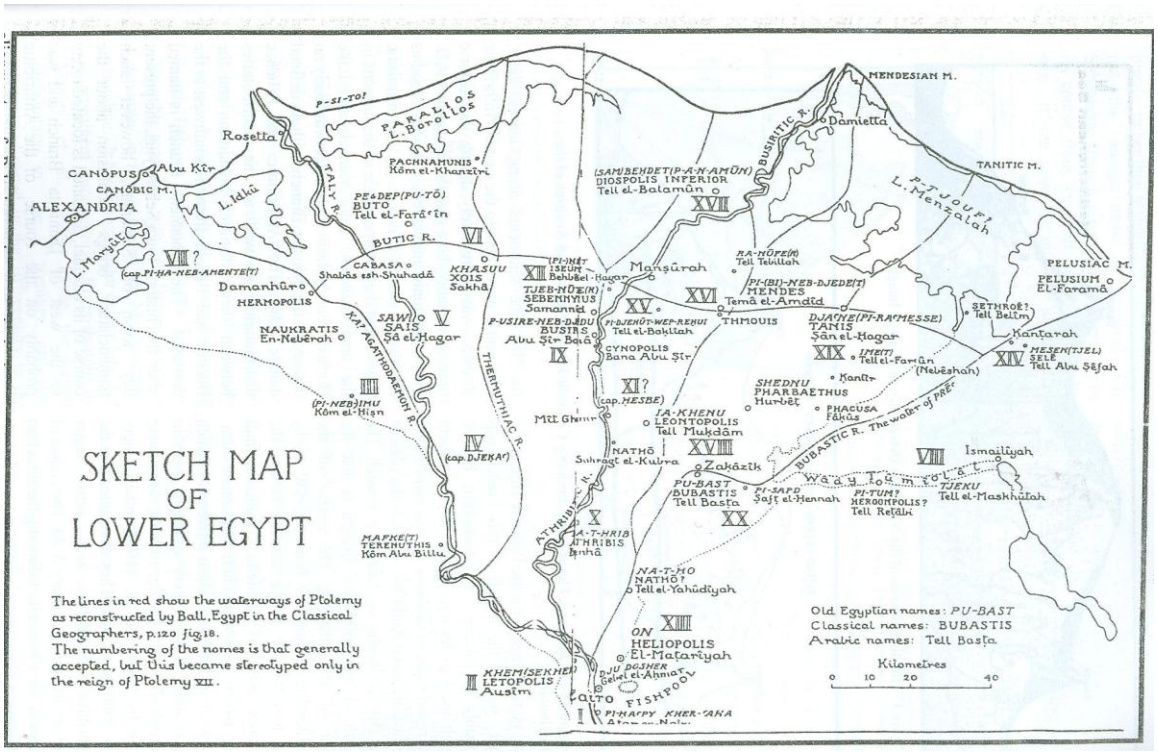


Fig. 11- The Historic Branches of the Nile Delta (after Ball, 1939)

V-1- Kafr El-Sheikh Governorate :-

Kafr El-Sheikh is the name of the central northern province of Egypt which borders the Mediterranean. The northern part comprises Lake Burullus, a shallow freshwater lake with small islands and reed beds. Its southern edge was formerly marshy and swampy but much land was reclaimed here in Roman times and from the nineteenth century. Many

fish farms have been developed here. The main town of Kafr El-Sheikh shares its name with the province. Other towns in this agricultural region are Simbellawein, Fuwa, Disuq.

1- Tell Mutubis (Tell El-Ahmar):-

The site consists of a tell situated on the northern side of a flat area of about 650 m by 550 m in size. The tell is roughly rectangular in shape and has two long sides of approximately 280 m and two shorter sides of about 180 m, forming a squat, four-sided hill. At its highest point it is 12 m above the local ground level, with very steep sides on the west and south and sloping sides on the north and east (Fig. 12). This form may be a result of wind erosion, digging or due to the type of structures buried under the mound on each of the sides. The surface of the tell has a predominantly red color caused by the broken pottery lying on the surface. Where it is not red it is grey because of mud brick. There are also glass fragments, corroded coins, some stone fragments, including limestone, red granite and volcanic tufa, and organic material, particularly bones, lying on the surface. The western side of the mound shows traces of mud brick walls visible along the edge, almost for the whole length of this side. At the southern end there are the remains of two parts of a red brick structure. One is still part of the mound, but the other seems to have been dug out in the past and is a water tank made of red brick and pink mortar. The tank, 3.5 m by 3.5 m by 1.40 m in height, has a plastered inner surface and is almost full of rubble. Near these structures is a fallen fragment of floor with rough marble tesserae (Fig. 13).

The flat area to the west shows signs that it has been dug out, leaving a number of depressions which fill with water in the winter. There is evidence for much red brick debris in this area, but it is not clear if it is in situ or red deposited here from elsewhere on the site. A number of tracks cross this area on raised causeways or embankments. One of them may be an old Light Railway embankment, branching from the main railway line at the south of the site.

Fig. 12- The main mound of Tell Mutubis

Fig. 13 -Water tank left after sabakhein digging.

The southern side of the tell is also very steep, with some mud brick structures standing out clearly. Along this side there are other isolated mud brick features at the foot of the main mound, two noticeable fragments of red granite, one probably part of a column, the other with a clearly worked face, a group of limestone blocks which seem to have been recently dug out of the mound and further to the south there is a red brick building of some kind (Fig.14).A low mound also runs through the southern part of the site and along with traces of red brick walls in the ground, may constitute a separate series of structures.

Fig. 14 - A group of limestone blocks at the base of the mound.

The pottery studied at the site included some ribbed Nile silt dishes and jars, fragments of African Red Slip ware dishes and plates, including some with embossed decoration, amphora spikes and necks, some fine wares and a few marl vessel fragments. The

material can be given a preliminary date of around the 4th-7th century AD. Four drill core holes were made at the site and they suggested that the site has been occupied continuously from perhaps late Ptolemaic times to Late Antique times, perhaps from the 1st century BC to about the 9th century AD. Much of this city was founded on clean alluvium (flood-deposited sediment) and also perhaps on drained marsh areas. On the eastern side of the tell, there was, however, a possibility that there was some even earlier settlement and that the Roman town had grown from it.

2- Tell Qabrit :-

This small tell is situated to the north-west of Tell Farain (Buto) and to the east of the small village of Qabrit. There is no concentrated modern settlement around the site, but it is bordered on the south by a main road and on the other sides by fields. Some of the border areas are more like wasteland and may have been unsuccessfully reclaimed from the tell (Fig. 15). The tell has no cover except for small patches of brush and the soil is coloured red or in some places grey. There is a reasonable amount of degraded pottery, glass and red brick on the surface, but the tell is not densely covered. The dry surface dust forms a covering of about 20 cm and can be scraped away to the damper, more compact soil. In the early morning, and possibly after rain, building patterns can be seen on the surface, mostly occurring in the form of small, squareish structures.

Fig. 15 - View of Tell Qabrit.

The tell is 4.1 m above the ground level at the site. It is 875 m from east to west and 757 m from north to south. The eastern to southern sides of the tell are relatively level on top, running down to the edges in a gentle slope. The northern and west sides of Tell Qabrit are more uneven and undulate in a series of small hillocks and mounds. A few of the mounds towards the centre of the site form the highest points of the tell. The shape of the tell may be due, in part, to wind erosion, with the wind blowing from north to south

creating the smoother southern tail-back of the tell. It was difficult to discern any pattern to the hills, though some of the modern tracks may indicate more substantial walls beneath the surface.

Some excavations have been carried out at the site by the SCA and these uncovered a series of Late Antique buildings to the south (2000) and a red brick church building in the central area (2001). Seven large granite grinding stones (Fig. 16) are visible on the surface, probably having been uncovered during the sebakh -digging and left as they were too heavy to easily take away. One limestone block was also noted.

Fig. 16 - Granite grinding stone.

The church building was associated with pottery of the 4th-7th centuries AD. The surviving walls measure 26.5 m from east to west and 12.1 m from north to south and were about 1.05 m thick. They are preserved to a height of 65 cm. The church is made from at least two types of different-sized red brick and had a rectangular outline oriented east-west. The building had limestone paving at the west end and possibly marble paving at the east end, though this had been removed. The walls of the church were originally plastered and founded upon layers of crushed limestone chips and earlier pottery. Among the debris a block with a few hieroglyphs in raised relief was found, suggesting that a Pharaonic site nearby may have provided much of the stone building material, or indeed, that there was a Pharaonic part of this site.

3- Tell Amya:-

This tell is smaller than Tell Qabrit, being 460 m by 320 m in size and reaching a height of around 8 m above the surrounding ground level. There is a central high ridge, running from north to south across the tell (Fig.17) , which seems to have been created by sebakhin diggers. The site seems to have been cleared away by sebakhin working from the east and west towards the central area.

The archaeological strata of the site have been extensively disturbed and it is difficult to detect any building features in the surviving areas. The amounts of red brick at Amya, the patches of grey mud brick and the pottery strata suggest that something once stood here, but its nature can not be determined by surface survey alone.

Fig. 17 -The ridge of Tell Amya.

Fig. 18 - Amphorae at Tell Amya.

The pottery from the site is similar to that at Tell Qabrit, with similar African Red Slip and Egyptian imitation wares, pottery with cream and brown paint (Fig.18), stylized plant decoration, imported amphora, 'carrot' amphora, and a number of Nile silt ware bowls or basins with either ribbing or pie-crust rims.

There is also a good quantity of glass at the site, but, in contrast to Qabrit, there is not the same amount of slag-like brick work, that is, bricks which have virtually vitrified. A number of corroded bronze coins were found on the surface, varying in their state of preservation and ranging from about 0.5 cm in diameter to 2 cm. One large fragment of red granite had been uncovered by the sebakh diggers. It seems to be an unfinished grindstone, still with roughly-cut surfaces. Tell Amya is one of a series of Late Antique sites in this area forming an east-west line.

4- Tell Matiur :-

This site was also visited as it formed the most westward of the chain of sites along the Roman road. From the surface pottery, this site was of tenth century AD date. It is about 300 m across at the maximum and rises to about 6-8 m above the ground level (Fig.19) . A number of circular brick granaries or storage chambers have been excavated here by the SCA.

Fig. 19 - View across the antiquities area at Tell Matiur.

5- Kom Abu Ismail :-

Kom Abu Ismail covers a large area of approximately 36 hectares. It extends 631.4 m from north to south and 569.46 m from east to west and rises to a maximum elevation of 8.5 m above the surrounding fields. Pottery, glass and brick fragments cover the surface of the mound, giving it a reddish appearance in places(Fig.20) . The tell stands on a small platform above the ground level and there are two main mounds, with a flat area between them.

At the eastern side, the ditch at the edge of the site had recently been cleaned out and a quantity of well preserved pottery was found here. The pottery from the surface was much affected by salt erosion on its under sides. One fragment of granite was noted on the main mound and a column base was found at the north-western edge of the site (Fig.21). It has a square base and measures about 2 m by 2 m in size. It has a graduated circle in the centre and is half buried in the ground.

Fig. 20 - View across the top and sides of Kom Abu Ismail.

Fig. 21 - Granite column base.

A preliminary study of the pottery collected at the site suggests that two main groups of material were gathered. One group could be dated to the 3rd-7th century AD and the other to the 9th to 10th century AD. This agreed broadly with the dates of the pottery obtained by the Buto Regional Survey (4th-8th century AD).

6- Kom El-Misk :-

Kom Misk is a small mound with a modern cemetery upon it, with the maximum dimensions 347 m from north to south and 270 m from east to west, rising to a height of around 8 m above the level of the surrounding fields. The surface is loose, powdery, dark brown earth, with some pottery and red brick lying on it, most likely having come from some of the older tombs in the cemetery. There is a large tomb on the summit of the mound which was built in 1960 for Ibrahim El-Sawy (Fig. 22). The outlying area of the site is flat and a track runs around it. This flatter area itself is about one meter above the level of the fields surrounding the site. The fields were checked for pottery but as very little was found, it is likely that the original site did not extend very far in this direction.

The pottery from the site reflects the more modern usage of the site. The earliest can be dated to the 4th century AD but the most common pieces date from between the 8th and 10th century AD, into the medieval period. The types of material collected included strainers from water jar necks and ribbed amphora in light cream coloured wares. There were also some glass fragments lying upon the surface of the site. Kom El-Misk is one of a group of sites with Kom Sidi Selim and Kom Bunduq in this area and it is likely that a defunct river channel once flowed from the south to Lake Burullus.

Fig. 22- The low mound of Kom El-Misk with the larger tomb of Ibrahim El-Sawy to the right.

7- Tell Aluwe (Tell el-Farr):-

The tell has a small flat edge and then steep sides rising to a plateau on the top. It has the maximum dimensions of 192 m from north to south and 189 m from east to west, rising to a maximum height of around 8.5 m above the level of the fields. The sides are quite regular and at the time of the survey there was a recently dug 3 m-deep pit on the top of the tell (Fig.23) . The sides showed several different layers containing pottery, brickwork and smashed limestone.

The site is probably the central remnant of a once larger tell, and seems to form part of the chain with Kom Dahab to the south. The surface had a covering of pottery and glass with some burnt, red brick fragments and it was clear from the pit that these strata continued down through the tell, which probably contains remains of buildings.

The pottery from the surface was very degraded because of salt and the dating of the material to between the 5th and 9th century AD suggests that there may be earlier material deeper under the tell.

Fig. 23 - The steep sides of Tell Aluwe with corn drying on the flat outer area.

8- Kom Dahab II:-

There was nothing at this site which suggested that it had been an ancient site. The area with this name is now a village and a cemetery, with the dimensions 131 m from north to south and 77 m from east to west. It had virtually no elevation above the surrounding fields (Fig. 24), although to the north there was a depression, filled with water. Kom Dahab (Hill of gold) may be a 'joke' name and show that the names of places can be misleading. It does form the southernmost point of the large ridge on the old maps, with Kom Ezbet El-Farr (Tell el-Aluwe) to the north.

Fig. 24 - Cemetery at Kom Dahab II.

9- Kom Sheikh Ibrahim :-

The tell is a large mound 660 m from north to south and 521 m from east to west. It covers an area of approximately 47 hectares. It reaches a maximum height of around 10.4 m above the surrounding fields. The site is a long, narrow mound from north to south, but may have up to two satellite areas on the west and east sides. To the north is the main mound area while a second mound lies to the south. Between them run two modern track ways making use of the firmer ground underneath this area and perhaps reflecting underlying structural remains. The edges of the tell are flat, but raised on a platform about 1 m above the surrounding fields. The surfaces of both mounds have a thin covering of pottery (Fig.25), glass and red brick. The southern mound has an exposed area of red brick building on its northern side. The top of the mound has traces of red brick buildings at the surface.

Fig. 25 - View from the top of Kom Sheikh Ibrahim showing red brick on the surface, with the modern cemetery mound to the east.

An area to the south has been sold to build a solar-powered electricity generating station and this was excavated by the SCA before the current builders moved in. The foundation trench for the wall surrounding the station provided some good examples of pottery and at the entrance to the site some stratigraphy with red brick buildings was visible. To the west is a small mound of earth, about 5-6 m high. It did not have much pottery on the surface and seemed to be more a remnant of an earlier tell or field clearance. To the east is the cemetery of the nearby village which is situated on a small mound, roughly parallel to the earth mound on the west. It was not possible to determine if either site had archaeological material in it. The topography of the tell and its elongated nature suggest that it was either once a much larger site as a whole.

The pottery could be mostly dated to within the range of the Middle to Late Roman period, but concentrated in the 4th to 8th century AD. The types of sherds studied included a neck with a strainer from water jar coloured with cream paint, an Africana Type II amphora import, a number of pie-crust and ridged rim sherds, showing variable types, but all from large cooking vessels or casserole dishes, a body sherd from a Gaza amphora, with black resin coating on inside, a small knob from the base of a qadus (saqiya pot) and a fragment of a yellow glazed ware. There were also fragments of glass.

10- Tell Foqaa :-

The site is a large sprawling tell, with soft dirt on the top surface in most areas and some firmer sections, particularly the central tell area. The maximum dimensions of the site are 472 m from north to south, 458 m from east to west and the tell has a maximum height of 7.5 m above the level of the surrounding fish farms. It covers an area of some 17 hectares, although the remaining site is most likely to be a smaller remnant of a much larger archaeological area. The sides have been cut back by the neighboring fish farms (Fig.26).The sides of the tell are gently sloping, with a low ridge on the eastern side enclosing a lower flatter area of land. Two fragments of granite grinding stones were noted (Fig. 27).

Fig. 26 - View from the top of Tell Foqaa towards the fish farms.

Fig. 27 - Granite grinding stone.

11-Tell El-Fara'in (Buto):-

The settlement of Buto (modern Tell El-Fara'in) is situated in the flood plain of the north-western Nile Delta, c. 40km south of the modern shore line of the Mediterranean. It is located in the Central Delta (31° 12' 50.6628" N, 30° 46' 41.4732" E) to the north-west of Kafr El-Sheikh. The site covers an area of approximately 1km2. It is topographically divided into a northern and a southern Kôm (mound) with mud-brick ruins rising about 15m above the cultivated land and a temple area surrounded by a huge enclosure wall.

Buto was a very ancient town which was continuously occupied in Predynastic times for over 500 years. In those times, when Buto was probably much closer to the north coast, the population would have taken refuge from the flooding of the plain on the tops of sand dunes which have long since been buried by the rising silt of the Delta. The earliest settlement at Buto, discovered 7m below the modern ground level, resulted in a difficult and dangerous task for the excavators as water had to be continuously pumped out of the area.

Between the two settlement mounds are remains of a Temple of Wadjet which faced south within enclosure walls, and was mentioned from Dynasty XII. The extant remains of the temple appear to have originated in the Saite Period, but this was destroyed by the Persians and later rebuilt by the early Ptolemy's. Buto seems to have played an important part throughout Egypt's history, at least as a symbolic cult center. During the Late New Kingdom the town was known as Per-Wadjet, meaning 'House of the goddess Wadjet'. The few visible remains today mostly date to the Ptolemaic and Roman Periods and include domestic buildings, cult buildings (Fig. 28) and cemeteries. Buto is gradually being revealed as a huge and complex site.

Fig. 28- Ruins of mudbrick buildings on the northern mound of Buto

The deepest drilling so far reached almost 14m. Burnt structures and objects, such as kilns or concentrations of pottery shreds, ashes and slags are indicated especially well and

also mud brick walls can be easily recognized. Additional information concerning the chronology and the function of special areas of the youngest settlement phase are provided by the collection of surface material.

The position of the settlement must have been on a level which protected the village against the Nile inundations and allowed a permanent habitation.

12-SidiYoussef:-

This site is on the north side of the main Alexandria-Cairo road and south of the railway line. The mound covers an area of 180 m from east to west by 160 m north to south and it is approximately 4 m above the ground level. A short direct track leads to it from the road and to the south of it there is the main Alexandria-Cairo railway line. The small hill is covered by a cemetery with the tomb of Sheikh Yusef at the top (Fig. 29). To the east of the site, there is a small area of waste land with shred's and red-brick fragments lying on the surface and present in the sides of the eastern ditch.

Fig. 29- Sidi Yousef site from the Alexandria-Cairo Railway line.

13-Kom Hassan:-

This seems to have been the name for some Antiquities' land to the north of the village of Muturis, where some excavations took place a number of years ago. There is nothing here now, except for the village.

14-Kom Khaleesh:-

The kom is a low, flat mound, approximately 2 to 3 m above the surrounding fields, with a sandy surface measuring around 100 m from east to west. On the eastern side is a cleared, flat area, lower than the main mound. Parts of the surface of the mound are covered in darker dry mud and low scrub, while in other places the sand is most obvious. There was some pottery on the surface of the mound. No features could be discerned, but at one side there was a fragment of a red brick wall in the side of a drainage ditch.

The tell seemed to be the most promising site in southern Abu Hummus. The pottery showed two main dating concentrations: (i) the Ptolemaic and early Roman period and (ii) the 6th to 8th century AD.

Fig. - Sandy, low mound at Kom Khaleesh, covered in scrub.

15-KomEl-Qanater:-

The village of Kom El-Qanatir is situated upon a small, low mound, with some deep pits filled with water next to it which may have been part of a kom reported to have once existed all around the village. A few pottery sherds were visible on the cleared areas beside the village, but it was not clear from where they originated.

16-Kom El-Boos:-

The village of Kom el-Boos is situated upon a mound, with the cemetery in the centre of the village on the highest part of the mound, up to 4 m above the fields around the village. The cemetery mound is surrounded by inhabited houses (Fig. 30), many of them still built of mud brick, and the village is close to the canal of Kanawiya. There were a few pottery sherds embedded in the surface of the mound and the western side part of it was cut away, showing some stratigraphy.

Fig. 30 - Cemetery mound in the centre of the village of Kom El-Boos.

17- Kom Debaa :-

Two sites, Kom Debaa north and south, lie near the shores of Lake Maryut. They may once have been linked, with Kom Debaa north serving as the cemetery for Kom Debaa south, although the preliminary findings from the pottery study suggest that the south site is earlier, with occupation shifting to the north. Before the Ptolemaic settlement there may have been a river channel to the west, flowing through a swampy area.

The silt deposits from such a channel created the levee upon which the Kom Debaa sites were founded and existed until the silting up of the channel in the Late Antique period. Kom Debaa el-Bahri (North) is a small, narrow tell with an ancient cemetery upon it (Figs. 31 & 32). The surface matrix is very sandy, but on the eastern side, where the tell has been cut away, a number of graves are visible. The pottery could be dated to the Late Roman and Late Antique Periods, with only a few sherds of Ptolemaic and Early to Middle Roman period. To the north of the site there are fish farms which continue into Lake Maryut.

Fig. 31 -View of Kom Debaa El-Bahri, showing the steady slope on the northern side of the mound

Fig.32 - Section in the southern side of Kom Debaa El-Bahri, showing a red brick construction.

The maximum dimensions of the site of Kom Debaa El-Qebli (South) are approximately 450 m from north to south and 300 m from east to west. The north-south measurement includes the large cleared area at this site; excluding the latter reduces this axis to only 300 m in length. The site is a low hillock, approximately 8 m high at its highest point above the surrounding fields. The sites of the kom slope gently up to the highest point in the centre of the hill. Traces of house plans can be seen on the north-eastern side of the mound slope near the top. Pottery material has been dredged from the bottom of the deeper ditches around the mound area and dumped onto the lower areas of the site. The surface of the whole mound is evenly covered in pot sherds, including fine-wares, red-brick fragments and some red orthoquartzite fragments. The material could be dated to the Imperial Roman period (that is, Early to Middle Roman), with only a few examples of

Late Ptolemaic and Late Roman pottery. This is an interesting contrast to the pottery collected from the north tell. While the apparent shift in occupation from south to north may reflect the sampling strategy, further work could indicate whether the mounds were occupied extensively at different times.

18-KomTagala:-

The site seems to have been a low, sandy mound and a few pottery sherds were still visible on the surface. In an area where excavated a deep trench the sandy soil contained a large amount of pottery (Fig. 33) dating to the Roman period. There did not seem to be any evidence for structures on the surface, but there were a few fragments of red and mud brick mixed with the sand. The pottery included a few sherds from the Ptolemaic period, but the majority was concentrated in the 6th to 7th century AD.

Fig. 33 - Early Roman Egyptian amphora neck and handles at Kom Tagala.

19-Kom El-Ahmar (Red Kom):-

This is a large site, about 650 m from east to west by 450 m from north to south and located near the village of Rodat El-Moazi. Originally there seems to have been one large mound here which was severely affected by sebakkhin digging in the nineteenth and early twentieth century. There was once also a branch of the Delta Light Railway running into the site. In its present condition it consists of five main mounds with an excavated area in the centre. The north-east mound is around 10 m above the level of the fields and is now covered by a modern cemetery. The central mound is 8-9 m in height, grey in color and has a flat surface on the top. The texture is compact and because of the grey color, parts of this mound seem to made of mud-brick. The other three main mounds to the north-

west, south-west and south-east of the site have sides sloping to a narrow area at the top and are covered in varying amounts of pottery, glass and red brick debris. The south-western mound is threatened by agricultural encroachment

Fig. 34 - The southern and north-eastern mounds of Kom El-Ahmar.

The most striking feature of the site is the complex of red brick structures which have been revealed in the central area. The main building has several vaulted chambers and plastered walls, with rounded buttresses at the southern end. Bath-houses (Fig. 35) are an important feature of some of the Beheira sites and can be dated to the Imperial Roman period and sometimes the later Roman period. They are a symbol of the Roman administration of a town because the bath houses were such an important feature in Roman social and economic life.

Fig. 35 - Bath houses at Kom El-Ahmar

A granite grinding stone and an eroded granite column base lie on the surface of the excavated areas. The granite may be derived from an earlier phase of this site or have been brought here from further afield. The pottery from the site covers a wide date range

and several periods including Saite, Ptolemaic to the 2nd century AD and 4th to 10th century AD are well represented.

20- Kom Hashiem :-.

The site consists of a sandy area, with a few pottery sherds lying on the surface. On the southern side there was an area of mud brick or an embankment. The pottery found consisted of small- sized sherds, but among it there were two pieces of African Red Slip ware which were dated to the 5th and 6th century AD. This could be an outlying area related to Kom Aziza, which is not far away. Together the two areas could have formed a similar site-complex to the two tells at Kom Debaa.

21- Kom Aziza :-

The site lies on other side of a small canal and main road. To the north of the road and canal there is a low, sandy mound with a hamlet and new school at its edges and to the south of the road upon a mound there is the larger village of Kom Aziza. The area to the north is 130 m north to south and 160 m east to west and is about 2-3 m above the level of the surrounding fields. The surface of this part of the site contained pottery sherds and in the playground of the school (Fig. 36) some larger oven outlines and traces of walls were visible. At the northern side, the tell has been cut away, revealing substantial deposits of pottery, including whole amphorae, to a depth of about 3 m at the deepest part of the section. There is a small village on the eastern side of the site which may be built over part of the ancient site.

Further along the road to the east there is a cemetery upon a low mound with a dug-out area now filled with water and reed beds. North of the area there is a depression which is now part of the orchards and agricultural land.

Fig. 36 - Northern side of Kom Aziza

Further along the road to the west there is the major site of Schedia at Kom Giza and Kom Hamam, so Aziza may have been part of the port and harbor system. Two drill augers transects across the north and south of the site suggested that parts of the site had a long settlement history, with core 7 drilling 5.17 m through a sandy-silt matrix containing burnt material, bone, pottery and brick fragments. The pottery from this core included a bowl rim sherd and bread mould fragment which may date to the end of the Old Kingdom. Other pottery from the site dated to Dynasty 26, although this was made from a surface collection and may not necessarily have originated here, whereas the pottery from the sandy section included amphorae fragments, cooking pots and pie-crust casserole dishes, all dating from the 4th to the 7th century AD (Late Antique). It may well have had a long life and was undoubtedly linked to other important centres in the region, including Koms Giza and Hamam to the west and Hashiem to the north.

22-Tell-Abureh:-

This site lies to the north of the sand hill named Tell Bisintawy. Tell Abureh itself seems to consist of two separate areas: Abureh, the guava orchard and cemetery area; and Abureh-Tell Hishmad, now occupied by a village called Ezbet Ashushi El -Askari and its large cemetery. Cores were drilled across this area and on to the east to obtain information about the depth of the sand deposits and the underlying geology. The cores showed the gradual build up of the sand hill layers, perhaps helped by the deposition of alluvium at Abureh-1. There was a clear lack of deep archaeological material, which suggests that the sites could have been settled only in relatively recent times. In the orchard at Abureh there was pottery lying on the surface and the upper drill cores brought out some brick fragments. The pottery studied at the site ranged in date from the Ptolemaic period to the 6th century AD.

23-Tell-Bisintawy:-

The Survey of Egypt 1:50,000 map shows a low mound area of same size at this location, reflecting earlier maps which show Tell Bisintawy as a low, sprawling series of mounds, which were perhaps originally river bank levees. The whole area is now under orange tree groves (Fig. 37) and although the sandy mound is noticeable because of its height of up to 15 m above ground level, it is difficult to see any traces of an ancient site. A water processing station has been constructed on the top of the mound at the southern end. Some pottery was collected at the site. The hill certainly seems to provide a strategic location for an ancient settlement of some description, but a more exhaustive survey will be needed to establish the exact significance of the site.

Fig. 37 - Orchards on top of the large sand mound at Tell Bisintawy.

24-Tell-Nakhlah:-

This seems to have been an extensive site at one time, but it has almost completely vanished now. There is a village and a cemetery upon the most prominent mounds at the site, being approximately 4 m and 3.5 m high respectively. At the southern end of the site there was a football pitch beside an area of animal rearing and dung patty production.

Fig. 38 – View of Tell Nakhlah

There was also a lake filled with brackish water to the north-east of the site which may have been connected to the removal of sebakh and soil from the site. The dimensions of the site are about 320 m by 300 m, but this may not be the true extent of the village or the archaeological material here (Fig. 38) . The pottery had a wide date range and included some Ptolemaic period sherds as well as material from the 7th century AD. On the face of it this seems to be a long-lived site. A meteor is reputed to have fallen to earth at the village in the early twentieth century.

25-Kom Ganadi:-

The remaining site at Ganadi lies underneath a cemetery attached to a village, with an area between them where animals are stabled. The actual mound is about 2 m above the level of the surrounding land and the whole site measures approximately 50 m by 140 m. There was very little pottery lying on the surface of either the cemetery or village, but some was recovered from the ditch around the site. It dated from the 3rd to the 6th century AD.

26-Kom Barsiq :-

The extent of the present site is about 200 m from east to west and 160 m from north to south. The site consists of a flat area with three main small mounds. There are two flat, sandy mounds which are clear of plant growth and a higher, ridge of darker mud, approximately 6-7 m above the field level, which may be the remnant of a structure made from mud brick. This is covered in small bushes and scrub (Fig. 39) which extend down into the dug-out areas between the mounds. In the south-eastern sector of the site there are the stumps of palm trees. A sheer section through the mound on the northern side shows considerable pottery sherd dumps. Also on this side there is a cleared area where burials in pottery coffins are clearly visible at the surface. The lower mounds are up to 4 m in height. A quartzite grinding stone was noted at the site.

Fig. 39 - View from highest mound at Kom Barsiq towards the west.

The fields to the south also contain pottery, suggesting that the mound may have originally extended further. The village of Ezbet Kom Awad to the south-east includes a cemetery which stands upon a low mound and the whole village seems to stand up above the field level. It is possible that the two places were once settlements, but only Awad has continued to exist or that Barsiq was the original village in the Roman period and at some stage the site was abandoned and its people moved to found Awad. The pottery dated to

the Late Ptolemaic period (2nd to 1st century BC), with a few possibly early Ptolemaic and some early Roman pieces

27-Kom Saieda:-

The site is a cleared sandy area next to a large rice processing factory. The main concentrations of pottery were to the southern end of the site in a small 100 m by 50 m area with some small sandy mounds. None of these mounds was very high .. The pottery was interesting, with material dating to the Ptolemaic period as well as the Late Antique period, specifically the 6th century AD.

28-Tell El-Qarawi:-

The site is a mound approximately 7 m in height with steep, almost sheer sides and a cemetery built atop it (Fig. 40). The tomb upon the top of the mound was that of Sheikh Mohamed El-Qarawi. The area covered by the site is about 230 m by 250 m. A little pottery was collected from the mound itself and some material was noted in the fields lying around the site. The fields all around the site lay about 0.75 m to 1 m below the level of the base of the mound. On the eastern side of the site there is evidence for a red-brick building and maybe some mud-brick structures but the date is not clear.

Fig. 40 - View of the mound of Tell El - Qarawi from a distance.

29-Geradat:-

This place is named as Al Jaradat on the Survey of Egypt map. There is a village here, but no obvious Antiquities area. Further along the same road is Kom El-Basal, which is also a built-up village and not an Antiquities area. Nearby is the village of Deir Amis where there is a cemetery mound in the middle of the village with a new school building nearby. This can be a sign of an older site, but the name of the village suggests a connection with a Christian church or monastery.

30-Balbaah:-

This area is a 1 m to 2 m high, sandy mound which has been flattened and cleared to make a football field (Fig. 41). On its eastern side there is a triangular area of land with

the remains of SCA excavations. Some pottery was noticeable in the fields around the area, but there was little pottery on the site or next to the SCA excavations.

Fig. 41 - View across the football field at Balbaah.

21-Kom Sebah-I:-

This village lies to the north of another named Abu Ghraia and both seem to be part of the same kom area, north of the Alexandria-Cairo road, and are perhaps associated with the site of Barsiq-Awad. Neither place is marked on the Survey of Egypt map. Kom Sebah itself is situated on a small mound (Fig. 42) , about 2-3 m above the fields at its highest point. It is difficult to see the mound because of the densely packed houses but in some wall foundation ditches and in the irrigation channels there was a good amount of ancient pottery sherds. The whole area is about 230 m north to south by about 80 m east to west. The village has a boundary wall on its northern side, which seems to be a feature of the villages in this part of Abu Hummus.

Fig. 42 - The palm tree marks the limit of the Antiquities' area at Kom Sebah.

32-Kom Sebah II:-

This area seems to be area marked on the Survey of Egypt map as a small shrine next to the road, north of Ezbet Abu Shaffaf, with Kom Rizq to the east. The kom consists of two areas on either side of a road. On the west side of the road, there is a small area about 1-2 m above the level of the fields. It is used to keep animals and for drying hay. On the east side of the road, there is a small cemetery with a shrine in the centre. It is not a building, but consists of a structure of bricks. The whole area is about 70 m from east to west and 30 m from north to south. A few sherds were visible in the fields and in the section of a ditch with pumps at the south side.

V- 2-El-Beheira Governorate:-

The modern town of Damanhur is believed to have been the capital of the 15th name of Lower Egypt, called Hermopolis Parva in antiquity. Although the modern name seems to have direct etymology as 'demi-en-Hor', the town of Horus, very little evidence of a more ancient settlement has been found here. The city itself has not yet been surveyed, however, and could, like Benha, conceal the traces of ancient remains under the modern buildings. It now contains governmental buildings because Damanhur is the capital of modern Beheira province.

33-Kom El-Dahab II:-

This is a low, flat area, partly covered in reeds and scrub and without significant features. The maximum dimensions of the site are 640 m from north to south and 220 m east to west. The area to the north-east is now occupied by a waste-materials processing plant (Fig. 43) of recent date. Small mounds of earth and rubble from its construction have been pushed immediately behind it to the south. A few red granite grinding stones and a limestone block have been gathered in front of the factory. There is also a football pitch covering part of the site. The surface soil of the flat areas is brown in colour and salty, with very little pottery lying upon it, although a few pieces were recovered for identification.

Fig. 43 - Flat area of Kom El-Dahab-II beside the processing plant.

34-Tell El-Barnugi:-

Ancient Nitria, modern Barnugi, was famous in antiquity as the place from which natron was excavated and gave access into Wadi Natrun on the western side of the Delta. It was also well known in the Christian period as a monastery site. It is most likely that it has an early history but work at the site would have to be particularly sensitive.

This site was extensive covering an area of approximately 560 m from east-west and 250 m from north to south. The area was roughly divided into two by a modern canal cut through the site and running north-south. The underlying surface matrix was very sandy, but there was more soil in small hills and mounds covered in sharp grass (Fig. 45) and camel thorn.

Fig. 44 - Sandy area of Tell El-Barnugi, with hillocks to the left.

At the eastern side of the site there was a football pitch beside the road and leading to the sandiest part of the site. In this sector, there was also a small mound of approximately 4 m in height, with the tomb of Sidi Sadallah El-Ansari upon it. At the southern end of the hilly area there was a large limestone block, other fragments of limestone and pottery sherds.

There was a black granite block in this area, close to the track running through it. It is likely that the ancient site continued to the north under the village and thus formed some sort of larger series of towns with Tell el-Barnugi north. The dimensions listed here are for the extant area, although there is no real tell and the highest mounds here are no more than 1.5 m above the general ground level. It has been well denuded by sebakhin-digging. There are undoubtedly archaeological remains in both parts of the site and under the cemetery mounds as it resembles both the sandy sites like Kom el-Hisn and the grass-covered mound sites, such as Kom Rebwa at Sais.

35-Kom El-Nawwam :-

This site is located next to the Ezbet Kom El-Nawwam which contains the tomb of Sheikh Hassan Nawwam. The area covered by the site, but not including the villages on the east and west, is 280 m from north to south and 200 m east to west. It has no elevation, and lies slightly below the ground level of the village. The cemetery does, however, stand upon small mound about 2 m at maximum height.

The central area of the site is a flat, dark brown, dusty area, now used as a football pitch, although there are at least three large boulders of granite (Fig. 45) lying half buried in the area. On the eastern side of this area there was a marshy lake, which must represent a dug-out area filled with rain water and perhaps ground water.

Fig. 45 - Kom El-Nawwam with the cemetery in the distance to the right and the flat area of the kom in the centre between two sides of the village.

The village lies directly to the east of this pool. A small excavated area on the west side of the pool contained a mixture of pottery, broken limestone and burnt (vitrified) red bricks, perhaps from the destruction of the site. On the western side of the flat area there was another set of houses adjoining it. Within this part of the village there was a red-brick and mortar construction being used as a duck coop. It was not possible to determine the age of this building.

On the north-eastern side of the site there is the cemetery mound. A granite block formed part of the doorway of one of the tombs and there was a number of granite grinding stones (Fig. 45), column fragments and other limestone fragments collected together at one side of the site. The pottery studied at the site could be dated to two main phases. There was a group from the Ptolemaic to early Roman (1st century AD) period and a second concentration from the 6th to 8th century AD.

V-3-Kafr El-Dawar Area :-

Kafr El-Dawar is a large town just before the outskirts of Alexandria on the main Agricultural Road between Cairo and Alexandria. Its main industries include chemicals

and textiles. The sites near it are mostly located between the Agricultural Road and the northern coast or shoreline of Lake Idku.

36- Kom El-Hag :-

The site is a small, rocky outcrop on the edge of the desert limestone rock formation. The kom is now surrounded by a small ezbet called Ezbet El-Bank and covers an area of approximately 120 m from north to south and 200 m from east to west. It is approximately 4.5 m high above the level of the fields and is now used as a manure store and animals are kept in small sheds on the hill by the nearby village (Fig. 46). The fields to the south of the main mound are covered in sherds and must be considered as part of the actual antiquities.

Fig.46 - View from the top of Kom El-Hag, showing the height of the hill above the surrounding fields.

37- Kom Ishu :-

The site is situated upon a limestone outcrop at the edge of the northern limestone formation. The dimensions of the rocky outcrop are 150 m from east to west and 200 m from north to south. The rock has a maximum height of approximately 4m and has some steep, almost sheer sides. It is surrounded on most sides by the village, to the north by a new sports centre and on the north-west by fields. It is covered now with a modern cemetery (Fig. 47) and some ancient pottery can be found on the ground surface. Some mud brick temporary animal huts were being built on the lower southern slopes. Both Kom El-Hag and Kom Ishu are situated on the southern limits of the old Lake Mareotis .

Fig. 47 - The sheer sides of Kom Ishu with a modern cemetery on its summit.

38- Kom El-Farag :-

This site is under a modern town (Fig. 48). From the top of a new school building which stands on a high point in the landscape, the view along the main street of this town seems to be a line of sight down the side of the low, sloping mound. From here two other sites were clearly visible to the north-west — Kom Makboura and Kom El-Jil — and to the north Kom El-Mahar could be seen in the distance.

Fig. 48 - View from Kom El-Farag with Kom el-Jil in the middle distance.

39- Kom El-Mahar: -

The site covers an area of 440 m from north to south and 200 m from east to west. The main part of the site consists of a 10-12 m-high mound to the north of the area covered in pottery. The soil is very sandy and contains many sea shells. In fact, the name of the site means ‘shell’ and shelly deposits are apparent all over the mound and in the sections as well. To the south-west, the lower slopes of the mound have a modern cemetery built on them and the south-east area of the site has been dug out and flattened. It is now surrounded by deep irrigation ditches and fields which are encroaching on the outer parts of the site. A section cut out of the north-western side shows ashlar limestone blocks, a

wall made of sandy mud bricks and shell-filled, mud bricks. There are also some fragments of red granite on the mound and a noticeable amount of glass is mixed in with the pottery which includes fine wares such as African Red Slip pottery. Pottery can thus be dated to the 6th century AD, but there is also some earlier material from the Ptolemaic period. This site may have been connected with the former site at Kom El-Farag, as they are very close and were possibly on the line of a river channel, one of the distributaries running west from the Canopic branch. The soil showing the distinctive white colour of the ground surface (Fig. 49) caused by the shelly soil once used to make mud bricks.

Fig. 49 - The lower, northern slopes of Kom El-Mahar,

40- Tell Sidi Ghazi:-

No tell exists here now and it seems to have been subsumed under a village.

41- Kom Defshu :-

Kom Defshu is a large archaeological area with several distinct zones, but it is mostly obscured underneath a large modern cemetery belonging to the nearby villages of Ezbet Mohammed El- Din and Zinzu. The whole area is at least 530 m from east to west and by 410 m from north to south. The 1:50,000 Survey of Egypt map preserves the name of Defshu only in the canal running nearby.

The main area consists of a mound sloping gently up to the north-west with a high point of about 10-12 m above the level of the fields and adjacent villages. This area is covered with modern tombs (Figs 50 & 51) and Aloe Vera plants The section shows good stratigraphy with layers of pottery, smashed limestone and some cut away sandy brick and mud brick walls. Some of these walls are quite substantial and may represent large administrative buildings or enclosures rather than houses.

Fig. 50 - View from the south-west across the mound with modern cemetery at Kom Defshu.

Fig.51 - Section of the Kom Defshu mound at the north-west side.

The zone to the south of the cemetery mound is a flat sandy area, may be about 1 to 2 m above the level of the nearby fields and orchard. In the section at the south-western side there are pottery coffins buried about 1 m below the surface, suggesting that this sandy area of the site was the cemetery area in antiquity.

Kom Defshu is to the west of the major site of Schedia, which was the port for Alexandria. Defshu could have provided a defensive outpost or town which had existed before Alexandria was founded and into the Roman period. Pottery from the site has been identified as Saite, Ptolemaic and 2nd century AD and confirms the impression that the site may have Pharaonic origins.

42- Kom El Terfayeh: -

This site is now subsumed under the village of the same name in this place. It is on the edge of the Idku Marsh area and a series of fish farms (Fig. 52). No pottery collection was made here. Two cores were drilled near the modern village in order to obtain information about the marshland and river channels here. The cores showed the presence of the former lake and marsh area to the east, with possible shores indicated by dense shell layers. This area is now a fish farm.

Fig. 52 - View from the village of Terfayah to the east across the fish farms

43- Kom El-Dahab :-

This small mound is located in the fish farms of 'Lake' Edku and is visible from the main new road across Idku running from Rosetta to Alexandria. It is shown on the 1:50,000 Survey of Egypt map. The site is roughly circular, with maximum approximate dimensions of 236 m from north to south and 165 m from east to west. The central mound of is approximately 5 m high with a crescent shaped ridge (Figs. 53&54) on the northern side of the site and the surrounding area is either flat or forms the gently sloping sides of the hill. The ditches around the site and some of the embankments around it contain pottery, so that it is likely that the mound is a smaller remnant of a once more extensive site

Fig. 53 - View from the south-east, Kom El-Dahab.

The survey traced the sides of a mud-brick feature on the top surface of the mound . This building has an entrance on the southern, long side and the pitched sides face towards Terfayah. It is reasonable to suppose that one side directly faces the town and the river which flowed between the town and this site.

The shape of the defensive walls is identical to a fort that once existed at Kom Dikke and two on the Abu Qir promontory called Fort Sab and Fort Tawfiq. The shape suggests that they were designed for cannon and so the fortification is most likely to be Napoleonic or nineteenth century in date.

Fig. 54 - The curtain wall at Kom El-Dahab looking towards the sea.

The brown area to the right of the white powdery area represents the wall, a corner of which is marked with the ring road. The whole surface of the mound was covered in Late Antique Roman pottery, glass and bronze coins (mostly very corroded), suggesting that the modern fort was built on top of an ancient site of some description.

The drill cores transect across the site of Kom El-Dahab from east to west showed the underlying marsh and river channels in the area prior to the formation of the alluvial mound upon which the present mound was founded. There may have been a pre-existing sand bar or gezira in this location which served as a strategically placed control post for the Canopic mouth of the river. The earlier feature at the site may have been part of the Late Antique defense chain which was later reused for the same purpose, but with a new structure. Alternatively the modern fort may have been constructed from earth brought from a nearby ancient site, such as Kom Terfayah and so the whole mound is redeposited from another place.

44- Kom Mazen:-

There is a village called Kom Mazen by the locals, but it seems to be known on the Survey of Egypt map as Bulin. This area is now covered by an orchard and fields. Some pottery is visible lying on the fields and in drainage ditches, but it is not very numerous. The canal running past Bulin is called the Kanoubiya Canal, a memory of the river channel which once runs close to the area. Two drill cores were made in this northern area and both were very similar. After a brief top soil layer, there was alluvial silt from about 0.5m to 3m, and then a gradual change to a sandy matrix with a blue-black colour. A second transect was made through the village of Bulin, starting in a field next to the Kanoubiya Canal. Core 3 consisted of silty alluvium to about 4.5m when it became sandier and darker in colour, with much brown-orange mottling; Core 4 next to the mosque had some modern rubbish on the surface, but then alluvial mud turning to a sandy dark matrix at about 3.5m. This pattern was repeated in Core 5 to the east of the village.

From the evidence of the field survey and cores, it is difficult to believe that there ever was an antiquities area at Kom Mazen. The scatter of pottery in the fields could have come from elsewhere and there is no depth or quantity to any of the pottery in the cores; it is at the surface when it does occur. The underlying geomorphology shows good alluvial land for the last thousand years based on sedimentation rates, and before that sandy soil, perhaps from the sand hills, with organic material.

45- Kom El-Qadi :-

The site is marked on the 1:50,000 Survey of Egypt map as a village Kom Qadi and a mound north-west of the Ezbet Abdu Pasha. There may be some confusion in the naming of the sites in the area as there is also a site called Abdu Basha . The site is now a sprawling area with several distinct zones covering an area of about 370 m from east to

west and 170 m from north to south. The main archaeological area is a high mound around 8 m high whose southern and northern faces have been cut away to form sheer sections (Fig. 55) . The southern sections show sandy brick walls, pottery deposits and human burials in both pottery coffins and brick vaults. On the eastern side there is a substantial mud-brick wall.

Fig. 55 - Section through the main mound at Kom El-Qadi.

Within the village there is a Roman bath-house (Fig. 56) which has been restored recently and more chambers can be seen on a sandy area to the east of the village and main mound. A further sandy area lying to the east and a patch of extensive low scrub on the north-east of the village may have been part of the original site.

Fig. 56 - Kom El- Qadi with part of a Roman floor and looking towards the main mound.

46- Tell El-Kanaies :-

It consists of an area under the village, for example near an old saqiya there was a concentration of pottery sherds and some bone fragments. Further beyond the village there are two low mounds, either side of a canal. The mound nearest the village was used as an a cemetery (Fig. 58) whose tombs had been almost all removed, except for one empty building left in the centre. A few pottery sherds were noticeable on the ground and a fragment of a quartzite mortar with lug handles was found on the surface. The second mound was a functioning cemetery, with a noticeable set of graves decorated with distinctive tombs. These belonged to the local wealthy family. A fragment of a granite grinding stone lay in the cemetery and lying on the pathway beside the cemetery there was the top part of a granite grinder. A fragment of an alabaster mortar with a lug handle was found in this area.

Fig. 57 - Mound with abandoned cemetery at Tell El-Kanaies.

47- Kom El-Giza and Kom El-Hamam :-

These sites are the location of the ancient port of Alexandria, Schedia, which is well attested from documentary sources. There are several distinct zones in the two main areas of the site. At Kom El-Giza a bath-house (Fig. 58), which has been well restored so that its original plan can be seen; a large sandy-mud ridge; and excavated red brick buildings.

At Kom El-Hamam: a substantial red brick structure with a number of large square piers with red brick bases and limestone and mortar caps; ridges and mounds of sandy-mud brick structural elements; and a cistern (Fig. 59). One of the excavated areas contains grinder -stones made from red granite and black basalt.

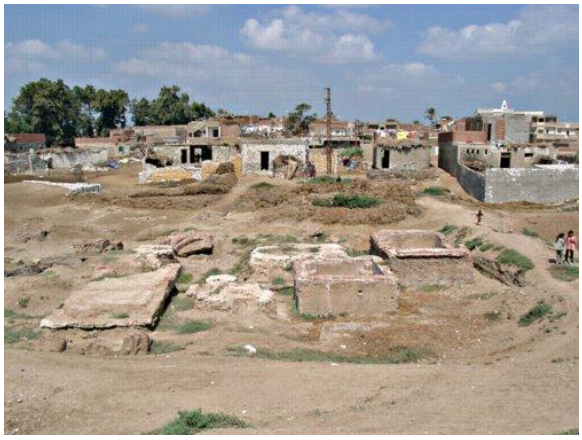


Fig. 58 - Buildings at Kom El-Giza.

Fig. 59 - Kom El-Hamam .

48- Tell Sherif Khalaf :-

This site is now overbuilt by houses and nothing can be easily seen of the any archaeological material. The highest point of the village is 6 to 7 m above the level of the fields and represents the side of the original mound which was cut off and truncated by the fields on the north-western side. According to the Survey of Egypt 1:50,000 map Ezbet Sharif is in this location, but they do not seem to be visible now. The pottery studied at the site is a collection of Ptolemaic and 7th century AD material.

V-5-Mahmudiyah Area :-

Mahmudiyah lies on the west bank of the Rosetta branch, opposite the town of Fuwa. It was a major crossing point on the river and some have suggested that it was the site of ancient Metelis.

49- Sidi Uqaba :-

This site was probably once one mound but it now consists of three separate small hills covered by a cemetery, with an excavated depression lying in the centre of the site and a flatter area, now a football pitch, to the south.

The area covered by the site is 260 m from north to south and 270 m from east to west. The highest mound at the site is around 4 m above the level of the surrounding fields. On the southern side of the site there is a small area of reed and grass scrub which is still regarded locally as Antiquities' land. To the east of it, there is another small cemetery mound upon which is the tomb of Sidi Uqaba.

Fig 60 - Cemetery at Kom Uqaba.

50- Kom El-Ghuraf :-

This site was visited in 2002 by the Delta Survey and now is the concession of an Italian Mission from the University of Rome, which has excavated some red brick (Fig. 61) of Late Antique tombs.

Fig. 61 - View from the top of Kom Ghuraf, with red brick structure embedded in the mound on the left.

51- Kom El-Wast :-

This site lies 2 km to the north of the latter and can be seen from it. The site is around 400 m from north to south and 400 m from east to west. The kom has a maximum height of 6 m above the level of the surrounding fields. The site consists of a flat outer area, slightly raised above the level of the surrounding fields, with a mound in the centre. The high southern part of the mound slopes down towards the north, where it forms a low ridge at the north end of the site. The centre of the mound, however, has been dug out and now forms a significant hollow in the centre of the site. This evidently fills with rainwater.

VI – CANOPIC DRILING STUDIES

The Western Delta Survey project has also initiated a collaborative project with Waseda University in Japan and the Department of Geology in Cairo University to carry out shallow drilling transects in the area south, east and to the north of Naukratis to traces the Canopic Branch and any distributaries from it in the Naukratis region.

From a practical point of view, such difficult movement between the main port of trade at Naukratis in the Saite period and the Saite capital at Sais does not seem plausible. Both cities would have a direct link to Memphis, but it seems to be a reasonable hypothesis that there must have been a more direct connection by waterway.

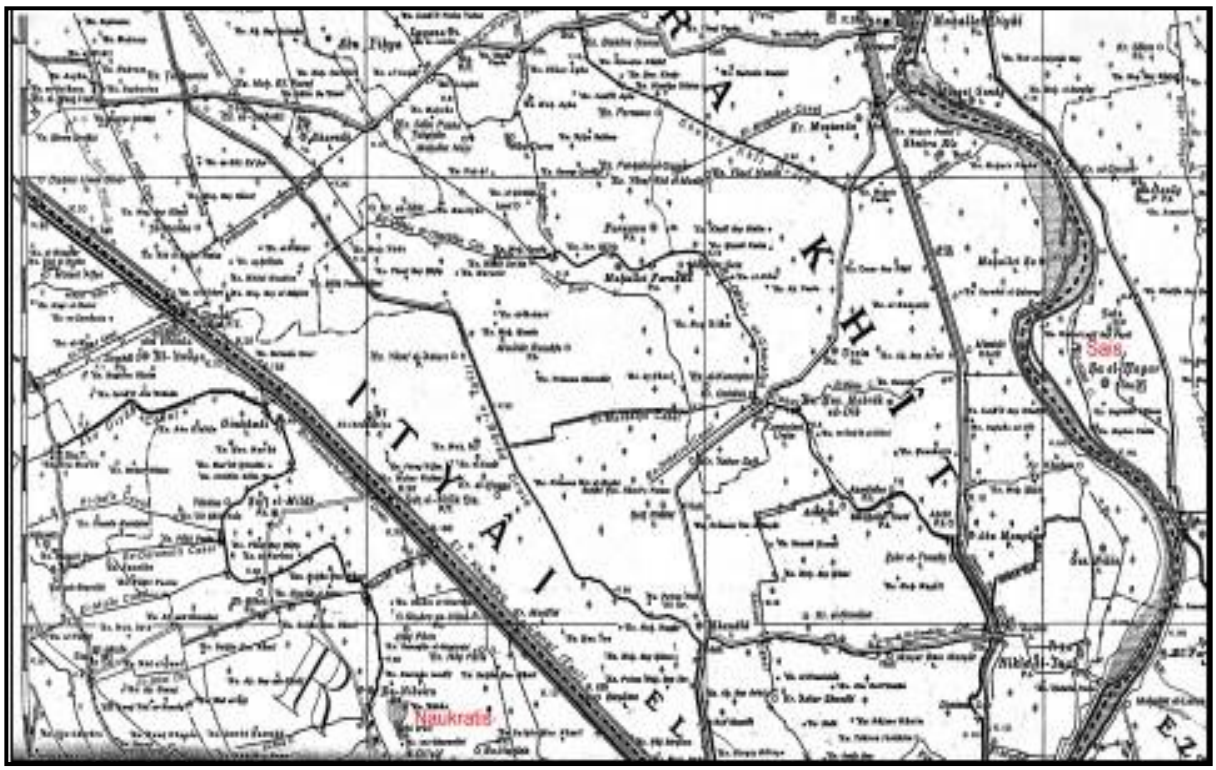


Fig. 62 - Locations map of the Naukratis and Sais, and some older canals.
(After Survey of Egypt map from 1908 at a scale of 1: 100,000)

Meanwhile, shallower drill transects are being undertaken by Al-Mansoura University team in the area from Kom Hamada to the north-west of Damanhur to investigate the possibility of archaeological sites relative to the main Canopic Branch. The channel of the river has been identified using topographic maps and satellite images and transects cut across the channel to identify the settlement patterns on either side of the river and the relationship of older and more recent villages to the river.

The combination of the detailed geomorphological data with the archaeological drill cores will provide a picture from which to establish both methodological parameters as well as to answer the specific research questions relating to the Naukratis-Sais link and the relationship between settlement patterns and waterways.

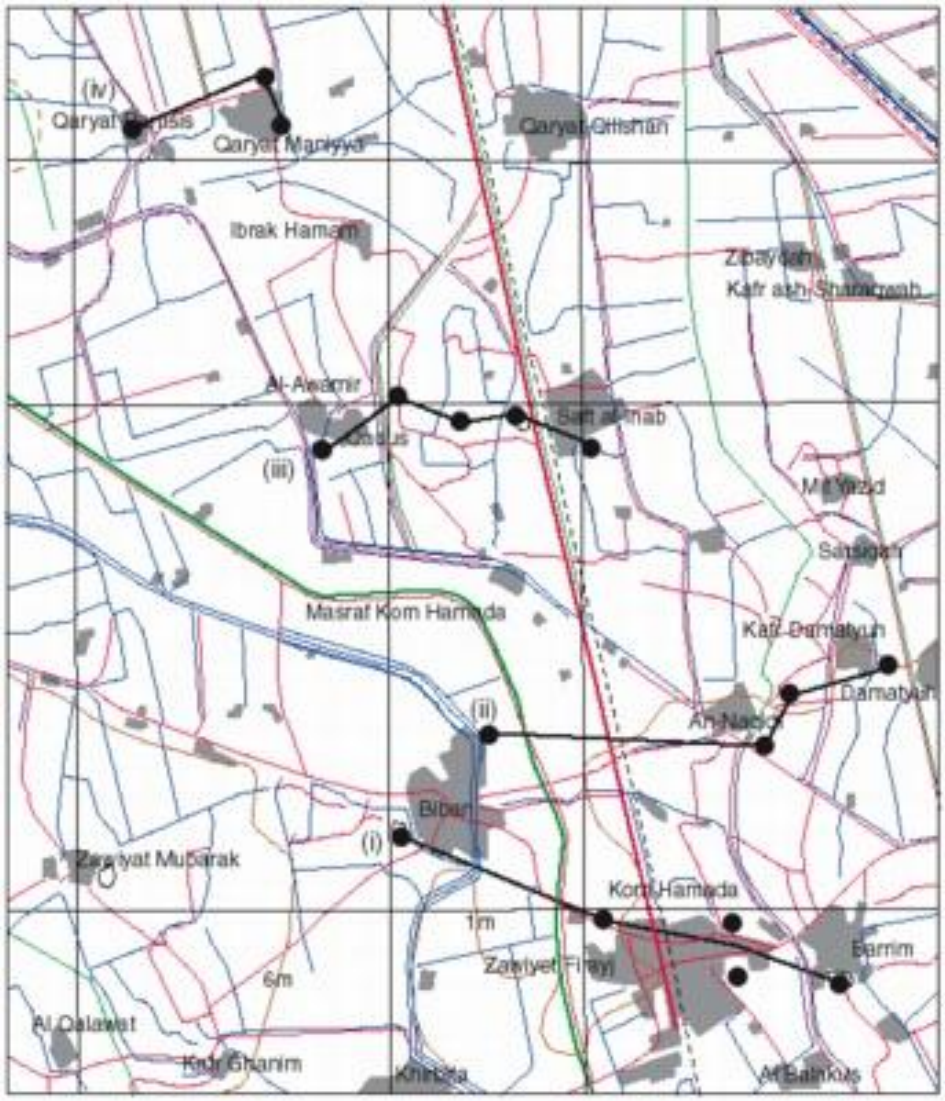


Fig. 63 - Drill Transects in Itay El- Barud

- Transect from Biban-Kom Hamada-Barrim: five drill cores were made in this transect from west to east. The cores confirmed the presence in Biban and Barrim of thick deposits of stiff silt-clay, which may be formed from river bank deposits of silt and provide a firm base for the two towns. At Kom Hamada there seems to be evidence for a river channel underneath the area to the east of the main town in the form of coarse sand and fine sand deposits.

- Transect from Biban-An-Naqidi-Kafr Damatyuh-Damatyuh, (5 cores). The satellite images suggest there is a bifurcation of the river at this point, possibly with one channel running north-east and a main channel to the north (west). The transect seemed to suggest that there was a channel to the north-east. Both of the cores around An-Naqidi and Damatyuh contained cultural material in the form of pottery sherds, in the upper strata.
- Al-Awamir-Saft El-Inab (5 cores). The area at Al Awamir showed deeper levels of pottery sherds (to 4 m) on a solid silt levee or river bank. The area between contained coarse sand at a relatively shallow level (1.3 m), which may be river or gezira sand, and at Saft el-Inab the fine sand found here may be deposited on the inside of a river bend.
- Qaryat Ramsis to Qaryat Manniya (3 cores). The area at Qaryat Ramsis had settlement layers at a depth of 6 to 5 meters with intermittent pottery sherds at 4.6 to 4 m depth. This settlement debris was sealed down by alluvial mud, but suggests there is a buried ancient site at this location. The settlement here seems to be located next to a river channel which runs close to Manniya.

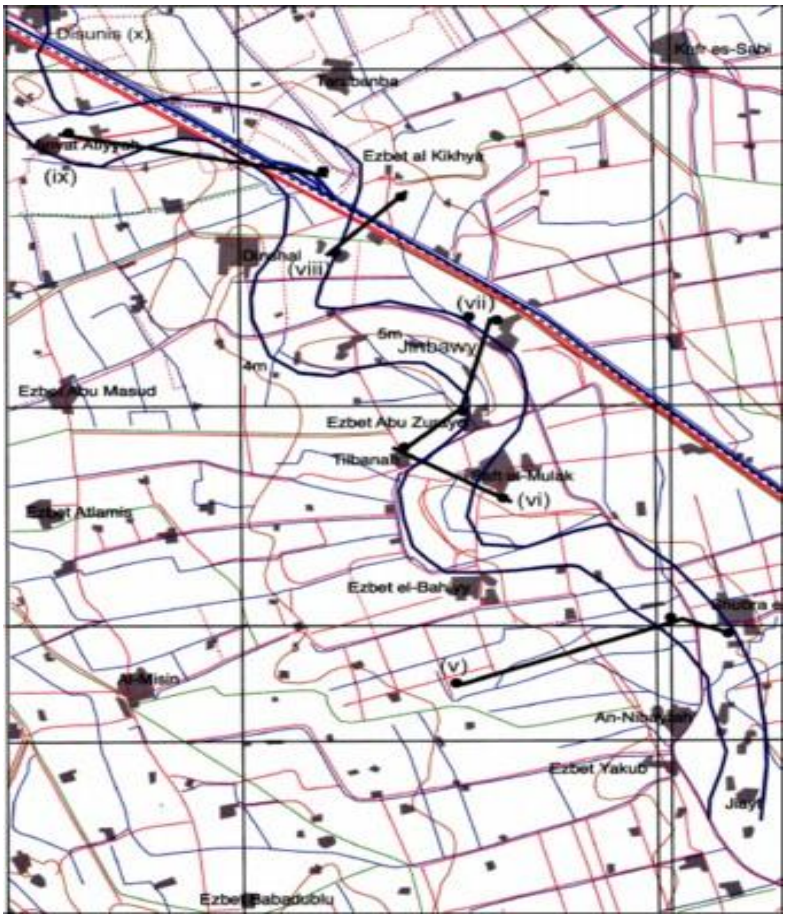
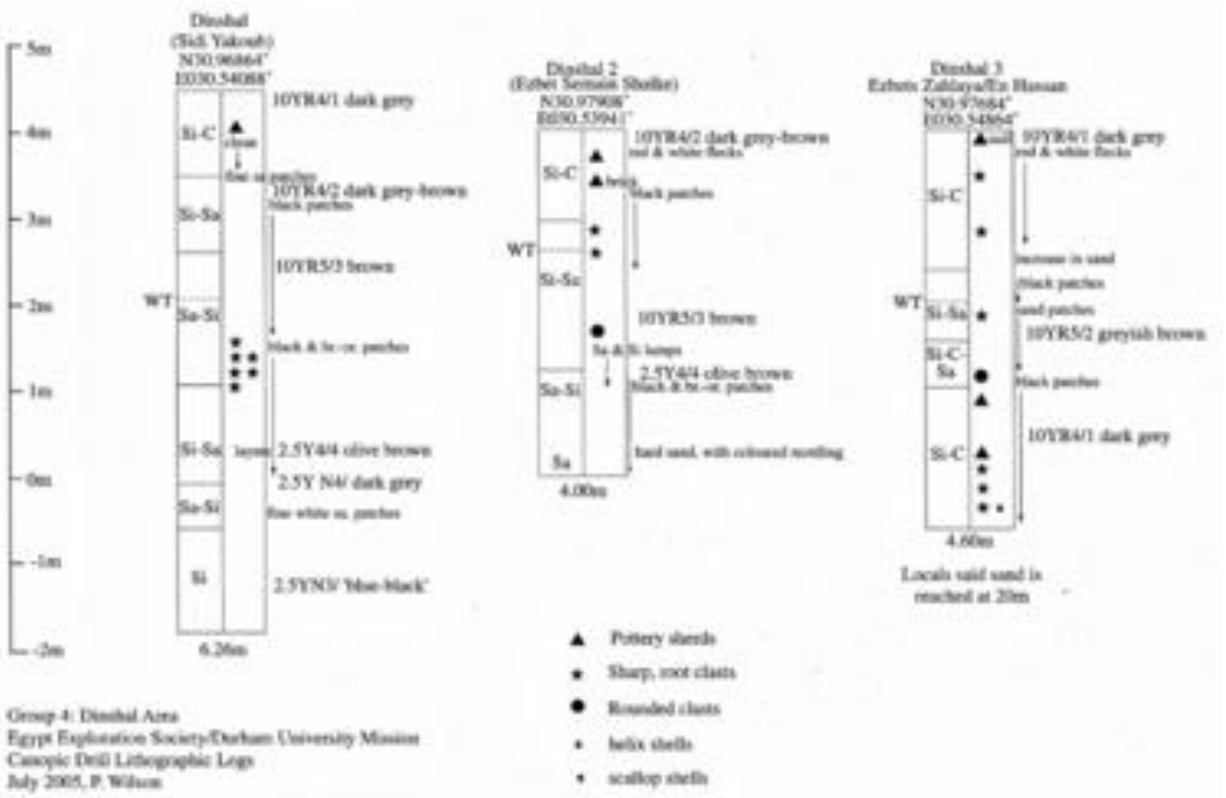


Fig. 64 - Drill Transects north of Naukratis

- Dinshal area. The first core at Ezbet Sidi Yakoub could have been river or river bank and the core tends to suggest that this is river bank with consistent periods of annual flooding. There is a band of sharp root-clasts at 3 to 3.5m below ground (2300-2600) years ago (Ptolemaic to Late Period) suggesting very dry conditions, and then at about 4 to 4.5m (3000-3450 years ago - 1000-1450 BC) a period when this area may have been swampy. At Ezbet Esmain Shalke, the core was less clear but there could have a channel or swamp at 3m down. Further east, the core was similarly difficult to interpret with interlaced sand and silt deposits, but at 3-4m below the ground surface there was pottery, suggesting a site or settlement from the Ptolemaic period and earlier.

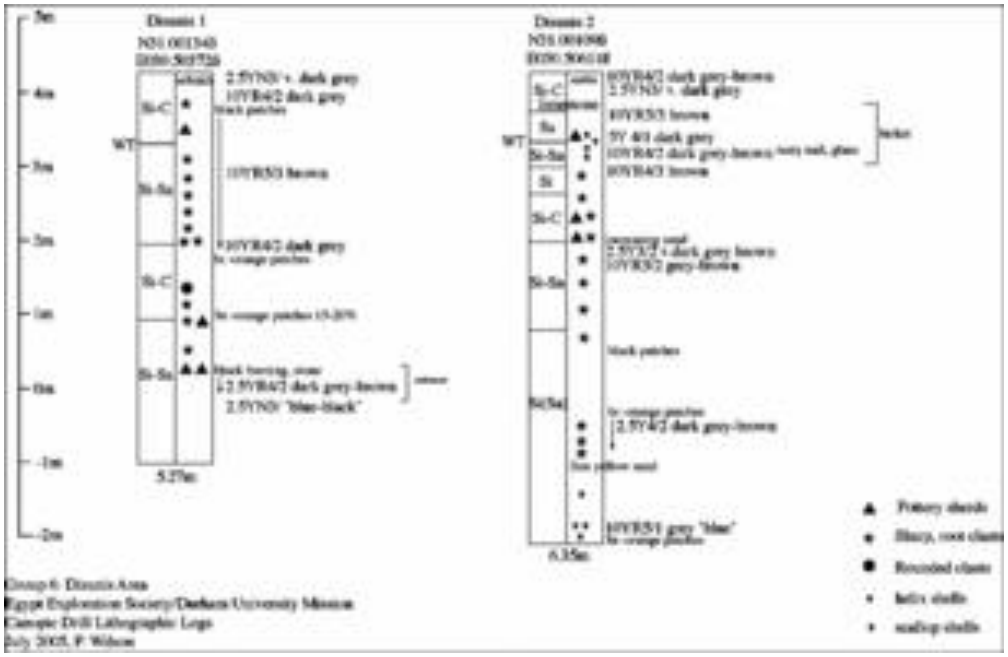


Group 4: Dinshal Area
Egypt Exploration Society/Durham University Mission
Canopic Drill Lithographic Logs
July 2005, P. Wilson

- Minyat Attiyah could have been over a river channel and the results from the core suggest some kind of swampy or marsh environment at a depth of 2.25 to 3.25m (Ptolemaic period), then a channel cut into the sand before this.

- Disunis area. The town of Disunis (Damanhur) could be situated upon a river levee and the first core to the north-west of the town, to some extent confirmed this with a series of stiff silty deposits to some depth. At 4.5m, however, there was evidence of human settlement with pottery and burnt material just above blue-black humic silt. This could date to 3461 years ago, that is around early New Kingdom times, but in practice the presence of the material at the blue-black

humic level is often more indicative of prehistoric settlement. Analysis of the pottery should give more conclusive results. The second Disunis core was drilled through an old birket in the town which was very clear in the upper levels of the core. Lower down the core there were bands of silty-sand material, with increasing sand or brown-orange mottling in places. These could represents bands of flooding, with times of relative aridity as shown by the root clasts in the soil matrix.



The Disunis drill logs.

Drill cores were made in two rough transects across the area of the site in order to understand the underlying geology and position of any river channels. The indications are that the whole site is situated upon a sand hill or levee and the depth of the settlement material and human cultural deposits (pottery and burnt material) suggests that there are different phases of settlement. The upper layers are probably of Late Roman date and are contemporary with the mud brick ramparts at the north-west corner of the tell. Beneath this are a layer of ‘clean’ sand, and then a further settlement layer at a depth of between 5.9 to 7.08 m. The soil here contains burnt material, pottery fragments and some faience, suggesting the possibility that the stratum could be Pharaonic in date.

To the north of the mound, the drills cores indicated that there was little settlement outside the immediate mound area and that the local matrix was yellow sand, with some tafl strata. The presence of broken limestone in both the cores and the sections, suggests that there was a limestone buildings here before the mud-brick structures now visible

were built. The limestone must have been broken up for mortar or gypsum powder, or quick lime as was common from the Roman period onward.

Drill Transects in Damanhur :-

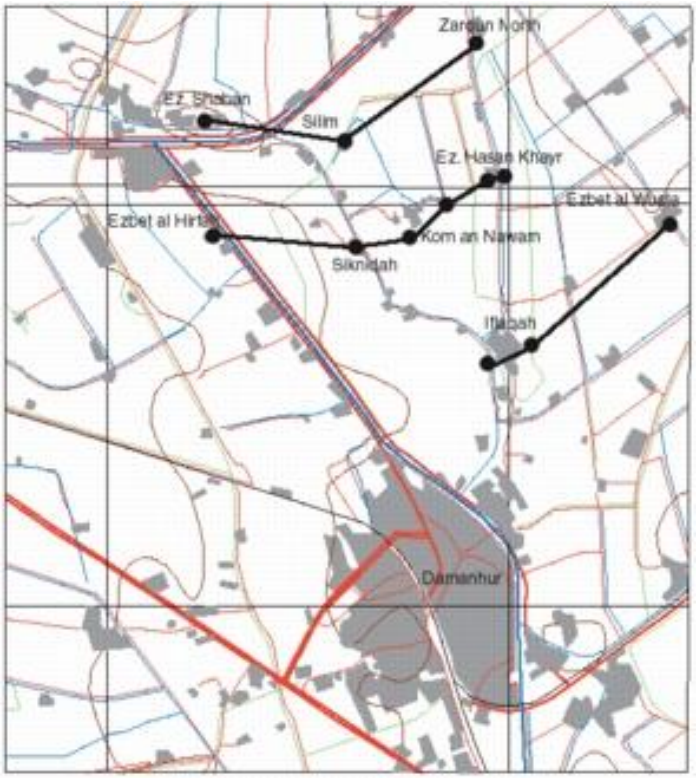


Fig. 65 - Map of drill locations north-west of Damanhur.

- Iflaqah to Ezbet el Wasta (3 cores). The indications from this transect suggest that there is a river channel to the east at El Wasta.

- Ezbet el Hirfah to Ezbet Hasan Khayr (6 cores). The channel identified above seems to continue at Hirafah implying that an ancient river channel runs from east to west to the north of the modern town of Damanhur. The channel seems, however, to be a comparatively ancient one because there was also an ancient settlement at Hirfah (now no longer apparent) in the Late Period and possibly before then. The river channel must have silted up and a settlement has been founded there perhaps from sometime in the New Kingdom onward. The archaeological site at Kom El-Nawwam may be contemporary with the new Hirfah site but did not continue to flourish for such a long period of time.

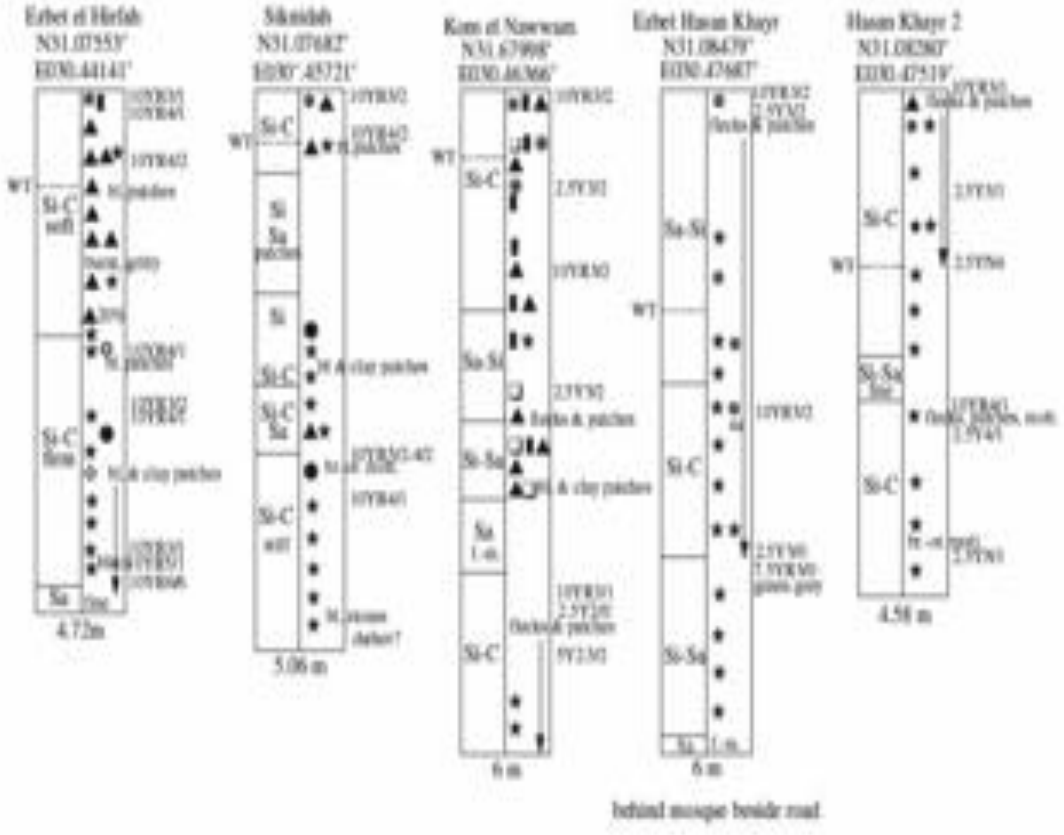


Figure 1 : Transect from Ezbet el Hirfah to Ezbet Hasan Khayr

The Hirfah drill logs.

Ezbet Shaban to El Zarqun (3 cores). Ezbet Shaban seems to be an old settlement, though probably extends back into the historic period only. The settlement is founded upon a solid tafl clay layer. The transects shows that this area is part of the alluvial plain and no river channels are evident. The information from these transects can be used to show the location of the Canopic Branch of the Nile in relation to the modern town of Damanhur, although a little more evidence is required from the area for further conclusions to be made.

Conclusions:-

In general, the cores were successful in determining the presence of river channels, possibly the old Canopic river branch, and of other areas of back-swamp (marsh) or oxbow-lake. Though the rates of sedimentation are estimation only, there seems to be a period of change in the Ptolemaic period and possibly in the New Kingdom. The Ptolemaic evidence may suggest environmental change or change brought about by human agency. The Canopic branch would have migrated over the course of its history, but the latest date from the drill cores for its silting up is in the eighth century AD, which

can be checked against historical sources. The drill cores also, unexpectedly found evidence for early settlement in two areas - at Disunis and Jinbawy, suggesting that some established settlements in the Beheira area may have longer histories than is so far attested. Further drilling in the area could build up an interesting picture of sites which were abandoned and sites which have continued over the last 3000 years.

Cairo University Coring Machine

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