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# Settlement patterns in the Northeastern Nile Delta during the fourth–second millennia B.C.

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## Introduction

Over the past four years (1984 - 1987) an archaeological and palaeogeographical survey has been conducted in the Sharqiya governate, northeastern Nile Delta, in an area of  $30 \times 30$  km around the towns of Abu Kebir, Faqus, Tell Rak and el-Huseiniya (Fig. 1).

In this project members of the Department of Egyptology and of the Department of Physical Geography and Soil Science, both of the Amsterdam University, cooperated in what has become known as the Amsterdam University Survey Expedition.

The Sharqiya governate is the third most densely populated in Egypt. As a response to the demands of a rapidly increasing rural population, land use has been intensified and there has been a sharp increase in land reclamation programs. The resultant negative effect on archaeological remains has necessitated the current survey.

The survey, divided over 4 seasons, two to three month each, was part of the research program titled "Regional diachronic investigations into settlement patterns in the northeastern Nile Delta" the scope and aims of which have been described *in extenso* in van den Brink (1987a).

A recent historical-geographical study of the eastern Delta written from an archaeological perspective (Bietak 1975), including a theoretical reconstruction of former rivers by interpretation of modern contour maps, provided an initial framework for the data collected during the survey.

The main aim of this project included the determination of potential settlement patterns in a single region and an explanation of their development through time. Special attention was paid to the environment of individual sites, the relation between the original landscape and the spatial distribution of ar-

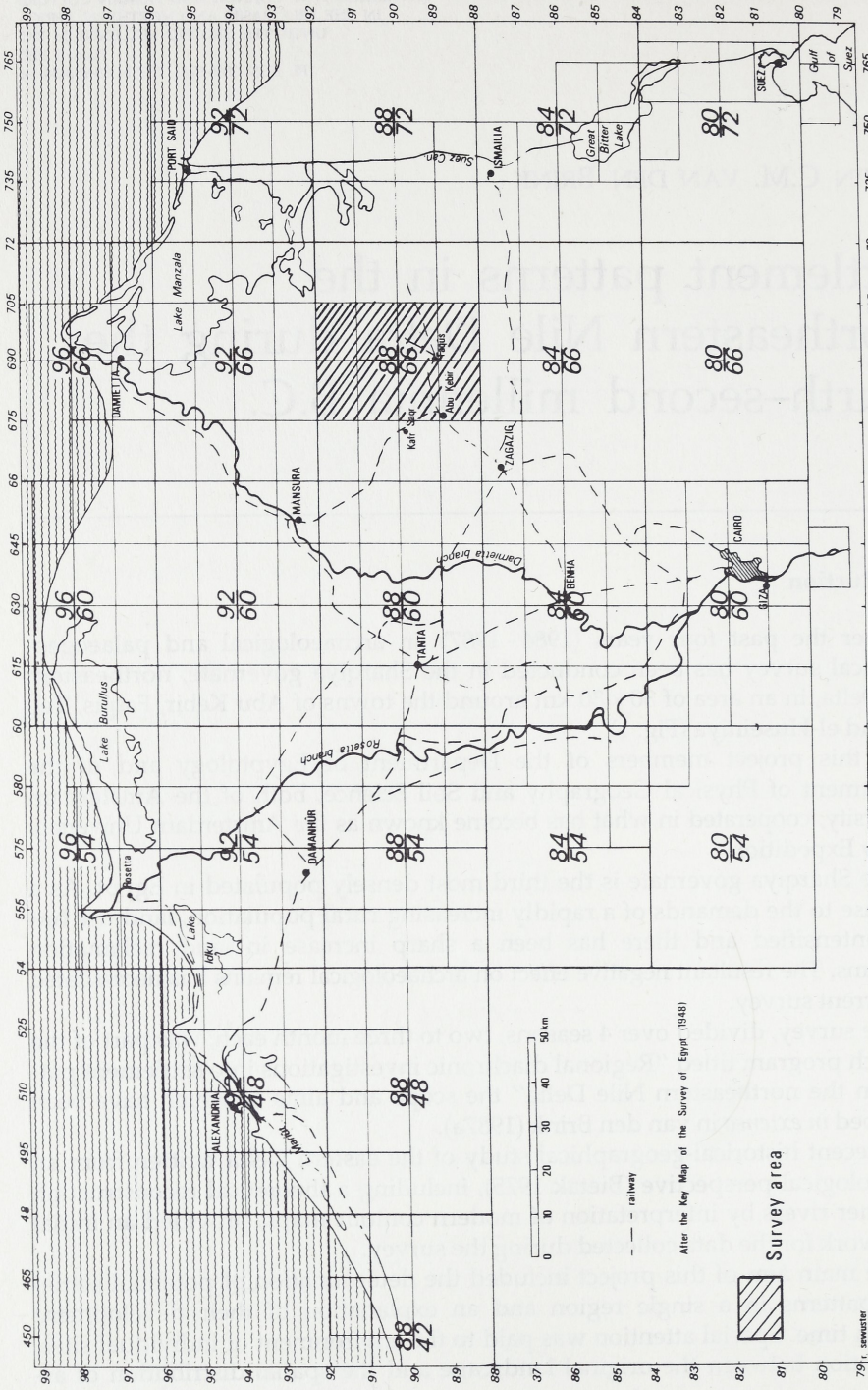


Fig. 1. Map of the Nile Delta, showing the survey area (after the Key Map of the Survey of Egypt, 1948).

chaeological remains. An attempt was made to explain the distribution patterns of these remains at least partially by their position in the original landscape. A brief exposition of the palaeo-environment of this part of the Delta is inevitable, before we can focus on the results of the archaeological survey proper.

### Geological history of the Eastern Nile Delta

"In general the natural environment of a delta, as of the Nile Delta before the construction of the Aswan dams, is subjected to continuous and relatively quick modifications. Successive cycles of deposition, erosion and redeposition produce highly complex patterns of sediments. The cyclicity of processes is governed essentially by regional factors such as variable river discharge, sealevel fluctuations and climatic oscillations. This complexity inevitable effects the palaeogeographical studies" (de Wit and van Stralen 1988a: 135).

Although the Delta has a long and respectable geological record, we confine ourselves here to that part of it which has immediate relevance to the spatial distribution of human relics, *viz.* habitation sites. For the successive rivers and types of sediments deposited in the Delta since Late Miocene times (5,400,000 B.P., *cf.* Table 1).

Table 1

Successive rivers and types of sediment deposited in the Nile Delta.

Period Age in thousand years B.P.	River	Lithology	Occurrence of sediments in the Nile Delta
0 Holocene 10	$\delta$ Neonile		
	Neonile	$\gamma/\delta$ recession $\gamma$ Neonile $\beta/\gamma$ recession $\beta$ Neonile $\alpha/\beta$ recession $\alpha$ Neonile	max. 40 m thickness
130 Pleistocene	Prenile/Neonile	gravel	absent in Delta
200	Prenile	cross-bedded sands and gravels	max. 1000 m thickness
650	Protonile	gravel, coarse sand, loam	300 m thickness
1850	Paleonile/Protonile	conglomerates	absent in Delta
	Paleonile	marine silt and clay	1000 m thickness
5400 Pliocene	Eonile/Paleonile	sand and shale	?
Miocene	Eonile	coarse sand and pebbles	bottom of Eonile can at 2500 m below the surface



Fig. 2. Western part of Geziret Sineita (partly quarried away). To the right in the background the cemetery of the contemporary village of Sineita.

As a convenient point of departure we consider the top of various layers of coarse, rounded quartz sands of Mid-Pleistocene age (700,000 - 200,000 B.P.), deposited in the Delta by the Prenile. From the heavy mineral composition, Kholief *et al.* (1969) concluded that these sand layers (reaching a maximum thickness of 1000 m) originated in the Abyssinian highlands.

Especially in the eastern Delta relics of these sediments still rise above the alluvium today, appearing as seemingly isolated sandy hills (arabic: *gezira*) in the midst of the green, arable land (Fig. 2).

Both in the past and present these large expanses of sand islands have invited extensive settlement of a permanent nature beyond the reach of the annual Nile floods. As was demonstrated during the survey, the majority of archaeological sites recorded (see further below) was located at the edges of the *geziras* in order to be as close as possible to the arable land on the alluvium and to the river, and just high enough on the *gezira* to stay out of reach of the annual inundations (*viz.* 1.5 m - 2 m above the surrounding floodplain). The parts higher up the *gezira*, and therefore at a greater distance of the alluvium, were most ideal for the location of cemeteries (van den Brink 1987b: 22, Figs. 7 - 8). The embankments of the various water courses flowing in-between these sand islands accommodated permanent settlement on a smaller scale.

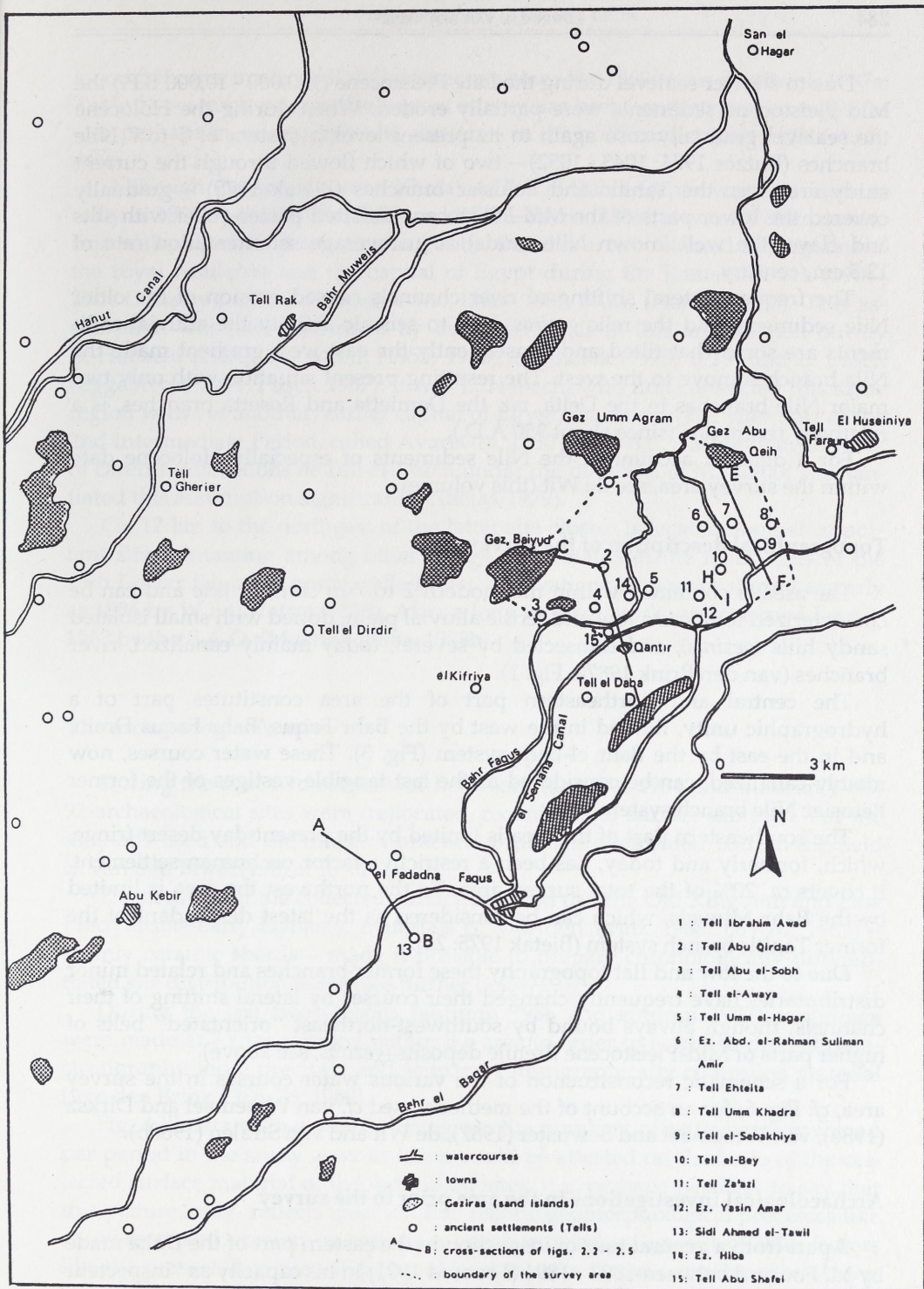


Fig. 3. Schematic map of the survey area, showing *i.a.* the position of *geziras* and a number of the recorded archaeological sites (after van Wesemael and Dirksz 1986: Fig. 2, 1).

Due to a lower sealevel during the Late Pleistocene (100,000 - 10,000 B.P.) the Mid-Pleistocene sediments were partially eroded. When during the Holocene the sealevel gradually rose again to its present level, a system of 5 to 7 Nile branches (Butzer 1974: 1043 - 1052) – two of which flowed through the current study area, *viz.* the Tanitic and Pelusiatic branches (Bietak 1975) – gradually covered the lower parts of the Mid-Pleistocene deflated palaeo-relief with silts and clays (the well known Nile muds) at an average sedimentation rate of 12.5 cm/century.

The frequent lateral shifting of river channels caused erosion of the older Nile sediments and the relic *geziras*. Due to seismic activity the alluvial sediments are somewhat tilted and consequently the east-west gradient made the Nile branches move to the west. The resulting present situation with only two major Nile branches in the Delta, *viz.* the Damietta and Rosetta branches, is a relatively recent one (since about 950 A.D.).

For a detailed account of the Nile sediments of especially Holocene date within the survey area, see de Wit (this volume).

### Topographical description of the survey area

The area is contained within the modern 2 to 7 m contour line and can be characterized today as a low and fertile alluvial plain, dotted with small isolated sandy hills (*geziras*), and transected by several, today mainly canalized, river branches (van den Brink 1987a: Fig. 1).

The central and northeastern part of the area constitutes part of a hydrographic unity, limited in the west by the Bahr Faqus/Bahr Faqus Drain, and in the east by the Bahr el-Baqr system (Fig. 3). These water courses, now mainly canalized, can be considered as the last tangible vestiges of the former Pelusiatic Nile branch system.

The southeastern part of the area is limited by the present day desert fringe, which, formerly and today, has been a restrictive factor on human settlement. It covers *ca.* 20% of the total survey area. To the northwest the area is limited by the Bahr Muweis, which can be considered as the latest descendant of the former Tanitic branch system (Bietak 1975: 28).

Due to the low and flat topography these former branches and related minor distributaries have frequently changed their courses by lateral shifting of their channels, though always bound by southwest-northeast "orientated" belts of higher parts of Mid-Pleistocene Pre Nile deposits (*geziras*, see above).

For a schematic reconstruction of the various water courses in the survey area, *cf.* Fig. 6; for an account of the methods used *cf.* van Wesemael and Dirksz (1986), van Wesemael and Sewuster (1987), de Wit and van Stralen (1988b).

### Archaeological investigations in the area prior to the survey

Apart from a general tour of inspection in the eastern part of the Delta made by M. Foucard between 1893 - 1894 (Foucard 1901) in his capacity as "inspecteur du service des antiquités" and beside a number of mainly limited soundings at

an odd 15 sites made by E.A.O. inspectors since the 1960s (van den Brink 1987a: Table 1), research prior to the current survey has been concentrated on two sites – or perhaps more correctly site clusters – in the northeastern part of the study area.

Although the area between Khata'na/Tell el-Dab'a-Qantir was examined as early as 1885 by E. Naville (1887) and W.F.L. Petrie (1888), it was M. Hamza who first realized, while excavating in Qantir, that this area contained the remains of the royal residence and the capital of Egypt during the Ramesside era (19th - 20th Dynasty), called Piramesse (*ca.* 1300 - 1080 B.C.), (Hamza 1930). This assumption was later confirmed by the excavations in this area carried out by L. Habachi (1954), Sh. Adam (1955; 1958), M. Bietak (1975; 1979) and E. Pusch (Eggebrecht 1981; Pusch 1987). It was L. Habachi who first connected this same region with yet another, earlier capital of Egypt, *viz.* during the later part of the 2nd Intermediate Period, called Avaris (*ca.* 1650 - 1540 B.C.). More than 20 years of careful excavations at Tell el-Dab'a under the direction of M. Bietak substantiated this assumption significantly (Bietak 1979).

*Ca.* 12 km to the northeast of the latter site cluster is located another important site, containing among other things the remains of the metropolis of the 19th Lower Egyptian nome, called Imet. Excavations here were started as early as 1886 by W.F.L. Petrie (1888). After a long interval work was resumed here in 1962 by the E.A.O. (Mustafa 1988a; 1988b).

### The archaeological survey

During the first two seasons of fieldwork (autumn 1984 and autumn 1985) 92 archaeological sites were (re)located, recorded and surface sampled. For the methods used and the range of practical problems confronted with in the field *cf.* van den Brink (1987a: 10 - 11).

The analysis of the collected surface material (for the Old Kingdom and Late Predynastic–Early Dynastic materials *cf.* van den Brink 1988: 66 - 76; 1989) – mainly ceramic sherds – made it possible to prepare chronologically differentiated site distribution maps (see further below).

During the last two seasons (autumn 1986 and autumn 1987) soundings were made at 7 sites selected within the area in order to establish their chronostratigraphy more precisely and to extract stratigraphically controlled material (van den Brink 1988: 76; 1989).

Fig. 4 illustrates in a simple histogram the numbers of settlements involved per period in the study area, as far as could be attested on the basis of the collected surface material of the individual sites. It is perhaps needless to say that this picture only reflects part of the reality; geomorphological processes like alluviation and erosion as well as a number of other, uncontrollable, factors like the present-day intensification of land use, the illegal activities of *sebakheen*, *etc.*, all affect site-discovery in a negative way.

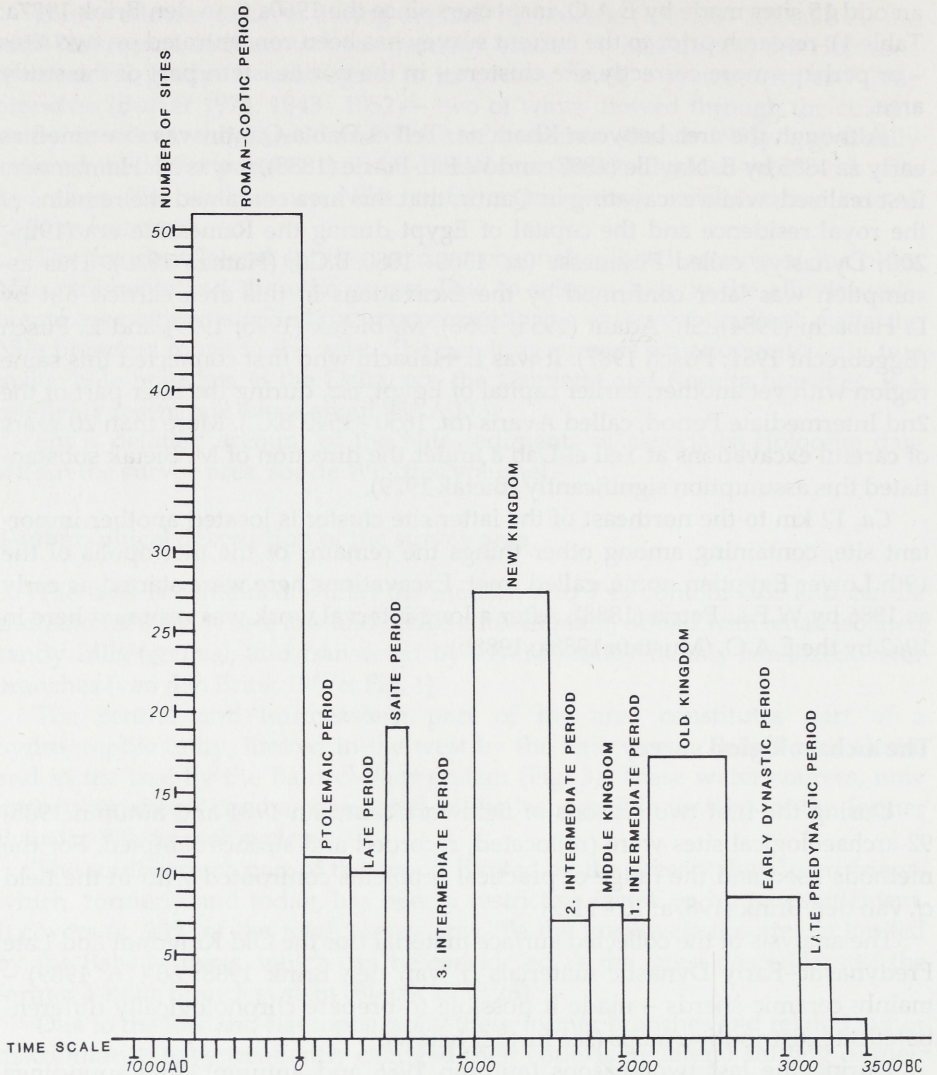


Fig. 4. Histogram showing the numbers of sites per period within the survey area.

Whatever the degree of distortion may be – which is difficult to estimate and/or to correct for – some significant information nonetheless emerges, for instance, an observed sharp decrease in the number of settlements after the collapse of the New Kingdom (ca. 1,080 B.C.).

There are 27 New Kingdom sites with attestable material while the succeeding period (the Third Intermediate Period) only has a mere three. Although future research may redress the balance by making material of the latter as recognizable as that of the former, the downward trend seems real enough.



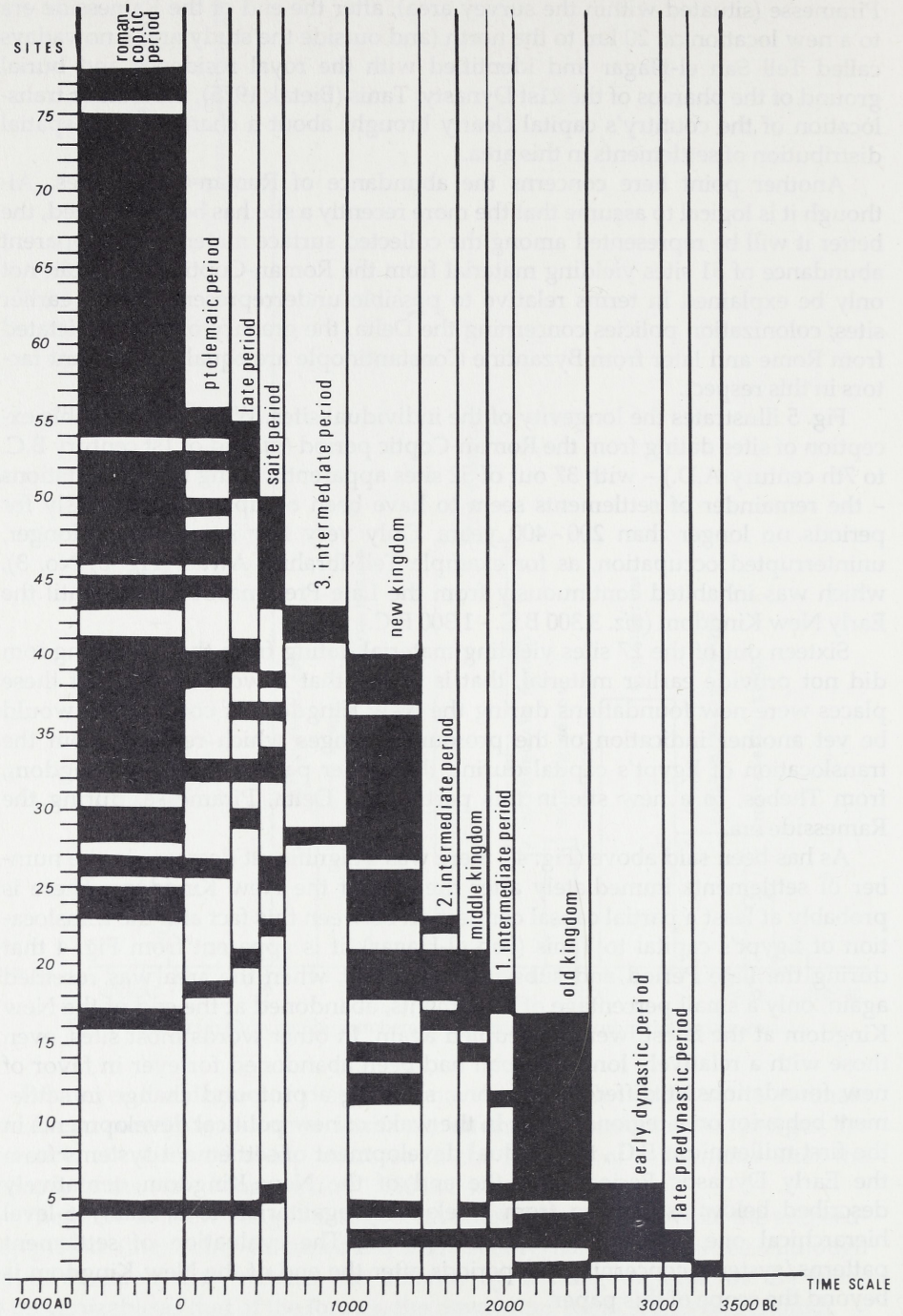
A possible explanation could be the contemporary shift of Egypt's capital, Piramesse (situated within the survey area), after the end of the Ramesside era to a new location *ca.* 20 km to the north (and outside the study area), nowadays called Tell San el-Hagar and identified with the royal residence and burial ground of the pharaohs of the 21st Dynasty, Tanis (Bietak 1975); the shift or translocation of the country's capital clearly brought about a change in the spatial distribution of settlements in this area.

Another point here concerns the abundance of Roman-Coptic sites. Although it is logical to assume that the more recently a site has been occupied, the better it will be represented among the collected surface material, the apparent abundance of 51 sites yielding material from the Roman-Coptic period can not only be explained in terms relative to possible underrepresentation of earlier sites; colonization policies concerning the Delta, the granary of Egypt, dictated from Rome and later from Byzantine Constantinople are equally dominant factors in this respect.

Fig. 5 illustrates the longevity of the individual sites. With the noticeable exception of sites dating from the Roman-Coptic period (*ca.* end of 1st century B.C. to 7th century A.D.) – with 37 out of 52 sites apparently being new foundations – the remainder of settlements seem to have been occupied continuously for periods no longer than 200 - 400 years. Only very few sites show a longer, uninterrupted occupation, as for example Tell Ibrahim Awad (Fig. 5, No. 3), which was inhabited continuously from the Late Predynastic Period until the Early New Kingdom (*viz.* 3,300 B.C. - 1,300 B.C.).

Sixteen out of the 27 sites yielding material dating from the New Kingdom did not provide earlier material, that is to say that it would seem that these places were new foundations during the New Kingdom. If correct, this would be yet another indication of the profound changes which resulted from the translocation of Egypt's capital during the earlier part of the New Kingdom, from Thebes, to a new site in this part of the Delta, Piramesse, during the Ramesside era.

As has been said above (Fig. 4), there was a significant decrease in the number of settlements immediately after the end of the New Kingdom. There is probably at least a partial causal connection between this fact and the translocation of Egypt's capital to Tanis (San el-Hagar); it is apparent from Fig. 4 that during the Late Period and subsequent periods, when the area was resettled again, only a small percentage of settlements, abandoned at the end of the New Kingdom at the latest, were reoccupied again. In other words most sites, even those with a relatively long life span had been abandoned for ever in favor of new foundations at different locations, showing a profound change in settlement behavior on a regional scale. In the wake of new political developments in the first millennium B.C., the gradual development of settlement systems from the Early Dynastic Period until the end of the New Kingdom, tentatively described below as starting from a relatively egalitarian to a finally 6-level hierarchical one, had come to an abrupt end. The evaluation of settlement patterns/systems concerning the periods after the end of the New Kingdom is beyond the scope of this paper.



## Settlement patterns and settlement systems

Having prepared chronologically differentiated settlement maps, and subscribing to the fact that "human behavior has spatial corollaries", and that "some of the corollaries can be expressed as point maps" (Pinder *et al.* 1979: 430), *i.e.* that point maps (here representing settlement locations) can be considered to a certain extent as spatial expressions of human behavior, we can start to look for meaningful patterns – if any – in the data obtained through the survey. We will try to identify the "empirical patterns" (expression by Flannery 1976: 162) drawn from our data, adequately characterizing the regularities perceived, in order to reveal glimpses of any underlying system which may have generated these patterns.

The developments of formal methods of spatial analysis in archaeology, especially during the last two decades, have provided us with a variety of statis-

Fig. 5. Histogram showing the longevity of the individual sites within the survey area.  
 Legenda of the numbers 1 - 78.

- |                                      |   |
|--------------------------------------|---|
| 1. Tell Gez. el-Masha'a              | 40. Aulad Musa                              |
| 2. el-Tell el-Iswid (south)          | 41. Kom Sultan Khadr                        |
| 3. Tell Ibrahim Awad                 | 42. el-Alaagma                              |
| 4. Tell Abu Dawud                    | 43. el-Fadadna (Tell Mindar)                |
| 5. Tell Far'un                       | 44. Tell Tukh el-Qaramus                    |
| 6. Tell Gherier                      | 45. Tell el-Riyad                           |
| 7. Tell el-Khasna                    | 46. Ezbet Tell Abu el-Rus                   |
| 8. Tilul Moh. Abu Hasan              | 47. Tell el-Bey                             |
| 9. Tell el-Dirdir                    | 48. Gez. Abu Mitawi                         |
| 10. Tell Ginidba                     | 49. Tell Abu Husa                           |
| 11. Tell el-Marra                    | 50. Tell Umm el-Hagar                       |
| 12. Tell el-Akhdar                   | 51. Tell el-Shaqf                           |
| 13. Tell el-Abbasiya                 | 52. Ezbet Salih Rif 'at                     |
| 14. Tell Umm 'Agram                  | 53. Tell Abu Kharufa                        |
| 15. el-Tell el-Iswid (north)         | 54. Urban Gez. Abu Imran                    |
| 16. Tell Umm el-Zaiyat               | 55. Gez. el-Nisf                            |
| 17. Tell Gez. el-Faras               | 56. Faqus                                   |
| 18. Tell el-Hagge                    | 57. Tell Muftah                             |
| 19. Tell el-Dab'a                    | 58. Tell Mirdas                             |
| 20. 'Arab el-Sheikh Mubarak          | 59. Gez. el-Tawila                          |
| 21. Tell Fauziya                     | 60. el-Dimeiyin                             |
| 22. Ezbet Hilmi (Tell Qirqafa)       | 61. Tell Gindiya                            |
| 23. Tell Farasha (Tell Maghud)       | 62. Tell el-Hilayla                         |
| 24. Tell Samuni                      | 63. Tell el-Barriya                         |
| 25. Ezbet el-Shuhada (Ma'askar)      | 64. Ezbet Rushdi Kebira (Tell Abu el-Filus) |
| 26. Sidi Ahmed el-Tawil              | 65. Tell Abu el-Sobh (Tell Safra)           |
| 27. Ezbet Razaiga                    | 66. Tell Abu el-Shaf'ei                     |
| 28. el-Salatna (Tell Abu Samandi)    | 67. Ezbet Yasin 'Amar                       |
| 29. Gez. Sultan Hasan                | 68. Ezbet Heiba                             |
| 30. Ezbet Gayel                      | 69. Gez. Sineita                            |
| 31. Qantir                           | 70. Tell Abu Qirdan                         |
| 32. el-Tell el-Abyad                 | 71. Tell Habrash                            |
| 33. el-Tell el-Ahmar                 | 72. Tell el-Batal                           |
| 34. Tell Za'azi                      | 73. Tell Atrash                             |
| 35. Ezbet Abd el-Rahman Suliman Amir | 74. Tell Ehteita                            |
| 36. Tell Abu Suliman                 | 75. Tell Abu Qeih                           |
| 37. Tell Gimeima                     | 76. Tell el-Shuwan                          |
| 38. el-Kifriya                       | 77. Tell el-Sebakhiya                       |
| 39. Tell el-'Awaya                   | 78. Sintiris                                |

For the exact location of these sites *cf.* van den Brink 1987a: Fig. 1 and Table 1.

tical and analytical methods to approach questions in this field. They include techniques such as nearest-neighbor analysis, various forms of quadrat analysis and – concerning more in particular the interpretation of *e.g.* stratified society settlement patterns – the construction of central-place models and the application of rank-size (normally population size) analysis.

Appropriate application of any of these procedures to the data collected, with the exception perhaps of nearest-neighbor analysis, is hampered by the fact that archaeological survey data generally “rarely include more variables per period than site location and the site size” (Paynter 1983: 238). In our case, moreover, for reasons explained already elsewhere (van den Brink 1987a: 10, 13) even the data concerning site size have real significance only in a very few cases. It is therefore not possible to establish relationships between site size and actual settlement size, or between settlement size and population size, information essential for application of the rank-size rule for instance, an analytic procedure analyzing the entire distribution of settlement sizes without requiring the isolation of individual hierarchical levels.

Our approach, therefore, towards identification and understanding of patterns in the spatial distribution of the recorded sites, has been to give in the first place an objective description of the point maps by using nearest-neighbor analysis together with a general characterization of regularities observed, and in the second place to try to offer some tentative explanations of these patterns by using contextual or circumstantial information.

### Discussion of the spatial distribution of settlement sites from the Early Dynastic Period through the Old Kingdom (*ca.* 3,150 - 2,185 B.C.). An attempt to describe and to comment on the “empirical” patterns

#### Introduction

As a first step to describe the individual point maps or site distribution maps, the nearest-neighbor statistic ( $R_n$ ) was calculated for each of the distinguished periods. This analysis (developed by plant ecologists) concerns itself only with location points (here human settlements) in space and it does not use any further contextual information. The  $R_n$  values thus obtained are a description of spatial patterns by distance to the first nearest-neighbor, expressible in general terms by four basic point patterns employed by archaeologists as goal models, *viz.* linear, random, clustered, dispersed.

Being aware of the fact that “underestimation is an inherent flaw of the technique”, particularly “...when point populations are small” (Pinder *et al.* 1979: 430 - 431), due to what has been labelled by Johnson (1981: 167) as the “boundary effect”, *i.e.* the problem that boundaries of a study area are not likely to coincide with the boundaries of a complete settlement system, and *ergo* it is unlikely to recover the entire pattern of a past system, thus causing distortions, the present writer does not see any other appropriate method, given the limitations of the

data variables obtained during the survey. Finally, moreover, "if we are interested in comparing (emphasis added) two or more point patterns, such as settlements in a series of phases, built-in clustering (due to "boundary effects", the author) may not matter greatly. This is because holding the area constant when making the comparisons places all analyses on the same base. Thus the interesting aspect of the  $R_n$  values will be their magnitude in relation to each other rather than the 1.0, the null hypothesis value" (Pinder *et al.* 1979: 435 - 436).

#### The Early Dynastic Period (Dynasty 0 - Dynasty 2; ca. 3150 - 2685 B.C.)

The  $R_n$  value calculated for the 8 sites yielding Early Dynastic materials is 1.23 (Table 2); this value greater than 1.0 means that the average distance between first nearest-neighbors is greater than it would be in a random distribution and therefore represents a more dispersed or regular pattern (Figs. 6 and 7). For the observed distances between first nearest-neighbors see Table 3.

Table 2

Nearest-neighbor statistic for the Early Dynastic Period and later periods.

Period	No. of sites	$\sqrt{a}/n$	Dran	Dobs	$R_n$
Early Dynastic Period	8	10.61	5.30	6.54	1.23
Old Kingdom	16	7.50	3.75	2.84	0.76
1st Intermediate Period	7	11.34	5.67	5.61	0.99
Middle Kingdom	8				1.11
2nd Intermediate Period	7	11.34	5.67	9.44	1.76
New Kingdom	27	6.00	3.00	3.30	1.10

$a = 900 \text{ km}^2$ ; reduction coefficient = 0.5.

A simplified map of the survey area and surroundings immediate to the west (Fig. 6) shows, beside the locations of the sites, a schematic reconstruction of former rivers and minor distributaries (based on the study of ca. 1500 soil samples; cf. van Wesemael and Dirksz 1986; van Wesemael and Sewuster 1987; de Wit and van Stralen 1988a; 1988b) together with the outlines of the sandy hills (*geziras*) as they rise today above the present plain. Given the fact that the flood plain was considerably lower during the time under consideration here, *viz.* the beginning of the 3rd millennium B.C., it will be understood that these sand bodies stood out even more above the alluvium then, than they do now.

All settlements, located at an average 6.5 km from each other, are situated in the near vicinity of a water course, reflecting the dependence on the river (for *e.g.* traffic, irrigation, drink water supply *etc.*) This accounts partially for the linear distribution pattern, the components of which seem to form a network along two axes (Fig. 7).

The first one is a NE-SW axis alongside a major former river, identified as the former Tanitic Nile branch. Its course is also indicated and confirmed by the

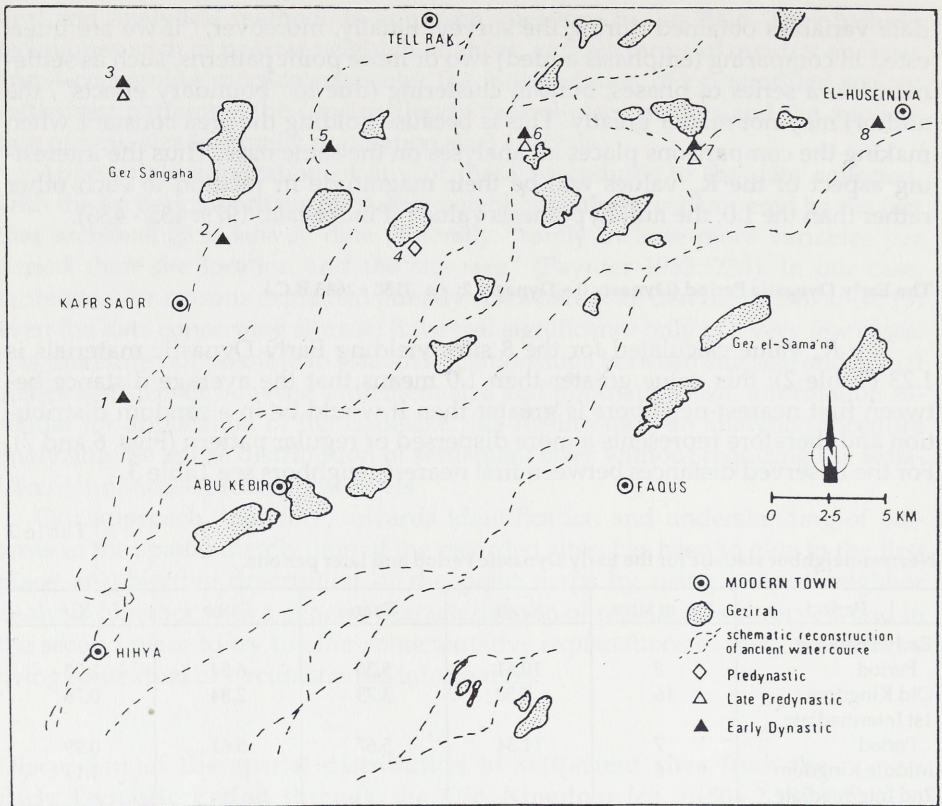


Fig. 6. Simplified map of the survey area and its surroundings immediately to the west, showing the reconstructed courses of former water courses and the distribution of Late Predynastic-Early Dynastic sites.

position of a number of contemporary Early Dynastic sites both within the survey area (Fig. 6, Nos. 1, 2, 5) as well as outside the study area (Table 3: c, d). The latter two are located at respectively 19.06 km and 24.53 km south of Ezbet el-Tell (the southernmost identifiable Early Dynastic site in the survey area), and at 5.47 km from each other, which would fit very well within the range of dobs between first nearest-neighbors in the survey area (Table 3). In view of the regularities observed (see further below) we could hypothesize the presence of another three Early Dynastic sites along the Tanitic branch in-between Ezbet el-Tell and Beni Amir.

With the exception of Gezira el-Masha'la, the second axis forms an almost straight east-west line, indicated by the position of a number of contemporary sites, perhaps significantly all contained within the modern 3.5 m and 3 m contour line. These are from west to east (Figs. 5 and 6): Tell el-Farkha, once more Tell Gherier, conveniently located at the spot where the Tanitic branch and one of its distributaries converge, el-Tell el-Iswid (south), located on a *gezira* east of

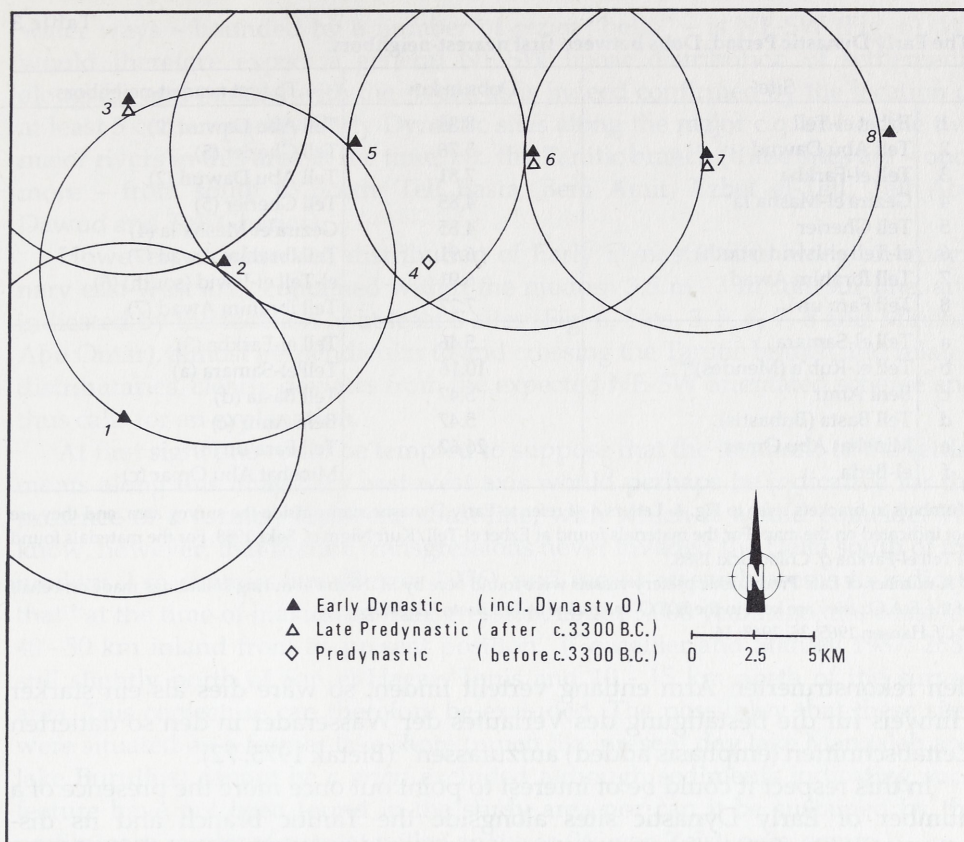


Fig. 7. Abstraction of Fig. 6, showing the distribution of Late Predynastic–Early Dynastic sites within the area; radius of circles is 6.54 km (= dobs) *cf.* Table 2.

yet another distributary channel (*cf.* also van den Brink 1990), Tell Ibrahim Awad, also situated on a *gezira* in the near vicinity of the spot where a former distributary channel seems to have bifurcated (van den Brink 1988: 76), and Tell Fara'un, located west of a former channel (Mustafa 1988b) which in this period either has to be considered as the easternmost distributary channel connected with the Tanitic branch or perhaps can be identified as belonging to the former Pelusiatic branch (see further below). Alongside the same water way, outside the survey area at a distance of *ca.* 26.5 km northeast of Tell Fara'un we find yet another partially contemporary site, *viz.* Minshat Abu Omar (Kroeper and Wildung 1985).

Because sufficient numbers of C-14 datings of sediments of succeeding rivers and related distributaries during the Holocene in this area are still lacking, it is necessary to resort to an admittedly indirect method in order to at least arrive at some conclusions about when a river has been active. This method starts with the assumption "Wenn sich mehrere Fundstätten mit gleichen Belegungsschichten

Table 3

## The Early Dynastic Period. Dobs between first nearest-neighbors.

	Site	Dobs in km	To first nearest-neighbors
1	Ezbet el-Tell	8.36	Tell Abu Dawud (2)
2	Tell Abu Dawud	5.76	Tell Gherier (5)
3	Tell el-Farkha	7.81	Tell Abu Dawud (2)
4	Gezira el-Masha'la*	4.85	Tell Gherier (5)
5	Tell Gherier	4.85	Gezira el-Masha'la (4)
6	el-Tell el-Iswid (south)	6.91	Tell Ibrahim Awad (7)
7	Tell Ibrahim Awad	6.91	el-Tell el-Iswid (south) (6)
8	Tell Fara'un	7.27	Tell Ibrahim Awad (7)
a	Tell el-Samara	5.46	Tell el-Farkha (3)
b	Tell el-Rub'a (Mendes)**	10.16	Tell el-Samara (a)
c	Beni Amir	5.47	Tell Basta (d)
d	Tell Basta (Bubastis)	5.47	Beni Amir (c)
e	Minshat Abu Omar	26.62	Tell Fara'un (8)
f	el-Beda		Minshat Abu Omar (c)

Numbers in brackets refer to Fig. 6. Letters a - f refer to Early Dynastic sites outside the survey area, and they are not indicated on the map. For the materials found at Ezbet el-Tell/Kufr Nigm cf. Bakr 1988. For the materials found at Tell el-Farkha cf. Chłodnicki 1988.

\* A number of Late Predynastic pottery vessels were found here by M. Nesh'at during soundings made on behalf of the E.A.O.; they are kept in the E.A.O. magazine at Tell Basta/Zagazig.

\*\* Cf. Hansen 1965: 36; 1968: 16.

den rekonstruierten Arm entlang verteilt finden, so wäre dies als ein starker Hinweis für die Bestätigung des Verlaufes der Wasserader in den so datierten Zeitabschnitten (emphasis added) aufzufassen" (Bietak 1975: 72).

In this respect it could be of interest to point out once more the presence of a number of Early Dynastic sites alongside the Tanitic branch and its distributaries (thus giving an indication of the period in which this river had been active, *viz.* at least at the beginning of the 3rd millennium B.C.) and the absence of contemporary sites alongside the former Pelusiac branch, where the earliest *in situ* finds are dated to the end of the First Intermediate Period/beginning of the Middle Kingdom (Bietak 1979: 290), *i.e. ca.* one millennium later than the first *in situ* finds alongside the Tanitic branch.

Having observed that human occupation started a thousand years earlier along the Tanitic branch than along the banks of the Pelusiac branch, one could wonder – though not conclusively answer yet – whether the Pelusiac branch had perhaps not yet been active at the beginning of the third millennium B.C.

If, on the other hand, one would assume that the Pelusiac branch had been active already in the Early Dynastic Period then the only alternative explanation for an apparent settlement vacuum along this river during most of the 3rd millennium B.C. would be that the Tanitic branch indicated the easternmost, natural border for human settling during this time in this part of the Delta, and that apparently there had been no urge to settle down far beyond the Tanitic branch eastwards.

We have observed before the very general tendency of settlements to be located near the water way, reflecting human dependency on the presence of rivers. We also have pointed out before that the general orientation of these



water ways – bounded by a number of *gezira* “belts” – is NE-SW (Fig. 6). We would therefore expect a general NE-SW linear distribution of settlements alongside and parallel with the rivers, as is indeed confirmed by the location of at least 5 contemporary Early Dynastic sites along the major c.q. one of the two major rivers in this area at the time, *viz.* the Tanitic branch (these sites are – once more – from south to north: Tell Basta, Beni Amir, Ezbet el-Tell, Tell Abu Dawud and Tell Gherier).

However, an observed distribution of Early Dynastic sites along an imaginary east-west axis, contained within the modern 3.5 m - 3 m contour line, and indicated by the location of at least 6 sites (Fig. 6, Nos. 3, 5, 6, 7, 8 and Minshat Abu Omar), almost perpendicular to and crossing the Tanitic branch and related distributaries, clearly deviates from the expected NE-SW orientated scheme and thus calls for an explanation.

At first sight one could be tempted to suppose that the locations of the settlements along this imaginary east-west axis would perhaps be indicative for the presence of a former, Holocene coast-line, with which it would coincide. We know, however, that marine transgressions never invaded the Delta south of the modern 2 m contour line (Butzer 1976), and recent research seems to indicate that “at the time of maximum transgression, about 5,000 years ago, the coast lay 40 - 50 km inland from its present position” (Coutellier and Stanley 1987: 268), still slightly north of San el-Hagar/Tanis and 10 - 15 km north of the survey area. This conjecture can therefore be excluded. The possibility that these sites were situated on a former lake shore (much like present day lake Manzalah and lake Burullus) cannot be *a priori* excluded although sediments indicating such feature have not been found in the study area nor can it be sustained by the preliminary results of current pollen analyses (W. van Zeist, pers. comm.).

We should take into account here that the regions adjoining the current survey area immediately to the north and west have not been systematically covered by any archaeological survey. Theoretically therefore, it is possible that what we observe in the area as an east-west orientated “belt” of settlements, in reality represents only a partial and therefore distorted picture of the total former pattern, and thus would illustrate, as a case in point, the dangers of “boundary effect”, mentioned above.

We are confident, however, that the “empirical pattern” does have a validity of its own, basing ourselves on circumstantial information presented below.

In this respect, we would like to mention some of the results of another archaeological survey, carried out during the years 1972 - 1982 by E.D. Oren in northern Sinai, between the Suez Canal and the Gaza Strip. The survey revealed the presence of *ca.* 250 sites yielding in varying quantities materials from both the Canaanite Early Bronze Age I - II cultures and the partially contemporary Late Predynastic - Early Dynastic cultures in Egypt. According to the surveyor the data indicate that “The complex of sites in northern Sinai represents, in our view, the eastward extension of the Egyptian sphere of interest and civilization, which served as a springboard for commercial (and military?) ventures in Southern Canaan at the very beginning of the Dynastic period” (Oren 1989).

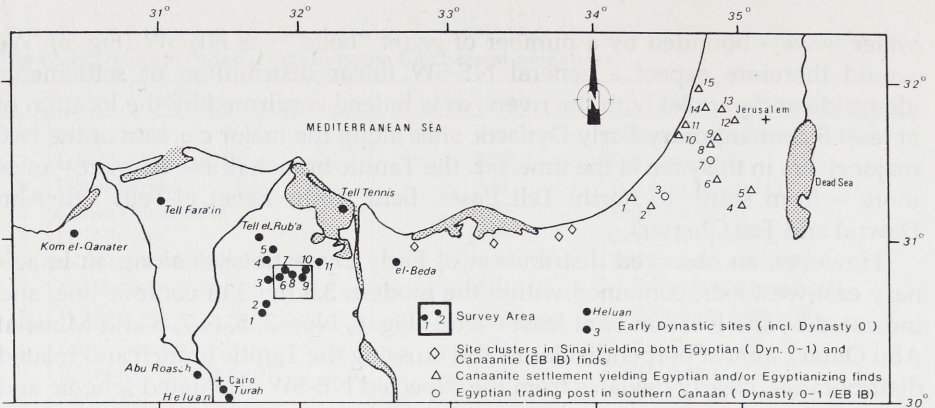


Fig. 8. Map showing distribution of sites dating from around the beginning of the 3rd millennium B.C. in the Nile Delta, northern Sinai and southern Canaan;

#### Nile Delta

- 1: Tell Basta; 2: Beni Amir; 3: Ezbet el-Tell; 4: Tell el-Farkha; 5: Tell el-Samara; 6: Tell Abu Dawud; 7: Tell Gherier; 8: el-Tell el-Iswid (south); 9: Tell Ibrahim Awad; 10: Tell Fara'on; 11: Minshat Abu Omar.

#### Southern Canaan

- 1: Taur Ikbeineh; 2: Site H; 3: 'En Besor (str. III); 4: Tell el-Malhata; 5: Tell Arad (str. IV - III); 6: Tell Halif; 7: Tell Ma'ahaz; 8: Tell 'Erani (Tell Gat); 9: Lachisch; 10: Afridar; 11: Nizzanim; 12: Hartuv; 13: Gezer; 14: Mdar; 15: Azor.

At present, some 25 sites in Southern Canaan are known to have yielded in varying quantities Egyptian and/or Egyptianizing finds dating from Dynasties 0 - 1, certainly testifying to the intensive contacts between Egypt and Canaan at this time. As for the true nature of this contact, more specific data need to be presented, in order to test the validity of such statements made *e.g.* by R. Gophna (1976: 9) already more than 10 years ago that "the Egyptians dominated not only the southern border areas of Canaan, which were not settled at that time (*viz.* the beginning of the Early Dynastic Period in Egypt, the author), but also exercised some control over the settled part of southern Canaan, chiefly for the purpose of economic exploitation".

When we take a look now at the map which reflects this situation around the beginning of the 3rd millennium B.C. (Fig. 8), and taking into consideration the following three points:

1. The northeast-southwest distribution of a number of Early Dynastic settlements spaced at regular intervals from each other along the banks of the former Tanitic branch both inside and outside the study area (*viz.* Tell Basta, Beni Amir, Ezbet el-Tell, Tell Abu Dawud and Tell Gherier);

2. The presence of a number of Early Dynastic sites equally regularly spaced along an imaginary east-west axis, off the northernmost site in the area (*viz.* Tell Gherier) and almost perpendicular to the Tanitic branch and distributaries, both inside and outside the survey area (*viz.* Tell el-Farkha, Tell Gherier, el-Tell el-Iswid [south], Tell Ibrahim Awad, Tell Fara'on, Minshat Abu Omar, el-Beda);

3. The flow of contemporary contacts *via* northern Sinai between Early Dynastic Egypt (and more specifically the Delta) and Early Bronze Age I southern Canaan;

we are inclined to explain the observed phenomena, particularly the imaginary east-west axis, in terms of a natural, corridor-like passage overland, possibly linking up with what is known to us from later texts as the Way(s)-of-Horus, thus connecting the southern and perhaps more central parts of the Delta with northern Sinai and eventually southern Canaan.

The clustering of *geziras* in this part of the survey area between the former Tanitic branch and distributaries, possibly provided the right conditions for donkey caravans for instance (Amiran 1985) to cross this watery area, even during the period of annual inundations, on the route to Sinai (copper trade) and southern Canaan.

At least three sites along this corridor yielded positive evidence for contemporary contacts with Sinai and Canaan, *viz.* Minshat Abu Omar (*e.g.* copper tools, EBA I ceramic imports, *cf.* Kroeper and Wildung 1985), Tell Ibrahim Awad (copper vessels, EBA I ceramic imports, *cf.* van den Brink 1988: 80, VI and 82-83) and el-Tell el-Iswid (south) (ceramic imports, *cf.* van den Brink 1989).

### The Late Predynastic Period: Excursus

The transition from terminal prehistory to (proto)history *viz.* the transition from the Late Predynastic Period to the Early Dynastic Period, is marked in the Delta by cultural discontinuity (van den Brink 1989). It would seem that the last exponents of a truly Lower Egyptian culture (standing in the tradition of, in chronological order, the Neolithic Fayum A, Merimde Beni-Salame/el-Omari, Maadi, Buto (Schicht II; von der Way 1989) and el-Tell el-Iswid (south) (phase A; van den Brink 1989), finally dissolved, during the process of "unification", into the Early Dynastic culture.

This cultural discontinuity can be inferred from observed radical changes in the ceramic and lithic assemblages and *e.g.* the proliferation of mudbrick architecture at the beginning of the Early Dynastic Period at a number of contemporary Delta sites.

These events do not seem to have caused a discontinuity in site occupation: at least 4 out of the 8 Early Dynastic sites mentioned above (Table 3) had already been inhabited during the Late Predynastic Period (*ca.* 3,300 B.C.), *viz.* Tell el-Farkha (R. Fattovich, pers. comm.), Tell Ibrahim Awad (van den Brink 1988: 77), Gez el-Masha'la (Rundbrief MDAIK 1988) and el-Tell el-Iswid (south) (van den Brink 1989). Tell el-Fara'in/Buto and Minshat Abu Omar, where the same phenomena have been observed, complete this picture, contrasting with the abandonment of Maadi at the beginning of the Early Dynastic Period.

Based on the presence of ceramic imports we also know that contacts between the Delta and Sinai-Canaan existed already during the Late Predynastic Period, for instance Minshat Abu Omar, grave groups 1-2 (Kroeper and Wildung 1985; Amiran 1985); Tell el-Fara'in/Buto, Schicht II (von der Way 1989); el-Tell el-Iswid (south), phase A (van den Brink 1989; N. Porat, pers. comm.).

Whether and to what degree these Late Predynastic settlements located within the "corridor" were later on functionally integrated in the network of Early Dynastic settlements, is a question which cannot be answered yet.

#### Inferences about Early Dynastic intersite differentiation

One would of course want to know whether the rise of central government and the crystallizing hierarchical structuring at the beginning of the Early Dynastic Period (including Dynasty 0) are reflected in the eventual system underlying the Early Dynastic settlement pattern.

A key characteristic of stratified society landscapes, found in studies of settlement patterns and systems, is that settlements are arranged in hierarchies with a large number of small places and a small number of large places.

Due to the deplorable state of preservation of many tells, rank-size relations, which could help us to explain the "empirical pattern" in this respect, cannot be inferred directly from the survey data alone. The linear distribution of these sites, however, spaced at rather regular intervals from one another, and the apparent absence of site clustering, seem to suggest a relatively egalitarian system.

On the level of social structuring intrasite and intersite differentiations do occur though; if one accepts that a relationship exists between certain variables in mortuary data (like size and structure of graves, the nature and number of funerary gifts included in a grave) and the social status or social persona of the deceased (*e.g.* Saxe 1970), then the Early Dynastic data-set at for instance Minshat Abu Omar mirrors a much wider range of internal social differentiation among the (cemetery) population than that reflected in the contemporary cemetery data at Ezbet el-Tell (Bakr 1988). In Minshat Abu Omar the extremes on the scale poor/rich burial (for a *caveat* concerning the interpretation of seemingly rich burials *cf.* Eiwanger 1987: 91 - 93), or low/high status are much further apart from each other than at Ezbet el-Tell.

For instance, at the former site grave structures vary from plain shallow pits with only few goods, to big rectangular mudbrick tombs, subdivided in 2 to 3 separate rooms, covered with a roof supported by wooden beams and containing more than 50 objects (Kroeper 1988: 12 - 13, 17).

At the latter site such extremes on this scale are virtually absent, the only deviation from the standard practice (burial in pottery coffin in shallow grave pit) being the addition sometimes of a small annex to the grave for extra storage (Bakr 1988: 51).

The only grave excavated so far at Tell Ibrahim Awad is comparable in structure and nature and number of funerary gifts included with those few graves, excavated in Minshat Abu Omar, which tend to the extreme "rich" side of the scale (van den Brink 1988: 77). That the owner of this particular grave, datable to the first half of the First Dynasty, had access to the royal workshops is indicated *e.g.* by the presence of a schist chalice (van den Brink 1988: Fig. 21, No. 28), a totally equal example of which has been found in Saqqara, tomb 3507, belonging to the earliest period of Udimu (Dwn), probably to Queen Her-Nit (consort of

Zer/Dr). The three burials uncovered so far at el-Tell el-Iswid (south) are perhaps indicative of a certain diachronic, internal development. The two earliest burials (A/87/2, stratum VIIIc and A/87/1, stratum IX) slightly predating those found at *e.g.* Ezbet el-Tell, where placed in shallow pits and – apart from a single bowl in grave A/87/2 – were not equipped with funerary gifts. The latest burial (A/87/3, stratum X) – contemporary with *e.g.* Minshat Abu Omar grave group 4, was placed in a *ca.* 1.3 m deep grave pit, equipped with numerous stone and pottery vessels as well as two grinding stones (van den Brink 1989: Figs. 6 and 7).

Uniformity in at least one major aspect concerning the disposition of the dead did exist among all sites mentioned above, *viz.* the burials were always single, the burial position contracted, left lateral, head in the north/northeast, facing east/southeast, feet in the south/southwest.

#### The Old Kingdom (Dynasties 3 - 6; *ca.* 2,685 - 2,185 B.C.)

With an average distance of 2.84 km in-between first nearest-neighbors (Table 4) and an  $R_n$  value of 0.76 (Table 2) it would seem that the spatial distribution of settlements during the Old Kingdom represents a less dispersed and relatively more clustered pattern (Figs. 9 - 10) compared to that of the preceding Early Dynastic Period.

At least five out of the 17 sites yielding materials dating from the Old Kingdom (van den Brink 1988: 66 - 69, Figs. 3 - 7) had already been inhabited

Table 4

#### The Old Kingdom. Dobs between first nearest-neighbors.

	Site	Dobs in km	To first nearest-neighbors
1	Tell Abu Dawud*	1.81	Tell Hasanin (2)
2	Tell Hasanin	1.81	Tell Abu Dawud (1)
3	Tilul Moh. Abu Hassan	1.81	Tell Hasanin (2)
4	Tell Umm el-Zaiyat	3.03	Tell Ginidba (5)
5	Tell Ginidba	1.81	Tell Gherier (6)
6	Tell Gherier*	1.70	Tell el-Marra (8)
7	Gezira Tell Faras	6.06	Tell Umm el-Zaiyat (4)
8	Tell el-Marra	1.70	Tell Gherier (6)
9	Tell el-Akhdar	2.79	Tell el-Abbasiya (12)
10	Tell el-Masha'la*	1.33	Tell el-Dirdir (11)
11	Tell el-Dirdir	1.33	Tell el-Masha'la (10)
12	Tell el-Abbasiya	2.79	Tell el-Akhdar (9)
13	el-Tell el-Iswid (south)**	0.61	Tell el-Abbasiya (12)
14	el-Tell el-Iswid (north)	2.91	Tell el-Abbasiya (12)
15	Tell Umm 'Agram	2.91	Tell Ibrahim Awad (16)
16	Tell Ibrahim Awad**	2.91	Tell Umm 'Agram (15)
17	Tell el-Khasna	8.72	Tell Abu Dawud (1)
a	Tell el-Rub'a (Mendes)	15.63	Tell Umm el-Zaiyat (4)
b	Tell Basta (Bubastis)	23.44	Tell el-Khasna (17)

Numbers in brackets refer to Figs. 9 - 10. Letters a - b refer to sites outside the survey area, and they are not indicated on the map.

\* Inhabited since the Early Dynastic Period.

\*\* Inhabited since the Late Predynastic Period.

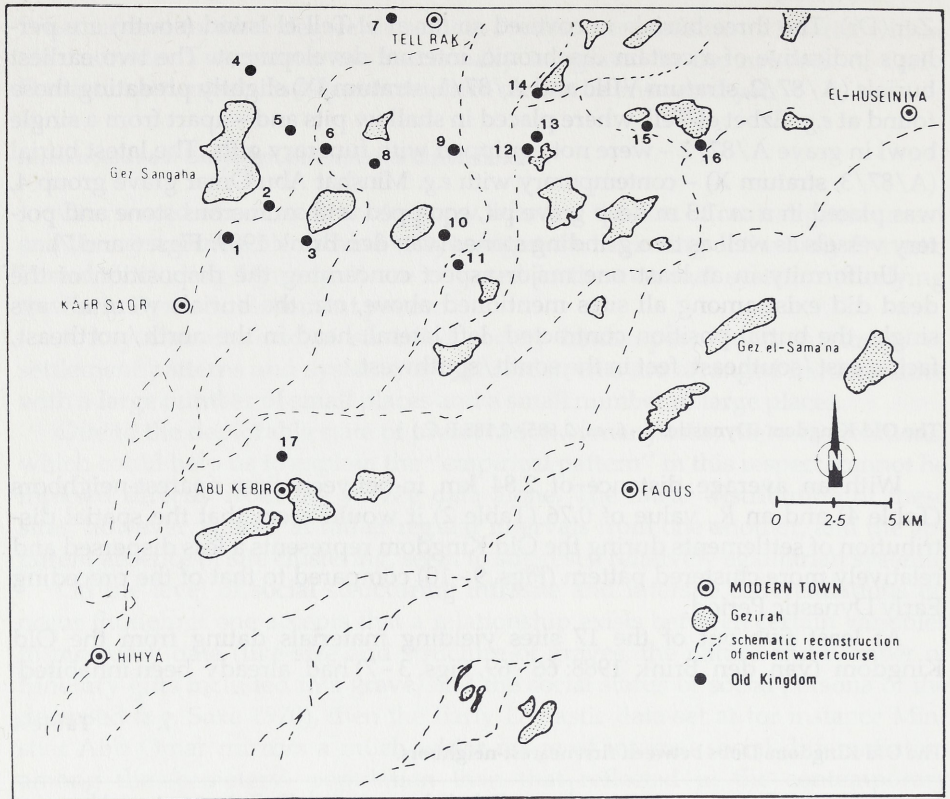


Fig. 9. Simplified map of the survey area and its surroundings immediately to the west, showing the reconstructed courses of former rivers and the distribution of Old Kingdom sites.

during the preceding Early Dynastic Period; of those five, three had already been occupied since the Late Predynastic Period (Table 4). This can be seen perhaps as an example of the "cumulative impact of prehistorical (and protohistorical, the author) social aggregation" (Butzer 1984: 929).

The 12 remaining sites that do not yield any material prior to the Old Kingdom are therefore considered to be new foundations. They illustrate the dynamics during this "pyramid age". Although future research of these sites may still reveal the presence of some earlier vestiges of human occupation, the sharp increase in the number of settlements is realistic enough. It is this fact that testifies to the interest of the central government in this region during the Old Kingdom, and perhaps also, more specifically, to the presence of a "local historical trajectory" (Butzer 1984), *viz.* the "corridor" described above, linking up with the Way(s)-of-Horus, giving access to the overland route *via* Sinai to southern Canaan.

Taking a look at the map (Fig. 9) and its abstraction (Fig. 10) one is given the impression that satellite foundations started to develop during the Old Kingdom around and in-between the surviving elements of the Early Dynastic

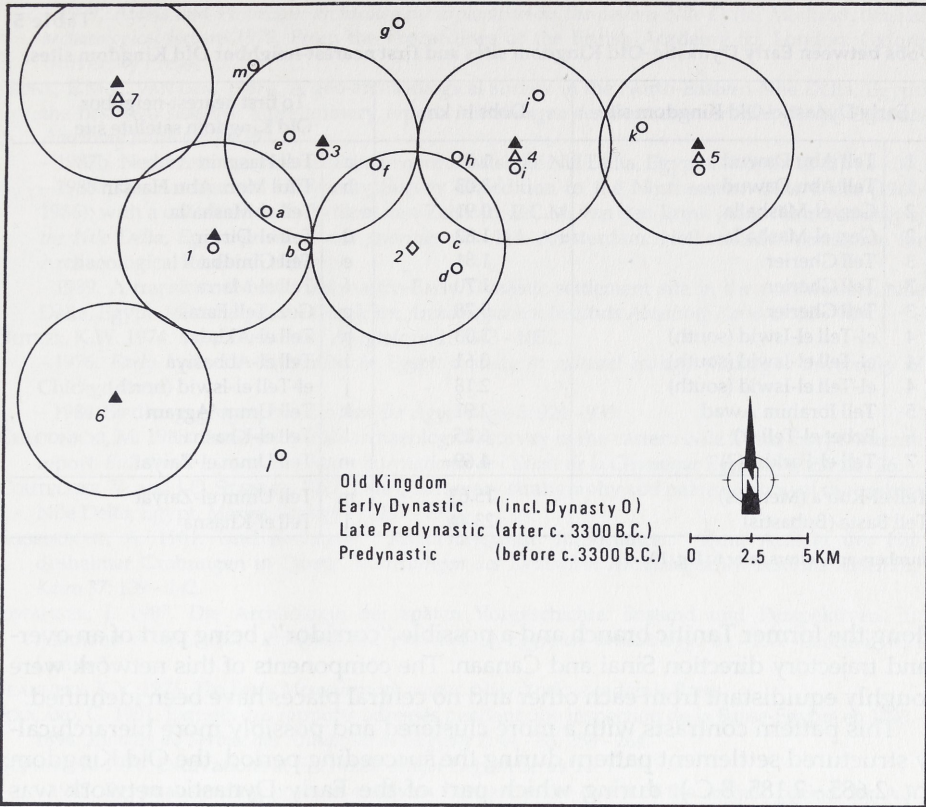


Fig. 10. Abstraction of Fig. 9, showing the distribution of Old Kingdom sites within the area; radius of circles is 2.84 km (= dobs) *cf.* Table 2. For explanation of the numbers and letters *cf.* Table 5.

settlement network (Table 5). During this process a shift in balance emerged favoring Old Kingdom foundations. This is indicated by the position of Tell el-Marra (Fig. 9, No. 8), located at equal distance from el-Tell el-Iswid (south) (6.06 km), Tell Abu Dawud (6.3 km) and Tell Umm el-Zaiyat (6.3 km) and by the position of Tell el-Abbasiya, situated at an equal distance from Tell Gherier (7.27 km) and Tell Ibrahim Awad (7.15 km; *cf.* Fig. 10).

In as far as this picture of the changes in settlement patterns is accurate, it indicates that centers of importance were developing for the first time in the region, the spatial distribution possibly reflecting an underlying hierarchical structure.

To summarize: So far we have tried to point out a development observed in the spatial distribution of sites within the survey area from the Late Predynastic Period through the Old Kingdom. Initially the sites formed a rather linear and egalitarian pattern during the Early Dynastic Period (*ca.* 3,150 - 2,685 B.C.), characterized by sites located at an average distance of *ca.* 6.5 km from each other

Table 5

## Dobs between Early Dynastic–Old Kingdom sites and first nearest-neighbor Old Kingdom sites.

Early Dynastic–Old Kingdom site		Dobs in km	To first nearest-neighbor Old Kingdom satellite site	
1	Tell Abu Dawud	1.81	a	Tell Hasanin
1	Tell Abu Dawud	3.03	b	Tilul Moh. Abu Hassan
2	Gez. el-Masha'la	0.91	c	Tell el-Masha'la
2	Gez. el-Masha'la	1.82	d	Tell el-Dirdir
3	Tell Gherier	1.81	e	Tell Ginidba
3	Tell Gherier	1.70	f	Tell el-Marra
3	Tell Gherier	5.78	g	Gez. Tell Faras
4	el-Tell el-Iswid (south)	3.03	h	Tell el-Akhdar
4	el-Tell el-Iswid (south)	0.61	i	Tell el-Abbasiya
4	el-Tell el-Iswid (south)	2.18	j	el-Tell el-Iswid (north)
5	Tell Ibrahim Awad	2.91	k	Tell Umm 'Agram
6	Ezbet el-Tell (?)	6.25	l	Tell el-Khasna
7	Tell el-Farkha (?)	4.69	m	Tell Umm el-Zaiyat
Tell el-Rub'a (Mendes)		15.63	m	Tell Umm el-Zaiyat
Tell Basta (Bubastis)		23.44	l	Tell el-Khasna

Numbers and letters refer to Fig. 10.

along the former Tanitic branch and a possible "corridor", being part of an overland trajectory direction Sinai and Canaan. The components of this network were roughly equidistant from each other and no central places have been identified.

This pattern contrasts with a more clustered and possibly more hierarchically structured settlement pattern during the succeeding period, the Old Kingdom (ca. 2,685 - 2,185 B.C.), during which part of the Early Dynastic network was interwoven with newly founded settlements (at an average distance of only 2.8 km from each other), probably precipitating the development of centers, a process which continued, as will be shown later on in Part II, after the Old Kingdom, culminating in the foundation of the country's capital during the Ramesside era, Piramesse, in exactly this region, during the later part of the New Kingdom.

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