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An ancient Nile harbour
University Museum excavations at the 'Birket Habu'

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Part I

The Nile as a transport artery

The importance of the Nile to the ancient Egyptians as a means of communication and transport can hardly be overestimated, for the available land-routes offered nothing of comparable convenience. Since all agricultural and pastoral activity was restricted to the alluvial plain for climatic reasons, nearly all the population and the major towns were also concentrated on this plain. Movement by land along the narrow valley of Upper and Middle Egypt was hindered by the earthen dykes of the innumerable irrigation basins into which the plain was divided and in the Delta a further obstacle was created by the branching of the Nile into several arms. Even if the Roman roads found along the eastern edge of the southern Egyptian valley and running in an irregular fashion from east to west across the Delta (Wilson, 1955: 225–6; Kees, 1961: 183–4; Butzer, 1960: 28; Hester, Hobler & Russell, 1970) had their equivalents in earlier periods, the river would still have been the preferable route. Partly this was because nothing could equal a ship for carrying capacity and reasonable speed. Prior to the Hellenistic period the donkey was the chief pack-animal and bulky and heavy material, such as the stone building blocks, colossal figures and obelisks which might be transported hundreds of miles, could be moved across land only by men or oxen hauling wooden sleds. By contrast, large bodies of troops or labourers, herds of cattle, grain by the hundredweight and stone by the ton could be shipped with comparative ease (Fig. 1). Wheeled wagons appear never to

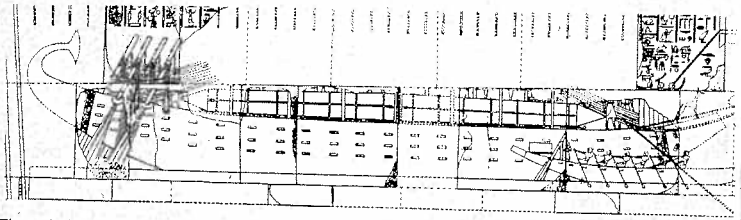


Figure 1. A towed barge of Queen Hatshepsut (1503–1482 BC), carrying obelisks. It has been estimated that the barge was 100 m long and had a beam of over 30 m. The depiction is from the walls of her funerary temple at Deir el-Bahari, western Thebes, see Fig. 3, No. 7.

have played any significant role in transportation and while the light horse-drawn chariot introduced in the mid-2nd millennium BC could have been used for administrative communication (and it is quite uncertain whether roads of an adequate length existed), lightly-built, multi-oared ships had already served this purpose for hundreds of years (Hornung, 1967: 98–100).

The Egyptian Nile presented no serious problems of movement to the careful and experienced navigator. It was a perennial and comparatively slow-moving stream (Hurst, 1957: 231–2), with a steady current bearing ships to the north. Sailing upstream was aided by a prevailing northerly wind, supplemented by the use of oars when necessary. At certain times during the year major changes in the river level occurred, but these were regular phenomena easily anticipated in normal circumstances; until very recently the highest level occurred at the time of the annual inundation (August–November), dropping to a period of low water from March to June, and then commencing to rise again (Simons, 1968: 24). Unexpected and violent gusts of wind might, it is true, overturn or swamp a poorly navigated or overladen boat and continuous alterations in the channel cut by the Nile through the soft alluvial plain created an ever-changing pattern of sand and mud banks on which the unwary captain might run aground, especially at low water. However, a truly major obstacle was not encountered until, 546 miles from the sea coast, the First Cataract was reached. Here a granite intrusion into the prevailing sandstone initiated a series of such cataracts which interrupted the even flow of the Nile as it ran through the modern Republic of the Sudan. Ancient Egyptian shipping eventually bypassed at least some of these cataracts by means of canals and 'slipways' along which vessels could be hauled (Breasted, 1906, I: 291–2; II: 32, 259–60; Vercoutter, 1965: 68–9; 1970: 204–14).

The form that the society and culture of historical Egypt took made it inevitable that the natural resources of the Egyptian Nile as a communication route would be fully exploited. During long periods of stable and centralized government the river was the major economic artery and the principal link between the central government, based on Memphis and This-Abydos (the latter replaced *c.* 2130 BC by Thebes), and its representatives in the provincial capitals of the Egyptian state. The Nile was also crucial in the development of international trade and for imperial expansion. Exotic imports from the Sudan and beyond naturally moved along the valley, which equally naturally was the invasion route for the Egyptian armies which eventually secured control over the indigenous Sudanese population as far south as the Fourth Cataract. Diplomatic and commercial contacts with the rich coastal and inland towns of Syria were of course maintained by sea, but the Egyptians preferred not to develop seaports along the exposed Egyptian coast with its marshy and poorly populated hinterland. Levantine and Aegean passengers and goods were carried past fortified control-points at the river mouths to Nile

harbours inland, sometimes reaching as far south as Thebes, and sea-borne invasions of the Levant were prepared at these same inland harbours. It was not until *c.* 1320 BC that a major seaport began to develop on the southern shore of the bay of Lake Menzaleh in the north-east Delta; the use of this port, and its continuing importance as a royal capital in the Twenty-first and Twenty-second Dynasties (1087–730 BC) was due to a combination of strong military and commercial interest in the Levant with internal political problems and not to the resources of its immediate area (Kees, 1961: 96–115, 183–211). To the west Alexandria, founded in the last half of the 4th century BC, was 'the first seaport constructed on the open coast of Egypt' (ibid.: 210).

Turquoise and copper from Sinai, and incense and other products from Punt on the east African coast (Kitchen, 1971: 185–8, 202–3) had to be carried overland to the Nile from Red Sea ports until the river, at a very late date, was linked directly to the Red Sea by a canal (Posener, 1938).

In the circumstances it is not surprising that the Egyptians had a variety of river craft (for collections of data, see Boreux, 1925; Reisner, 1913; Faulkner, 1940: 7; Säve-Söderbergh, 1946; Hornung, 1967: 98–100; Landström, 1970; Vandier, 1969; Goyon, 1971a, with a report of an experimental investigation into the problems of handling barges carrying monoliths). The available evidence shows a considerable range of types running from tiny papyrus canoes through small and moderately sized fishing and pleasure craft and officials' and cargo boats up to large troop ships and royal house-boats and massive transportation barges (Fig. 1). Egyptian sea-going vessels, of distinctive types but developed from riverine shipping, have also been studied (Faulkner, 1940; Säve-Söderbergh, 1946; Hornung, 1967: 98–100) and, as noted above, could appear on the river as far south as Thebes.

Quays and harbours on the Nile

It would seem likely that this mass of shipping might require in some areas artificial arrangements for its accommodation, especially at the national and provincial capitals where shipping would tend to concentrate. In modern Egypt the practice is to use simply a length of revetted river bank, with perhaps a projecting pier, or the basins created at the junctions of major canals. An illuminating case is Cairo, which until modern times stood well back from the Nile, behind a belt of fields and gardens. The suburbs of Bulak, and earlier Fustat, served as ports, yet at neither place do landing facilities appear to have consisted of more than a stretch of the river bank (*Description de L'Egypte, Etat moderne*, planches I, pls. 15, 16, 24, 25; texte II, 2e partie: 748–9). As will be discussed later the one detailed representation of a waterfront from ancient Egypt, at the new Pharaonic capital of el-Amarna, appears to reflect a similarly simple arrangement, with pile jetties projecting from the bank. Yet the evidence from ancient times also infers that more ambitious and varied arrangements could be made from place to place. Thus more important towns could be provided with quays, which might project straight out into the river (Emery, 1961: 85–6; Steindorff, 1937: 9–12 Blatt 5, 6) and sometimes with artificial basins excavated in the alluvial plain. These basins should not be confused with the harbour and quay with which a temple was often provided, at least from *c.* 1570 BC onwards. These temple harbours were usually small in size and ceremonial in function (cf. below), but town harbours would have been larger and more varied functionally. They would be especially useful where shipping congestion might threaten to block the river, an example of which appears to be illustrated in a Theban tomb of *c.* 1417–1379 BC (Davies & Faulkner, 1947: 44) and perhaps where shipbuilding or maintenance on a large scale was being carried out. The delivery of bulky supplies or heavy stone building blocks to those comparatively rare examples of major settlements or building sites (like Abydos, Malḳata and the funerary temple of Amenhotep III at western Thebes, all discussed further below) which were located some distance from the river would clearly be greatly facilitated by a canal leading to a comparatively large basin.

Defensive requirements as a factor influen-

cing the development of Nile harbours should not be forgotten. Egypt suffered several 'intermediate periods' characterized by varying degrees of political and economic disintegration throughout the country. During these periods local rulers often maintained their own fleets for purposes of trade, supply, offence and defence, and artificial basins would have made these fleets more easily defended against surprise attack and from being used as entry points by besiegers of the town at whose walls or quays they were moored.

The word *mḥ't*, which appears to mean in some examples of its occurrence a place where material unloaded from, or due to be loaded onto ships, was weighed and stored, has in one of its earliest appearances (the earlier Twelfth Dynasty: 1991–1878 BC) a unique determinative which may represent an artificial, T-shaped harbour and canal (Newberry & Griffith, 1895: I, pl. xiv, line 11; Helck, 1954: 80, n. 22; Glanville, 1932: 17; Janssen 1961: 99–100) while a Middle Kingdom fort built between 1970 and 1928 BC at Serra East in Lower Nubia had an internal harbour (Hughes, 1963: 127–8; Knudstad, 1966: 173–4, 176–7) which may be based on First Intermediate Period prototypes in Egypt proper. The besieging and capture of Memphis via its harbour is described under King Piankhy (751–730 BC, Breasted, 1906: IV: 432–5) at the end of the Third Intermediate Period.

Despite the certainty of the existence of artificial harbour basins in ancient Egypt it is difficult to locate specific examples. Three types of data can be referred to—textual, pictorial and archaeological—but each presents special problems of preservation and interpretation. As far as textual data is concerned one problem is that two kinds of texts are likely to refer to harbours. One is the 'historical' or 'biographical' text found inscribed on stone walls of temples and tombs or on stelae, and the other is the administrative text written in ink on papyrus or ostraca. The former has survived in greater numbers, but since texts of this type are primarily concerned with the glorification of an individual, usually in a religious context, harbours or possible harbours are referred to only in passing without any description. Undoubtedly the construction and administration of harbours must have generated detailed administrative records and memoranda of the second kind, but only a few tantalizing fragments of these fragile documents have survived (Glanville, 1931, 1932; Simpson, 1965).

Ancient terminology

Interpretation of the textual evidence is further complicated by the ambiguity of the terms used to refer to harbours or parts of harbours, an ambiguity caused in part by the application of terms for purely natural topographical features to artificial features which are visually and functionally similar. Thus the not infrequent word *mryt* can mean river bank or related artificial structures such as irrigation dykes and harbours. In many of the references to ships mooring at the *mryt* of a town it is not specified whether a harbour basin or simply the river bank is meant, and we must fall back on Janssen's sensible suggestion that for important towns the former is meant and for small towns the latter (Erman & Grapow, 1928: 109–10; Faulkner, 1962: 112; Janssen, 1961: 68; Černý, 1973: 94–7). A rarer word *mnlwt* sometimes translated as 'harbour' does in at least one instance certainly refer to harbours, although perhaps natural rather than artificial ones (Erman & Grapow, 1928: 74; Faulkner, 1962: 108; Gardiner, 1948: 18), but it is derived from *mnlt*, 'mooring post' and could therefore in some instances refer to a simple quay on the river bank itself (Erman & Grapow, 1928: 72–3; Faulkner, 1962: 107).

A comparatively frequent word, *wḥryt*, is usually translated 'dockyard' and this is undoubtedly sometimes and perhaps usually its meaning (references conveniently collected in Simpson, 1965: 17; add Fischer, 1968: 212; Simpson, 1973). However, *wḥryt* can also refer to a carpenter's shop which might but presumably did not necessarily include shipbuilding among its activities. Just such a shop is depicted in a tomb of *c.* 2170 BC, boats being only one item amongst several being worked on, while the 'great overseer of the *wḥryt*' is in fact supervising the making of a

bed (Faulkner, 1962: 68; Davies, 1902: 11, pl. x)! A shipbuilding or repairing installation in ancient Egypt need not, in any case, have to have used an artificial basin (small and medium-sized boats could be built on the river bank), although one large *wḥryt* near Memphis does in fact seem to have been associated with an already existing basin. Typically, the word used for the basin of the Memphite *wḥryt* is *š*, which can also be used for natural lakes and artificial bodies of water such as irrigation basins and temple pools (Glanville, 1932: 11. On *š*, see Erman & Grapow, 1930: 397–8; Faulkner, 1962: 260.) Wall-Gordon (1958: 174), on the basis of a reference to the Memphite *wḥryt* being on an island under Ptolemy XI, has interpreted the much earlier reference to the *š* of the Memphite *wḥryt* under Tuthmosis III (1504–1450 BC) as meaning that at this time it stood on 'an island' in an (implicitly natural ?) 'lake'. However, the analogy of the nearly contemporary 'Birket Habu', discussed below, suggests strongly that the Tuthmoside *š* at Memphis was an artificial basin.

In summary then the interpretation of a word in a text as referring to an artificial harbour depends very much on the context, which is often too vague for a decisive conclusion.

Pictorial evidence

Pictorial evidence is less useful than might be hoped, in view of its relative abundance in ancient Egypt. Egyptian art is of course abbreviated and summary, sacrificing realism and correct proportion to what the artists regarded as the essential action in a scene and its symbolic significance. We cannot demand photographic realism of it. In just one case, virtually contemporary with the Birket Habu, ships are shown moored at a clearly drawn quay (Fig. 2, Davies, 1908: pl. V; Badawy, 1968: 32–3). It occurs in a rock tomb at el-Amarna, No. 14. As almost the only part of the tomb's decoration to have survived its context is not entirely clear, but parallels in other el-Amarna tombs suggest that it belongs to a large representation of the palace, which excavation has shown must have stood close to the river bank. One cannot do better than to quote the description given by the principal

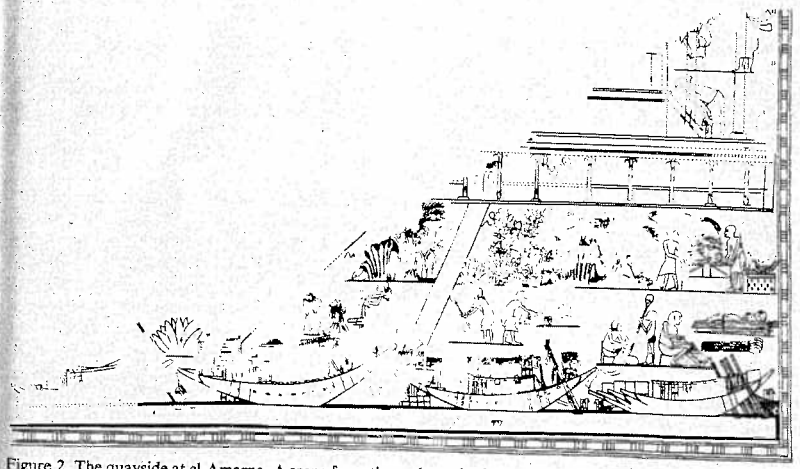


Figure 2. The quayside at el-Amarna. A scene from the rock tomb of May, No. 14 at el-Amarna. *c.* 1365 BC. For a description see above.

publisher of the scene (Davies, 1908: 3):

> 'In the background we see a colonnade running along the river-front of the palace. A uraeus-crowned gate having seven columns with open papyrus-capitals on either (?) side of it forms the entrance to the palace; and from it two diverging paths lead down the bank (in a sloping line therefore) to two landing-stages raised on piles and carrying uraeus-topped kiosks or fencing. At one the barge of the King, at the other that of the Queen, is made fast to mooring-stakes at stem and stern, with a crowd of craft above and below, similar but simpler, to accommodate the Royal household. On the foreshore the crews are busy at work repairing the tackle, etc. To the right lie the oars neatly lashed together, the mast, the yards, the sails and the tackle. A sailor is making a net in approved fashion, holding the end taut between his toes, while with one hand and the other foot he extends the edge on which he is working. His right hand holds the netting-shuttle. Near him a man is trimming the shaft of a paddle which a boy holds steady for him. Elsewhere men are taking oars from a pile or binding masts. Stands of meat are shown also. Further up the bank gardeners are busy removing bouquets and foliage which they have been cutting for decorations. The strip of ground between the palace and the quay is thickly planted with palms, leafy shrubs, clumps of papyrus and flowers; and on the right a tree is seen, growing in a brick holder, which is pierced with outlets for the moisture.'

A basically similar arrangement, complete with formal doorways leading on to the Corniche, is familiar to any modern tourist at Luxor.

No other scene comparable in its explicitness has survived, but attention might be drawn to several others of the el-Amarna period showing boats with downward sloping stepped gangways depicted in direct juxtaposition to gardens and cattle yards (Davies, 1903: pls xxv, xxix; 1906: pl. viii; Cooney, 1965: 80–5; cf. also Anus, 1971: 84, fig. 9 where a boat on a waterway is adjacent to a large building). Elsewhere, moored ships have probably correctly been *interpreted* as standing at quays on which unloading and marketing are taking place (cf. Davies & Faulkner, 1947). In the Theban tomb of Khaemhat a large number of vessels are shown unloading supplies, possibly for a festival, mentioned elsewhere in the same tomb, which was celebrated in the Malḳata palace of Amenhotep III during his 30th year (Wreszinski, 1923: pl. 199–200; Helck, 1961: 280–4). There is no attempt to show that the ships are moored in an artificial basin, yet it seems fair to assume that they were in the great artificial basin of the Birket Habu, on the shores of which the Malḳata palace stood. This harbour of Amenhotep III was perhaps equalled in size by the one founded at Memphis, perhaps by Tuthmosis III some hundred years earlier (Hayes, 1973: 369), to which the Memphite *whryt* discussed above belonged. The Memphite harbour and its immediate environs were called Peru-Nefer and in a tomb dating to Amenhotep II (1450–1425 BC) there is a fragmentary depiction of a fleet of warships probably moored at Peru-Nefer. Unfortunately, the scene is largely destroyed but on the analogy of the Birket Habu depiction referred to above it is unlikely that any effort was made to indicate the harbour's outlines. (Davies, 1930: pl. xxxv. The owner of the tomb was the administrator of Peru-Nefer, the base of the Egyptian war-fleet, hence its depiction. Ibid.: 10–12, 17–20; Helck, 1939: 49–54.)

From the Eighteenth and Nineteenth Dynasties there are, it is true, several depictions of temple harbours, rectangular basins provided with a quay, standing in front of the temple and linked to the Nile by a canal. Such harbours appear to have been ceremonial in purpose and were used when the image of the temple's deity departed on or returned from a journey in its sacred barque. It is true that in one instance a ceremonial boat appears on one of these harbours towed by an equally small 'warship' (Davies & Gardiner, 1948: pl. xv, 17–20), but this may be only a model warship, appropriate to the god in question, the deified warrior king Tuthmosis III. By contrast, another scene shows large vessels of non-ceremonial function floating on the river *outside* the mouth of a canal leading to a temple harbour as if they were too large to enter. This example is all the more striking in that it appears to represent the harbour at the great Theban temple of Karnak as it was left by the builders of Amenhotep III, who was responsible for the apparently very large

harbour at the Birket Habu on the opposite bank (Davies, 1933: 19, 28–32, pls xli–xliii; Haeny, 1970: 34–5)!

The contribution of archaeology

Excavated temple harbours are in fact comparatively small, if one remembers that by the middle of the 3rd millennium BC some Egyptian ships were already over 50 m long, and that the admittedly extraordinarily large obelisk barges of Hatshepsut (1503–1482 BC) were about 100 m in length (Faulkner, 1940: 3; Hayes, 1973: 331; Landström, 1970: 129). Normal Nile transport boats were probably much smaller, perhaps ranging from 10 to 40 m, but even so not many could have comfortably fitted into the most recent of the Karnak harbours, which was apparently only 100 m wide (Lauffray *et al.*, 1970: 58) or the harbour of the funerary temple of Rameses III at Medinet Habu, as reconstructed by the excavator (Hölscher, 1951: 13, figs 12–13). One exception to these remarks is the second harbour of Soleb temple, built by Amenhotep III; its predecessor was quite small, about 30 by 55 m, but the second harbour occupied about 7500 m² and was presumably designed to facilitate the delivery of material to the temple, which was rapidly and greatly expanded at this time. That the function of this large harbour was short-lived is indicated by the fact that it was eventually filled in and replaced by a causeway leading to a stone quay on the river bank (Schiff-Giorgini, 1962: 153–5 [figs 1–3], 168; 1964: 88 [fig. 1], 89). In the case of the valley temples belonging to the pyramids of the Old Kingdom in the Memphite area it has long been known that they too were provided with quays to accommodate water transport, but the size of their harbours, whilst uncertain, has always been regarded as small. That is, until a recent article (Goyon, 1971*b*) postulated harbours of much greater dimensions, possibly linked by a major canal.

Unfortunately the excavation of major settlements, and hence of their potential harbours, has been neglected in Egypt, archaeologists preferring the better preserved and more easily explored cemeteries on the low desert adjoining the alluvial plain. Most of the important towns were on this plain, still heavily populated and intensively cultivated, and even when their remains are indicated by mounds of considerable size not one has been adequately explored. The short-lived capital of el-Amarna (1379–1360 BC) is of course an exception, but cultivated fields now cover the area between the town and the river, and the scene described above (Fig. 2) suggests that important landing facilities were on the river bank; although one of the excavators of the quarter whose appearance was the most commercial voiced the possibility that a short canal had been cut to it from the river (Pendlebury, 1935: 43). In any case, even though the mounds of other towns remain accessible, the likely sites of their harbours, if not actually cut away by changes in the river's course, are now usually under cultivation. The only excavated example of a non-temple harbour is a fairly small one, about 900 m² in area, located within the Middle Kingdom fortress of Serra East in the northern Sudan. This extremely interesting example consists of a partially rock-cut basin with rough masonry revetments; although subsequently filled in and built over, the site of the harbour was uninhabited at the time of scientific excavation and, more importantly, had always been surrounded by a poorly populated region without extensive cultivation (Hughes, 1963: 127–8; Knudstad, 1966: 176–7). Such conditions are of course extremely rare in Egypt.

Part II

The 'Birket Habu'

However, the remains of another artificial Nile harbour, much larger than that of Serra, have always been visible and yet, curiously, have provoked only sporadic discussions and virtually no excavation. The site of this harbour has been called since at least the end of the 18th century AD the 'Birket Habu' and it lies at Western Thebes, approximately

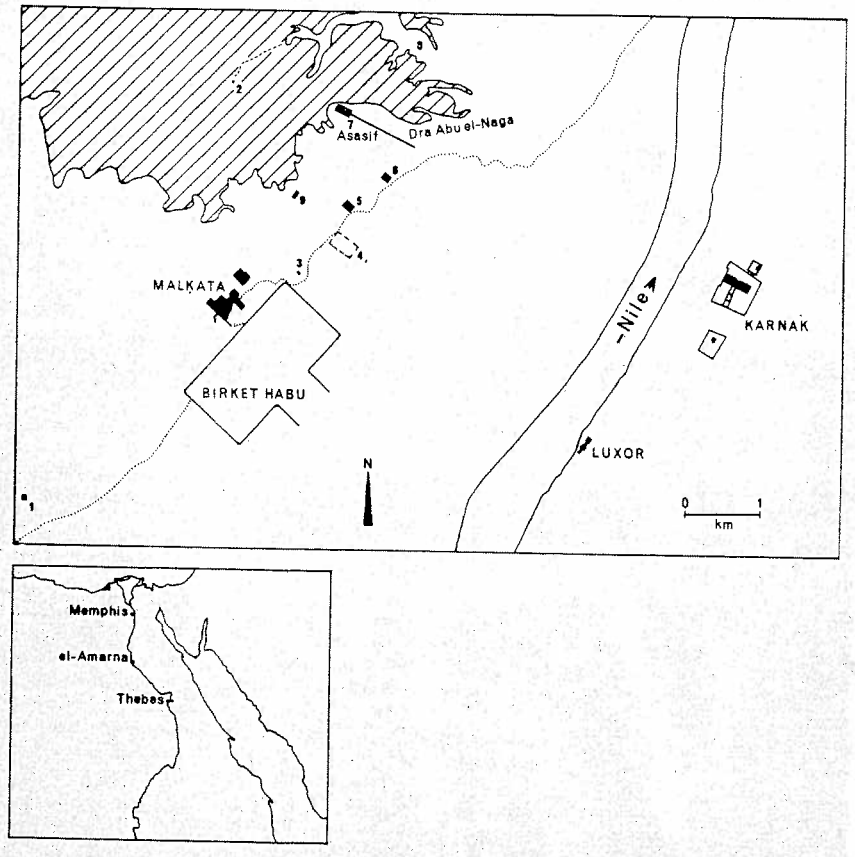
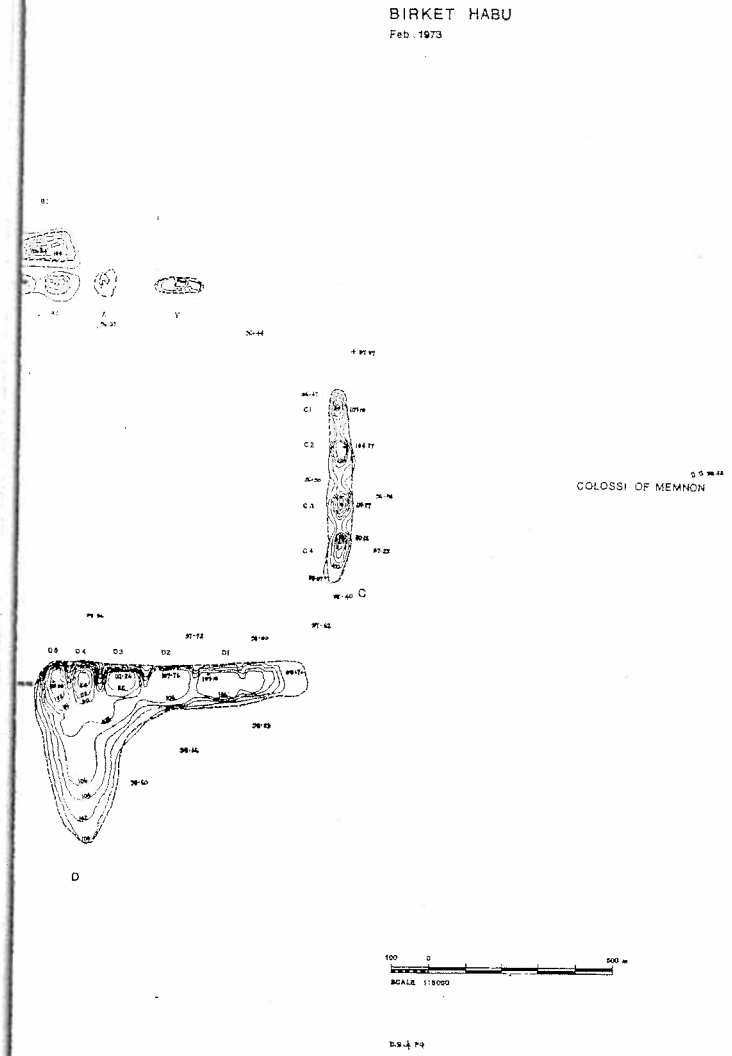


Figure 3. Thebes in the reign of Amenhotep III, with inset map of Egypt. 1. Kom el-Abd. 2. The tomb of Amenhotep III. 3. The temple of 'Amen of the place of holiness'. 4. Site of the funerary temple of Amenhotep III, with the Colossi of Memnon in front. 5. Funerary temple of Tuthmosis IV. 6. Funerary temple of Tuthmosis III. 7. Funerary temple of Queen Hatshepsut (Deir el-Bahari). 8. Entrance to the Valley of Kings. 9. Workmen's village of Deir el-Medina. The outlines of Luxor and Karnak temples represent their final stages with considerable additions from periods later than Amenhotep III.

2·5 km from the present course of the river (Fig. 3). Enormous mounds of sterile sand, earth and gravel, representing spoil produced by the original excavation of the harbour basin, are arranged in a clearly defined rectangular shape measuring approximately 2·4 km by 1 km in area (Figs 4, 5 and 18). The harbour basin itself is now filled with and covered by alluvium which, like that of the surrounding area, is under cultivation (Fig. 22); but our own excavations have already indicated that it filled practically all the available space between the mounds. Halfway along the south-east side of the rectangle the mounds



00 m is a cement threshold in the Pennsylvania expedition house, Mound Z, which appears

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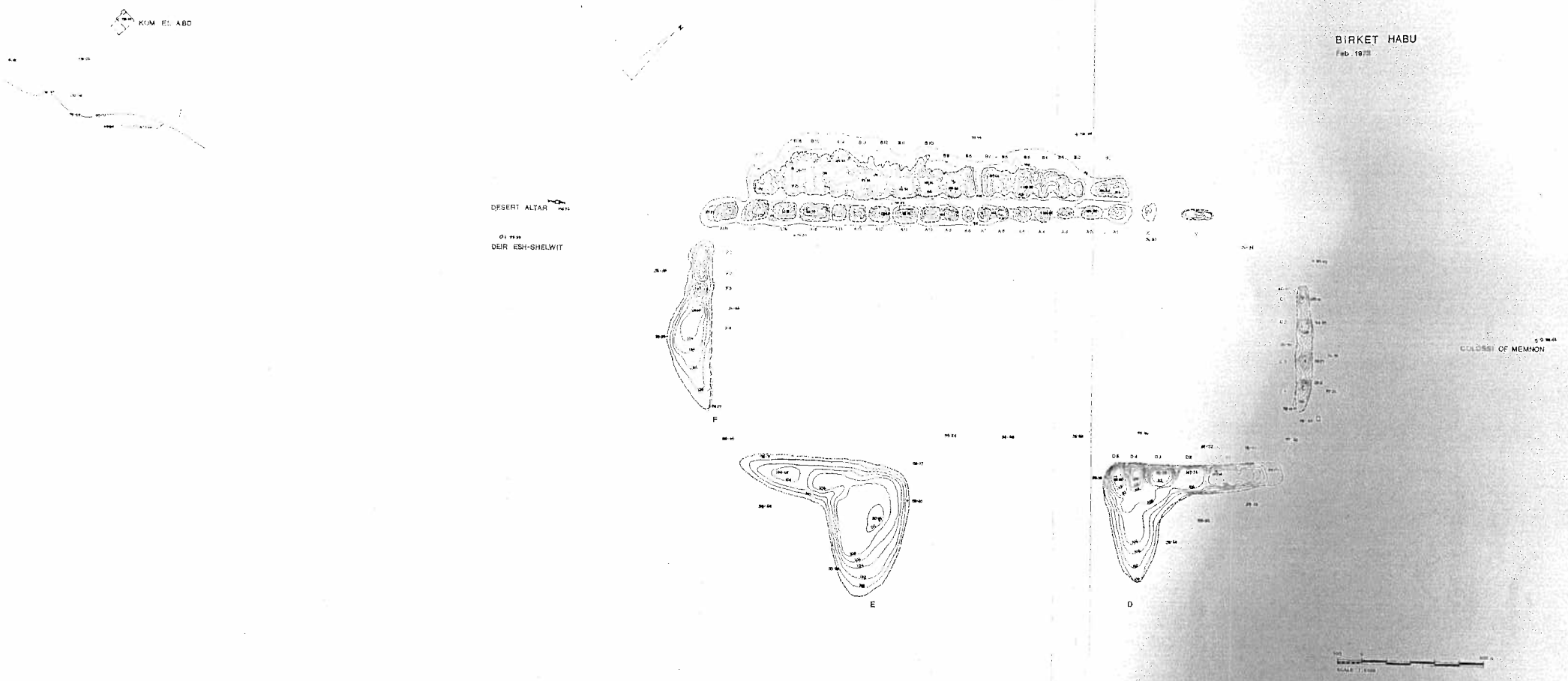

Contour map of the mounds of the Birket Habu. Contours are at 2 m intervals. The heavy dotted lines around the bases of the mounds represent their edges as they now appear on the ground. The datum point of 100·00 m is a cement threshold in the Pennsylvania expedition house, Mound Z, which appears on old aerial photographs, has now almost vanished and is not therefore marked. It was last seen in 1970, during the survey, when it had been reduced to a tiny lump, like an ant-hill, buried in a field of maize.

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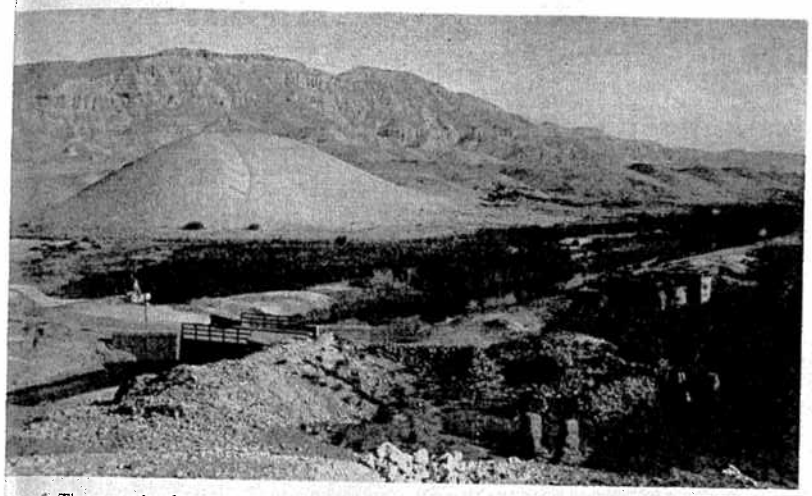


gure 5. The mounds of row A on the north-west side of the Birket Habu, looking north. The prominent mound in the foreground is A17. Note the Ramses Canal running parallel to row A. In the background are the Theban hills containing the Valley of Kings.

eak and turn outwards, presumably mark-
g the point of junction with a canal running
the Nile. It is noticeable that the mounds
) not continue far along the probable course
the canal, and one might deduce from this
at in ancient times the Nile ran much closer
the site. It is true that both early and
cent maps show that the distance between
nal mouth and Nile bank, measured along
e probable line of the canal, is as great as
or 2·5 km (compare Jacotin, pl. 5, based on
e survey of Napoleon's expedition at the
id of the 18th century AD, with Nims, 1965:
, based on modern surveys). However, these
aps cover only the last 180 years, and since
e Birket Habu was created some 3370 years
go major changes in the local course of the
ver might seem conceivable. But the extent
which one can allow for the meandering
the river, a far from haphazard process,
is to be limited by the existence not far
ostream of the ancient towns of Armant
id Tod. Excavations have shown that their
stories on their present sites extend back at
ast to the New Kingdom, and their positions
hibit one from envisaging too drastic an alteration in the course of the river, such as would be necessary to bring it up against the Birket Habu. It thus remains probable that the canal was actually quite long but that its spoil heaps, considerably smaller than those produced by the harbour itself, were destroyed by the centuries of cultivation following the abandonment and silting up of the canal. The area near the river bank was always intensively cultivated, while the expansion of cultivation in and around the Birket Habu itself appears to have been relatively recent and forms part of a modern pattern of expanding cultivation found in many parts of Egypt. Most of the spoil of mounds D and E (Figs 4 and 6) comes probably from the excavation of the basin itself.

History of exploration

The exploration of this harbour basin and its environs is the principal aim of the University Museum, University of Pennsylvania Expedition to Malḳata and the Birket Habu, which has now carried out two seasons of excavations (1971, 1973). Malḳata is the modern

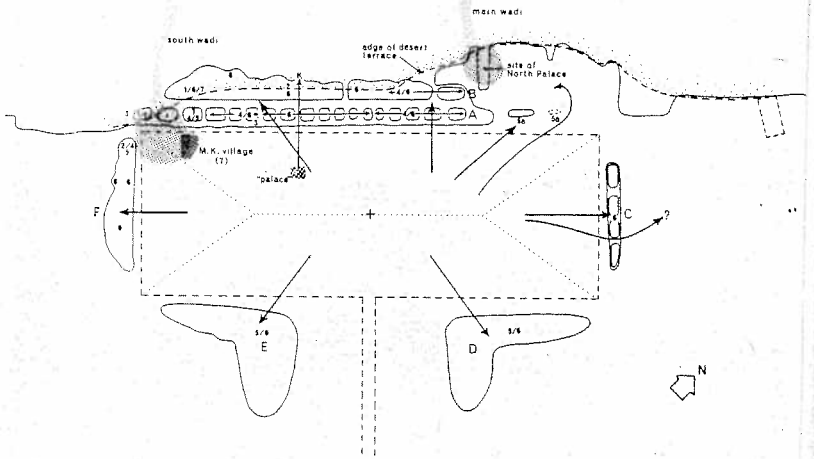


Figure 6. The basic structure of the Birket Habu. This diagram contains a number of hypotheses to be test by future excavation and is thus very tentative indeed. The two principal wadis are indicated by lig stippling, their outwash fans by heavier stippling. An attempt has been made to summarize the ma visible constituents of the mounds as follows: 1. sandy gravel, representing weathered desert surfa material; 2. chips of pale yellow and white limestone; 3. rough boulders of limestone, breccia a conglomerate; 4. predominantly sand, often with quartzite and other pebbles mixed in; 5. san alluvium, the sand being either coarse and yellow or finer and white (5a); 6. alluvium, either in th homogeneous beds, or bedded but broken into lumps; 7. debris from a Middle Kingdom occupati site; 8. coarse rounded flint and limestone pebbles. The symmetry of the mounds suggests some sort ancient plan for excavating and dumping, and this is sketched in as well, the heavy arrows indicati the direction of dumping.

name for an extensive ancient settlement located on the north-western edge of the Birket, a settlement which has long been known as a 'palace-city' of King Amenhotep III (1417–1379 BC), the existence of which strongly influenced interpretations of the Birket for many years. After an initial misidentification as a 'Hippodrome', 'un vaste champ de Mars, où les troupes étoient exercées au maniement des armes' (Jollois & Devilliers, 1809, ch. IX: 69), it was realized by 1830 that it was rather once an artificial lake (Wilkinson, 1835: 77–8), an interpretation accepted by all recent scholars who have touched on the topic. In view of the existence of the 'palace-city' it was natural that Steindorff should have suggested, in 1901, that the Birket was probably a 'pleasure lak built for Tiy, wife of Amenhotep III, a described on several historical scarabs issu during his reign (Steindorff, 1901: 64). Th interpretation was generally followed, spite of the awkward fact that the 'pleasu lake' as described on the scarab was mu smaller (600,000 m²) than the visible rema of the Birket Habu as defined by its moun (2,400,000 m²) and had taken only 16 da to make! Ingenious efforts were made explain the discrepancies (Engelbach Macaldin, 1938), but these were negated by brilliant study of Yoyotte (1959), who show conclusively that the so-called 'pleasure la was actually an irrigation basin at Akhmi far to the north of Thebes, and was not to

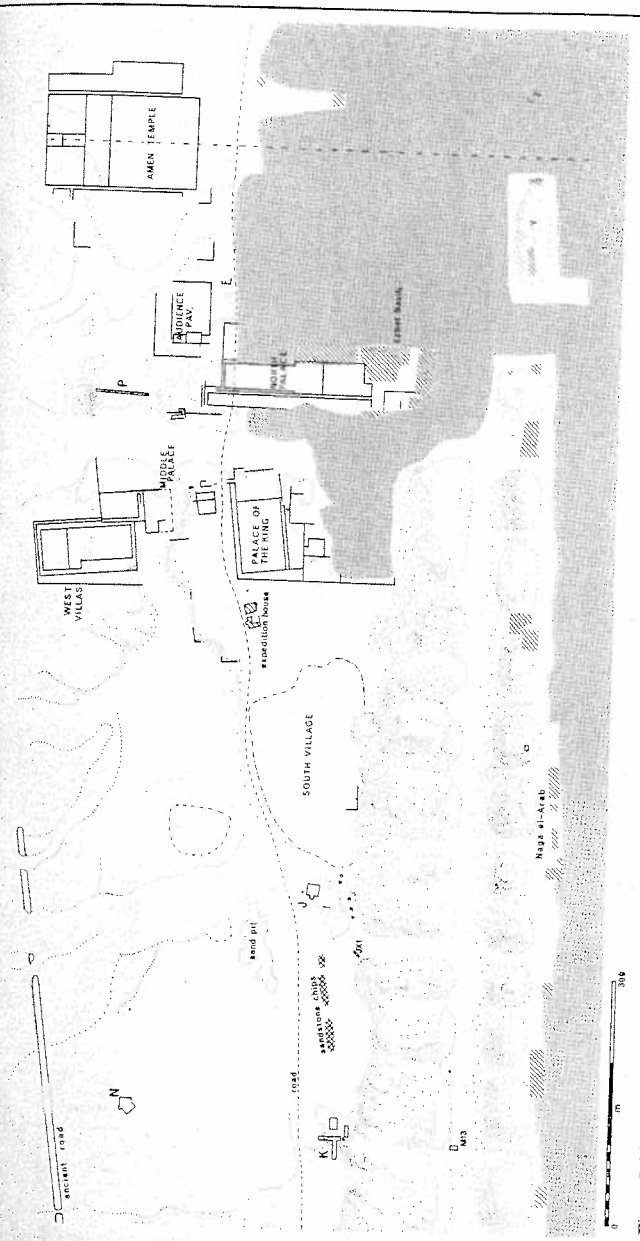


Figure 7. Plan of the north-west side of the Birket Habu, showing the mounds of rows A and B, and the Malkata building complex. Mound Z has now been removed by local cultivators. Sites J and P are parts of the Eighteenth Dynasty town. For site K see p. 122.

identified with the Birket Habu (Yoyotte, 1959). It is in fact most likely that the Birket was a true harbour intended to serve several important functions (Engelbach & Macaldin, 1938: 54; Kemp, 1972: 664), including probably ceremonial and recreational ones.

Those parts of the 'palace-city' comp which are still accessible (a large section now buried under encroaching fields) h been to a large extent excavated by 19 primarily by expeditions sponsored by t Metropolitan Museum of Art in 1902 a

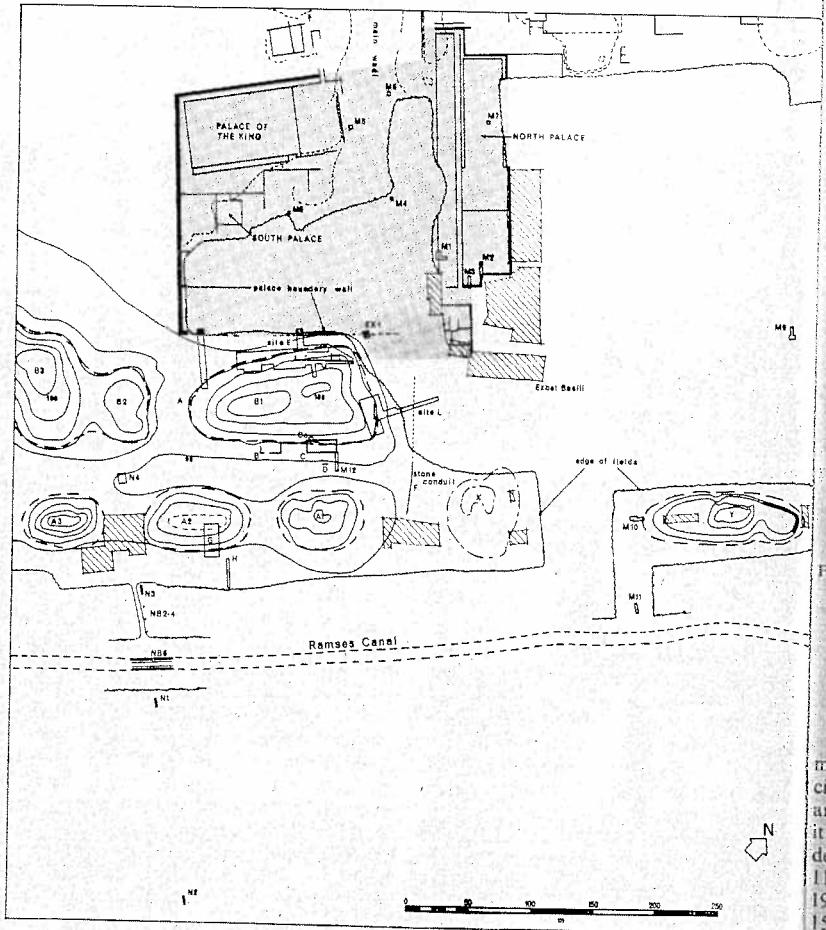


Figure 8. General map of the area around mound B1 and the Palace Compound of Malkata, see Figs 7 and Sites A–H, L, M1–M12 and the N series are shown. The stippled area is the Palace Compound; l hatching represents modern housing, including the village of Ezbet Basili. Contours are at 2 m in vals; the heavier dotted lines represent the bases of the mounds as they now appear on the grou

1910–1920 (Hayes, 1951: 35, n. 1, n. 3). The complex, as preserved (Figs 7 and 8), includes the remains of four palaces, an Amen temple and several residential areas; it appears in fact to have been the south-western end of a sprawling town which once stretched as far as the mortuary temple of Amenhotep III (Fig. 9) traces of this town having been recovered during the excavation of later

attention. Tytus notes in a brief report on the earliest Metropolitan Museum work on the site that a test trench had proved that the harbour was constructed at the same time as the palace-city, but the evidence itself was never published. Later, the excavation of 'a private house between the palace and the lake, on the east side of one of the dikes' was mentioned (our sites B–D); material of

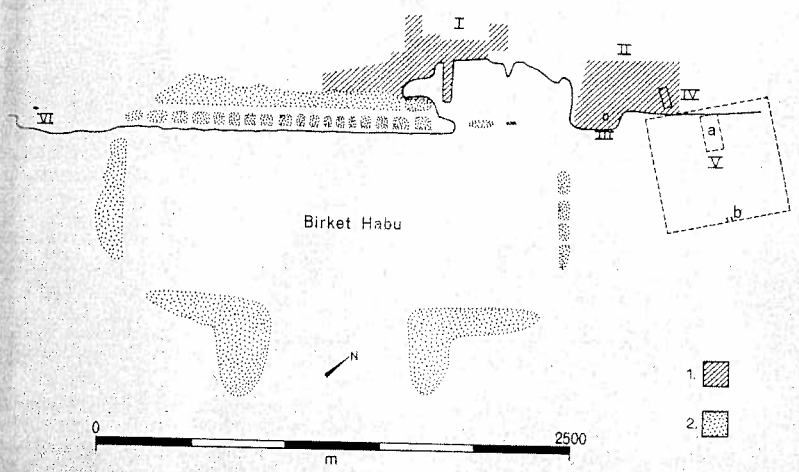


Figure 9. The Birket Habu and its Eighteenth Dynasty environs. 1. Areas of the known remains of the palace complex of Amenhotep III and its accompanying town. 2. The mounds of ancient spoil surrounding the Birket Habu. I. Malkata. II. General area covered by Eighteenth Dynasty houses found beneath later mortuary temples. III. The temple of 'Amen of the place of holiness'. IV. The funerary temple of Amenhotep, son of Hapu, a favoured official of Amenhotep III and possibly his chief architect. V. The site of the funerary temple of Amenhotep III; Va: Kom el-Hetan; Vb: the Colossi of Memnon, actually of Amenhotep III. The area enclosed by its surrounding wall (based on a reconstruction in Robichon & Varille, 1936: pl. IV) is probably exaggerated. VI. Desert altar.

mortuary temples in the area. The 'palace-city' itself was built of sun-dried mud brick and is now poorly preserved, but originally it must have been an imposing and richly decorated complex (Hölscher, 1939: 45–6, 110; Robichon & Varille, 1936: 33–4; Hayes, 1951: 35–7, 177–80, 182–3; Smith, 1958: 159–72).

The directors of the Metropolitan Museum Expeditions had assumed that the Birket Habu was the 'pleasure lake' of Queen Tiy and, perhaps for this reason, paid it little Eighteenth Dynasty date recovered from this 'house' suggested that the harbour was at least in existence by this date (Tytus, 1903: 9; Winlock, 1912: 188).

In 1970 O'Connor proposed to the University Museum that in view of the obvious importance of the Birket Habu it deserved fuller study. After Kemp had carried out, at O'Connor's invitation, a thorough field survey of Malkata and the Birket Habu (Winter 1970), the project was formally set up under O'Connor's general direction. The first full

season lasted from the end of September to early December 1971, of which four weeks were actually devoted to excavation, with O'Connor as field-director, and the second from 20 January to 10 April, 1973, under the direction of Kemp. The results clearly justify continuing excavation, and the next excavations are planned for the latter part of 1974.

The projects of Amenhotep III in western Thebes

Prior to Amenhotep III the west bank of Thebes had a long history as a necropolis extending back to the days of the Old Kingdom (Fig. 3). Its centre lay towards the north, around Dra Abu el-Naga and Asasif, and here lay the tombs of the kings of the Eleventh and Seventeenth Dynasties. It was in this part that Hatshepsut's famous mortuary temple of Deir el-Bahari was built and it remained throughout the New Kingdom a favoured location for private tombs. In the hills behind lay the new royal cemetery, the Valley of Kings, at the head of a long winding valley whose entrance lay just to the north of Dra Abu el-Naga. Further to the south-west, however, a new centre of activity began to emerge. Early in the Eighteenth Dynasty a community was established in the valley of Deir el-Medina (Fig. 3, No. 9), its purpose to quarry and decorate the royal tombs in the Valley of Kings. Near the edge of the modern cultivated land, and more or less opposite the Deir el-Medina valley, another community grew up with its own little temple, dedicated to 'Amen of the Place of Holiness'. It was around this area that the great west bank projects of Amenhotep III were centred, and although they themselves turned out to be short lived the importance of this part of the Theban necropolis was given a fresh stimulus with the siting here of Rameses III's great mortuary temple of Medinet Habu. By the end of the New Kingdom this had become the centre of west bank life (Kemp, 1972: 666).

The projects of Amenhotep III represented a massive addition to the structures on the west bank. Following the tradition of the Eighteenth Dynasty his tomb was in the Valley of Kings (No. 22 in the Western Valley) and his mortuary cult served by a separate temple near the edge of the alluvial plain. In this case, however, it projected into it much further than others. It has been badly destroyed, to the extent that only two separated areas of stonework remain (Fig. 9). But one of these, the colossal statues popularly known as the Colossi of Memnon, gives some indication of the scale intended, whilst the other, Kom el-Hetan (see Ricke 1965), an area of column bases, serves to mark the central part of the temple and to suggest that the Colossi of Memnon must represent the beginning of a processional avenue leading up to the front of the temple proper. Numerous fragments of other statues remain, some of them from other colossi, and add to the impression that in scale and quality of work this temple can have had few equals on the west bank (Porter & Moss 1972: 449–54).

Malḳata: its extent and plan

Excavations into the foundations of later mortuary temples lying immediately behind on the desert edge have shown that by this time the settlement around the little temple of 'Amen of the Place of Holiness' had grown considerably, and must be regarded as a suburb of the Malḳata complex from which it is separated by a low-lying area now under cultivation. The 1970 survey made a particular point of checking the intervening desert surface but no trace of Eighteenth Dynasty occupation was apparent. A trench (M9) cut in the centre of the intervening fields in 1973 also gave a somewhat negative result, but it represents such a tiny sample of the whole area that it does not exclude the possibility that the two settlement areas were linked to form a continuous town (Figs 8 and 9). The 1970 survey also established that earlier excavators had virtually exhausted the Malḳata complex itself, so that the published outline plans (Hayes, 1951, fig. 1; Smith, 1958: 161, fig. 54) represent most of what there is. Apart from buildings around mound B1, our work has, to date, found only two further areas of settlement, both on the fringes of the main complex. One, site P, lies behind the 'North Palace', the other, site J, is a continuation of the 'South Village', on the floor of a shallow wadi behind mound B7 (Fig. 7).

As hitherto presented the Malḳata complex has seemed like a rambling and rather haphazard collection of buildings separated by large irregular spaces. This is, however, a false impression. An appreciation of the underlying topography, the results of our own excavation, and a careful study of aerial photographs taken in 1921 shortly after the end of the Metropolitan Museum of Art excavations, are beginning to reveal a much greater coherence of layout, and in particular that some of the principal units are aligned far more closely to an overall grid plan and to the edges of the Birket Habu itself (Figs 7 and 9). It has also become clear that in constructional terms Malḳata and the Birket Habu are intimately connected, were conceived as a unit, and constructed simultaneously. It also seems likely that Amenhotep's project remained uncompleted, so that the full extent of what was contemplated here may never be known. Yet before his death his designs had reached out to an even more distant site, Kom el-Abd (Figs. 3, No. 1 & 4), where a strange brick platform was erected, accompanied by a group of caretakers' houses (Myers, 1937; a fuller report by Kemp will be published shortly).

The nature of the Birket Habu

As an exercise in excavation and comprehension the Birket Habu is something outside the normal range of archaeological work in the Nile valley, demanding close attention to geology, and particularly to what might be termed the geology of human disturbance on a massive scale. Indeed, the scale is so great that even large excavations represent only tiny bites into its surface, and much has to be inferred from a close study of what is visible on the ground. Certain basic features are, however, tolerably clear by now (Figs 6 and 10). The Birket Habu was laid out roughly parallel to the edge of the low desert terrace. This natural feature did not follow a straight line, but curved inwards to form a bay which sweeps past Malḳata proper and then turns back out to pass beneath the temple of Medinet Habu. The temple 'Amen of the Place of Holiness' stands more or less where it ends. At least two wadis had disgorged

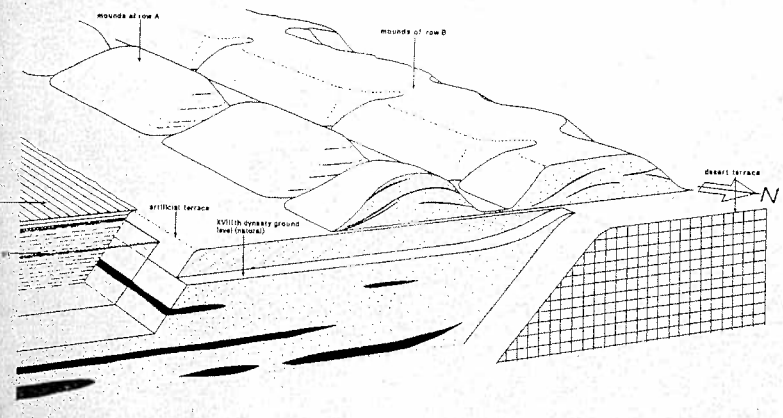


Figure 10. Schematic diagram of the basic structure of the north-west side of the Birket Habu as suggested by fieldwork. Not to scale.

protruding fans of gravel. On one of them the North Palace of Malḳata was built; the other, at the western corner of the Birket Habu, had to be cut into as the basin was dug out. As Amenhotep's workmen excavated the basin the spoil was heaped in an orderly and carefully controlled way around the edges, in places up to 14 m above even the modern level of the alluvial plain. But on the northwest side the conspicuous parallel rows of mounds (rows A and B) mark only a second phase of dumping. At first, we assumed that these mounds rested on the hard desert, concealed by a thin cover of wind-blown sand. But excavation, particularly of trenches M12, M13 (Fig. 11) and N4, has shown that the cover of wind-blown sand actually conceals an extension of the natural desert terrace, artificially created from the excavated spoil. It is this artificial terrace, emerging from beneath the mounds of row A, which forms the present ground level between the mounds and the cultivated fields. By coincidence, the natural rise in the Nile flood plain over the centuries, brought about by an annual flooding by silt-laden waters, has made the level of the alluvial, cultivated land more or less the same as that of this artificial terrace. Nowhere have we located the true desert edge in this area, but it must be presumed to run beneath the mounds of row B.

Beyond mounds A1 and B1, as the desert bay reaches its fullest extent, the character of the site changes. The mounds are reduced to a single row (X, Y, Z), each small in size

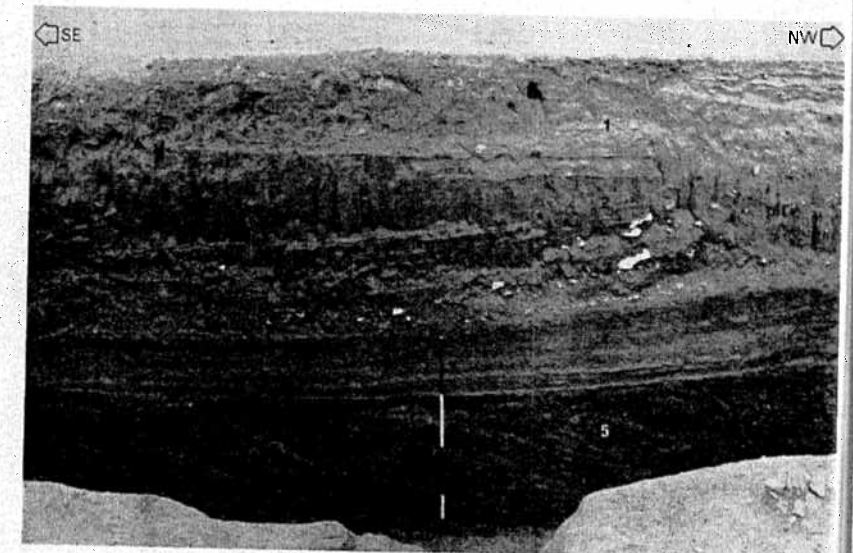
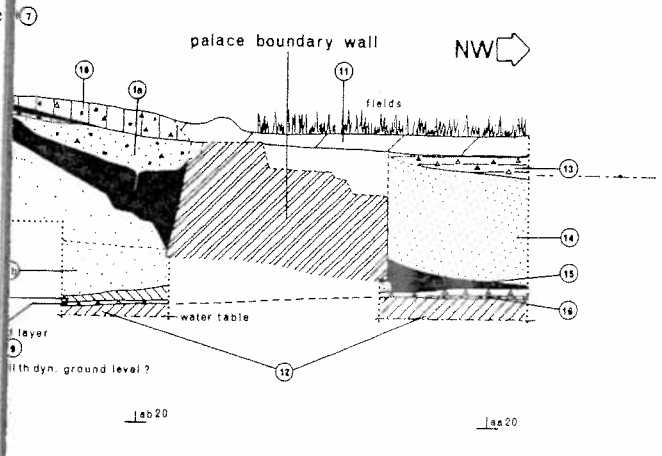
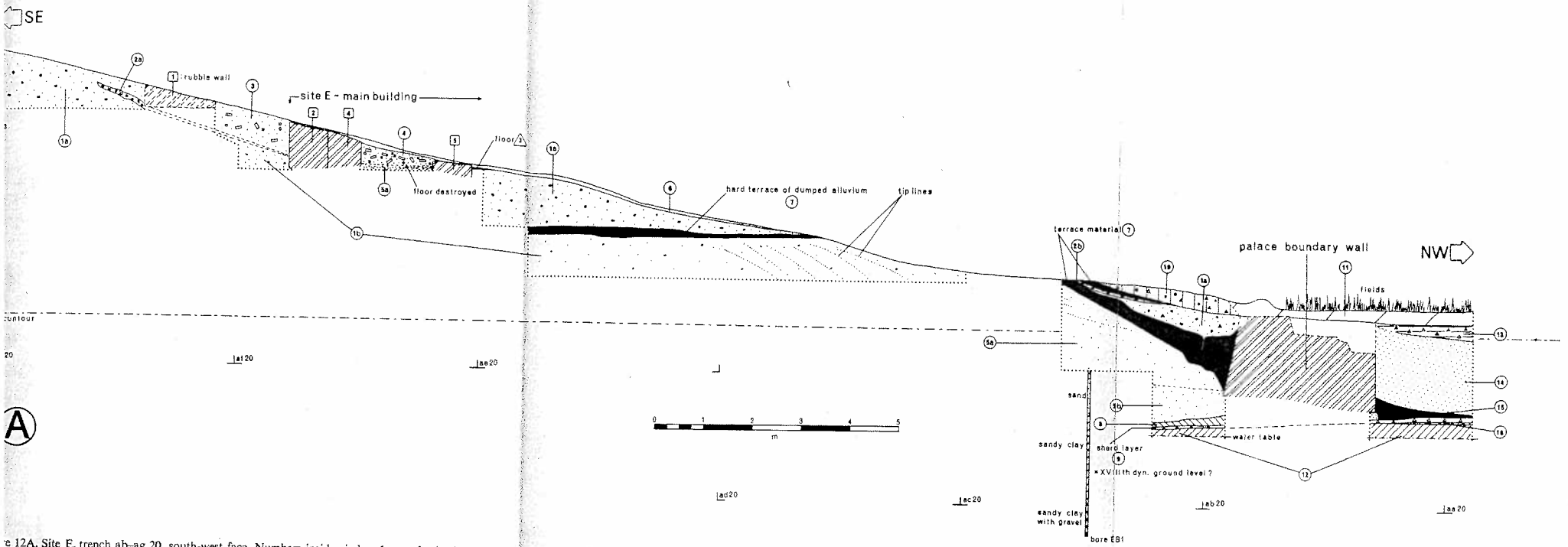


Figure 11. Trench M13, on the floor of the avenue between rows A and B of the Birket Habu mounds, see Fig. 7. 1. Surface deposit of sand and limestone chips. 2. Coarse, wind-deposited sand. 3. Sloping layer, rising to the north-west, of limestone fragments in a matrix of fine brown soil with some clay. This represents a second phase of dumping. The foreground surface is the top of this layer, with some limestone fragments visible. Note the pit that has been dug into it. 4. Wind-deposited sand with traces of alluvium; bedded in fine horizontal planes. 5. Alternating tip lines of loose sand and alluvium containing New Kingdom sherds. This is the terrace formed during the first dumping phase. Its upper surface has been trampled hard and flat. This stratum continues below the trench floor for an uncertain distance. The ranging rod is 2 m long.



in white powdery matrix; 2b, sand and limestone chips; 3, sand and fragments of mud ; 8, fine alluvial clay; 9, sandy clay containing trampled sherds; 10, surface material: distinguishable; 15, brown alluvium; 16, sand and fine gravel. Numbers inside squares

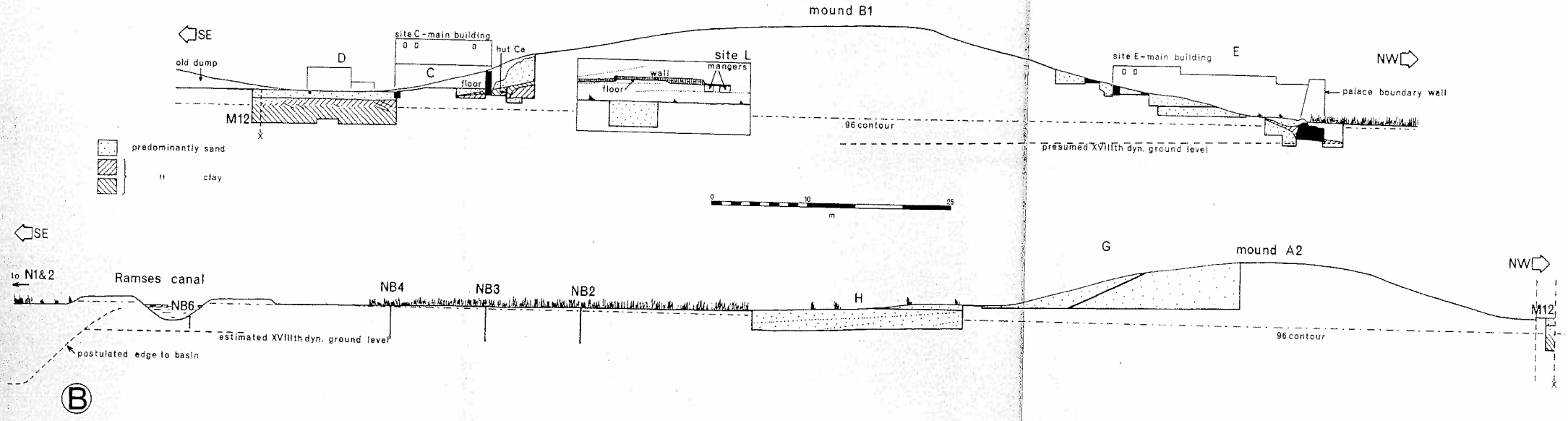
[facing p. 116



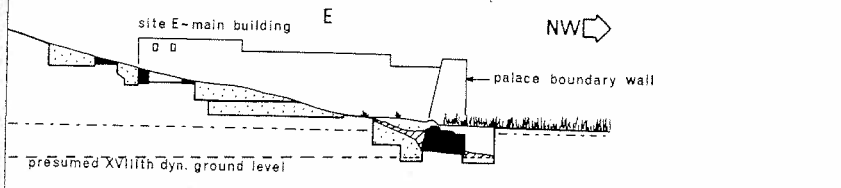
e 12A. Site E, trench ab–ag 20, south-west face. Numbers inside circles: 1a, sand mixed with lumps of alluvium; 1b, similar to 1a, but with finer sand and fewer lumps of alluvium; 2a, rounded limestone fragments in white powdery matrix; 2b, sand and limestone chips; 3, sand and fragments of mud brick from walls; 4, mud brick and mud roofing fragments plus sherds in sand; 5a, fine sand; 5b, fine sand, whether dumped or naturally deposited is uncertain; 6, loose sandy surface material: 7, hard alluvium; 8, fine alluvial clay; 9, sandy clay containing trampled sherds; 10, surface material: sandy earth with alluvial lumps and sherds; 11, cultivated soil; 12, very compact sandy clay, without sherds; 13, compact sandy soil, with sherds; 14, sandy alluvium, denser than 13, but not always readily distinguishable; 15, brown alluvium; 16, sand and fine gravel. Numbers inside squares are walls.

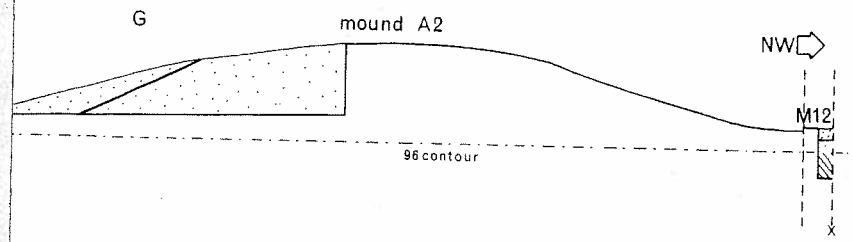
For part B see over.

[*facing p. 116*



B. Composite section through the north-west row of mounds incorporating the results of the 1971 and 1973 excavations.



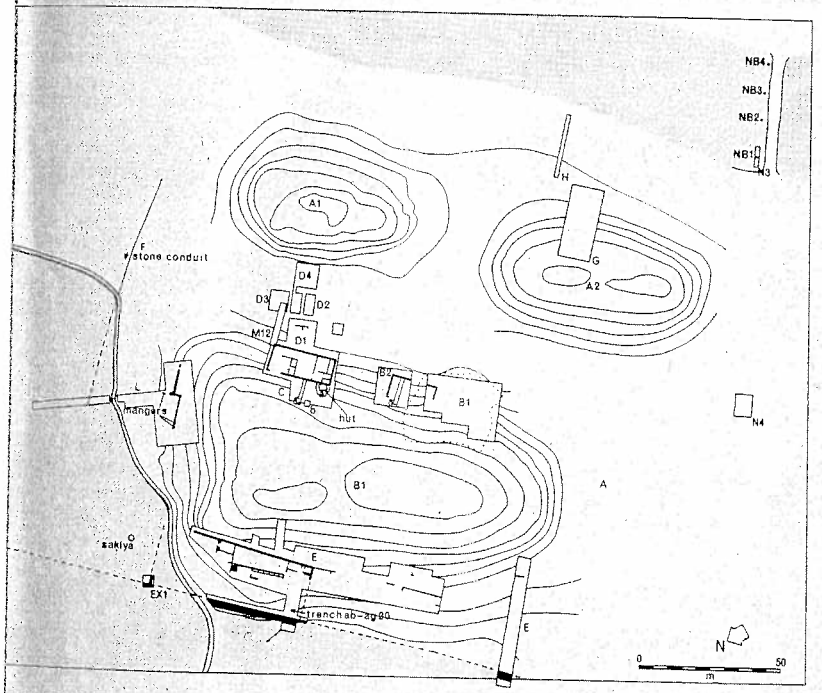


excavations.

id widely separated. It has proved possible r the local farmers to extend cultivation to this area. Our excavations have shown, wever, that the artificial terrace was almost rtainly extended at least into part of this ea, between the Palace of the King, the orth Palace, and mound B1. The building of ese palaces proceeded simultaneously with e digging of the Birket Habu.

he evidence of site E

he sequence is best illustrated by trench –ag 20 at site E (Figs 12 and 13). Its west part (Fig. 12A: 9) is one of the few aces where it was possible to expose a ratum which could, with some confidence, be regarded as the Eighteenth Dynasty ground level. Part of it was carpeted with sherds which appear to belong to the general repertoire of types in use at Malḳata, and from the impression they give of having been trodden into the ground, might tentatively be regarded as rubbish from a temporary encampment or meal site for workmen. This level runs beneath all the dumped material, but slopes downwards towards the Nile as it does so, so that by the time it is running beneath the gap between mounds B1 and A1 it has passed beneath the water table. The next stage is a little uncertain, for it is not quite clear whether levels 5b and 8 in squares ac–ab 20 represent a natural deposit of alluvium and a sand bank or the first dumping



gure 13. Plan of the excavations around mound B1. The stippled areas are those now under cultivation. The contours belong to a survey carried out independently of the main one, and are at 1 m intervals. Sakiya is an Arabic word for an animal-driven irrigation water-wheel.

phase of the artificial terrace beneath mound B1, an interpretation probably more correct. But on the sloping surface so formed the building of the Palace Boundary Wall was begun. The section illustrated in Fig. 12A may give the impression that a foundation trench was cut to receive it. But this is a purely local vagary in level 7. In the opposite face of the trench, 5 m away, no sign of a foundation trench was visible despite a careful search for one, and it must be concluded that the terrace beneath mound B1 was heaped against the wall.

The Palace Compound

The Palace Boundary Wall is 3 m thick at its base, with a heavy batter on one side. It runs along the base of mound B1, and in the south-west turns to run north-west along the present desert edge, its course having been determined by the Metropolitan Museum of Art (Fig. 8). It then turns north-eastwards to enclose the Palace of the King. This stood on a low elevated piece of desert, and to take maximum advantage of this the axis of the Palace has been turned to an angle from the general overlying grid plan of Malḳata. What course the wall next took has been lost by the action of the main wadi which crosses the site at this point. Two trenches sunk into it (M5 and M6) showed a depth of about 0·75 m of sand and gravel burying a stratum which must be the dissolved remains of mud bricks. On the far side of the wadi the North Palace leaves the desert edge and runs out into the cultivation, disappearing beneath the village of Ezbet Basili. A series of trenches dug into its foundations (M1–3, M7) show the same massive wall construction as is represented by the Palace Boundary Wall at site E. The main palace walls were built on a wadi outwash fan of gravel as a series of casemates, subsequently filled up with earth to provide a platform on which rooms and partition walls were laid out on a level now similar to the adjacent desert terrace. The North Palace thus replaces the Palace Boundary Wall to complete the enclosing of a substantial area which might be termed the Palace Compound. It is almost certain that the part of this compound now covered with fields was also deliberately filled up with sandy soil (Fig. 12A: 14), though whether it was occup by buildings of relatively light construction by gardens, an important feature of co architecture, is as yet unknown.

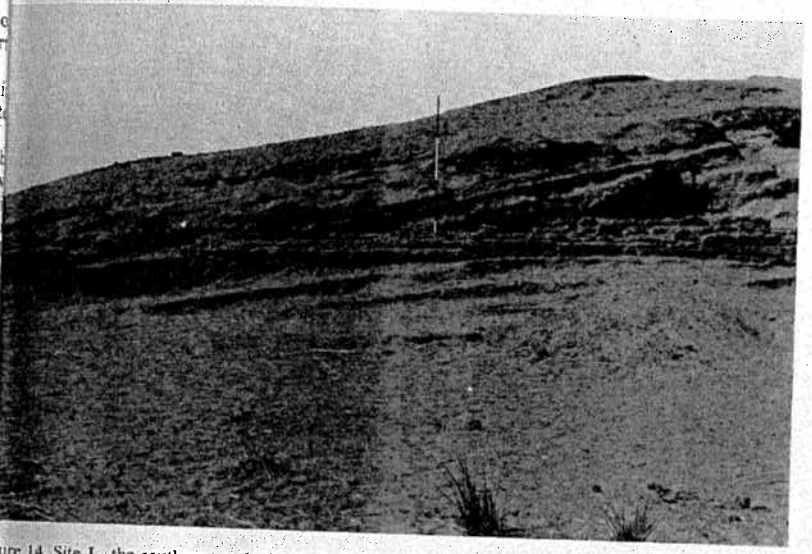
The unity of the palace buildings Malḳata is thus firmly established, as is th precise contemporaneity with the excavati of the Birket Habu.

It would obviously have been advantage to have continued the artificial terrace nor eastwards beyond the North Palace and have accommodated part of the support town on this 'reclaimed' land. It was to t this hypothesis that trench M9 was dug the centre of this area. The stratigraph without obvious traces of buildings, w difficult to interpret, but comparison w deep trenches dug elsewhere towards the e of the 1973 season (principally M12 and M suggests that at least from 1·3 m below present ground level the soil is in fact dump material. It is to be hoped that the futu course of the excavations will produce m positive results, and also determine whet the artificial terrace extends north-east ev from the mounds of row C, filling the spa between them and the site of the mortua temple of Amenhotep III (cf. Fig. 6). The w in which this temple itself projects much f ther into the alluvial plain than its fello may be a sign that it too lies on artificia raised ground.

The formation of mound B1

Returning to the section from site E (Fig. 12A the sandy material from the terrace bene mound B1 (5a) can be seen dumped agai the great wall. This wall has almost certain along with much of the Malḳata compl been systematically demolished. It presuma once stood to a considerable height, and wh it must have served to prevent mound B1 fr spreading into the Palace Compound, main purpose as a continuation of the w on the south-west side must have been provide privacy and security. The upper s face of the terrace beneath mound B1 perhaps marked by the layer of trampled m 7 on Fig. 12A. This looks remarka horizontal in this section, but in fact var

nsiderably over site E, rising and falling, d often dividing into several separate mpled layers. In general these layers rise om south-east to north-west, as is very ear from site L on the north-east side of ound B1 (Fig. 14) and the cutting made



gure 14. Site L, the south-east end, showing the contrasting planes of the rear wall of the main building (horizontal) and the sloping terraces of compacted sand and alluvium. The foundation trench for the wall was cut into the terraces, and the edge has possibly been blurred by superficial excavations conducted earlier this century. The three arrows are immediately above the pegs which mark, at 5 m intervals along a straight line, the limits of our own excavations. The uneven surface in front of this line is the swept surface of the uppermost terrace. The ranging rod is 2 m long.

hind the building on site C (Figs 15 and 16). s the work of laying down this great arti- ial terrace went ahead a few short-lived uctures were put up, later to be buried and rgotten. At site Ca a small but well pre- rved hut was found beneath the material mound B1 and the main building on the e (Figs 15 and 16). Before being buried this d been literally filled up with pottery. At e L a number of small mud structures, obably animal mangers, stood for a time fore being buried (Figs 12B and 13). When ound B1 had been completed a number of well made buildings were erected on its sides. At sites C and L (Fig. 14) their walls had been sunk in foundation trenches cut into material which must be some of the last dumped on the mound; at site E (Fig. 17) the picture was less clear, but at one point it seemed that the main building there had had mound material heaped against it, implying that it is slightly earlier than the other two, and made whilst the formation of mound B1 was still progressing. A further element in the building complex in this area is a limestone water conduit laid over the artificial terrace north-east of site L (Figs 8 and 13) which had carried water from the Birket Habu, presumably raised by means of a series of *shadufs*, down to some point in the Palace Compound. The final stage, a very fragmentary one, consisted of the appearance of more lightly

built structures at site E (Fig. 13) alongside the main building and apparently dating to a time when it was falling into decay.

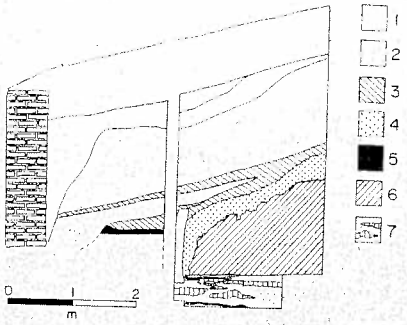


Figure 15. Section showing the relationship between mound B1, the large structure in C and the small hut Ca underlying mound 1. The large brick wall is the rear (north-west) wall of the main structure, while the rear wall of hut Ca is left blank. 1, Aeolian sand, very compact except for the surface layers; 2, loose sand; 3, fine brown soil; 4, hard dark grey alluvial soil, in a tumbled condition; 5, very hard dark grey alluvial soil; 6, brown mixed fill; brown soil, grey alluvium, occasional sherds; 7, loose sand and firm, clayey sand, part of an artificial terrace. The section is staggered; for the right-hand part cf. Fig. 16; the left-hand part is *beyond* the hut.

Figure 16. The rubbish filled hut Ca, underl mound B1 (cf. Figs 12B and 15). The wall of the main building of site C is on left. The ranging rod is 2 m long.

The geology of the Birket Habu

As Amenhotep's workmen dug out the gr basin they cut into the varied sediments wh made up the flood plain as it then existed, heaped them around the edge. All of our w so far, including the 1970 survey, confir that everywhere the mounds are heaps excavated spoil and not the sanded c remains of massive brick walls. This mist had been initiated in the *Description l'Egypte* (1809), and was still being repea as late as 1959 (Jollois & Devilliers, 1809 ch. IX: 67; Yoyotte, 1959: 25). These mou thus contain some sort of record of the unc

Figure 17. Panoramic view of site E, looking south-west, after the conclusion of excavations. Squares EX1 ab 20 have been filled in completely, ac 20 partially. 'W' is the edge of the Palace Boundary W Mounds B2 and B3 rise in the background, the former (to the left of the palm tree) covered with Kingdom sherds.

lying sediments, and a general attempt to summarize them is made in Fig. 6. In general it can be seen that the outer mounds contain mostly alluvium (Fig. 18), whilst those nearest the edge of the desert contain a great deal of sand, as do parts of the artificial terrace. Nevertheless total homogeneity of material is

Figure 18. Mound D2, north-west side, facing the Birket Habu. The D mounds have all been cut back anciently, leaving almost vertical faces. The houses of the village of Kom el-Ba'irat can be seen on top.

not particularly common, more often there is a rapid alternation of sand and clay and intermediate sandy clays (cf. Fig. 21). To understand more clearly the nature of the ancient ground it is worthwhile to go back to a remarkable series of over one hundred pits and borings made across the Nile valley in the vicinity of Cairo by Horner between 1851 and 1854, and meticulously observed and published (Horner, 1855 and 1858). Horner discovered wherever he took a sample a remarkable variation in the sequence and variety of sediment, even where his pits were quite close. He distinguished seven basic types of sediment, which tended to pass imperceptibly into each other, but recognized that the two main constituents were Nile mud and wind-blown quartz sand. Horner's observations on materials and their haphazard succession read very much like a commentary on our own work at the Birket Habu. His explanation also sounds eminently feasible; that the cause of the variation is eddies in the inundation waters which disturb the process of sediment distribution, eddies caused by anything from trees to irrigation works and villages. The aeolian sand derives from winds carrying sand from the deserts and being caught as they blow across the surface of water, particularly standing lakes in low lying areas. It is a basic character of flood plains that their lowest parts tend to be at the furthest edges away from the river, where the least amount of heavy sediment is deposited. These marginal areas (back swamps) are thus more likely to trap wind blown sand and Horner noted in his pits that sand tended to be commoner nearest the desert edge. This appears, from the record of the mounds, to have been true of the Birket Habu area. This introduces an important practical consideration. By choosing to dig out the Birket Habu basin near the desert edge Amenhotep's workmen probably made a considerable saving of effort, being faced with at least 1 m less of topsoil to remove than had they chosen to dig near the river bank. (For valuable schematic sections through the Nile valley see Butzer, 1959: 28, fig. 4; 69, fig. 8).

Near the western corner the tongue of a wadi outwash fan had to be cut into. The record left of this is in the form of tall steep mounds (Fig. 5) which, as the 1973 magnetometer survey of Malkata showed, are composed entirely of sand and gravel, and large boulders of flint and conglomerate, presumably the relics of ancient rainstorms which had to be hauled out and dumped, principally around mound A18. Somewhere in the neighbourhood, perhaps actually on the edge of this wadi tongue, a Middle Kingdom village or farm had stood. This too was removed and dumped in the mounds. Most surprising of all, the dumped spoil contains, at site K, rubble from a demolished painted brick building of Amenhotep III himself (Fig. 19).

The mound pattern

The dumping of the spoil was patently not a haphazard process but an integral part of the whole carefully planned enterprise. It is distributed with some evenness around the perimeter, the main anomaly being the

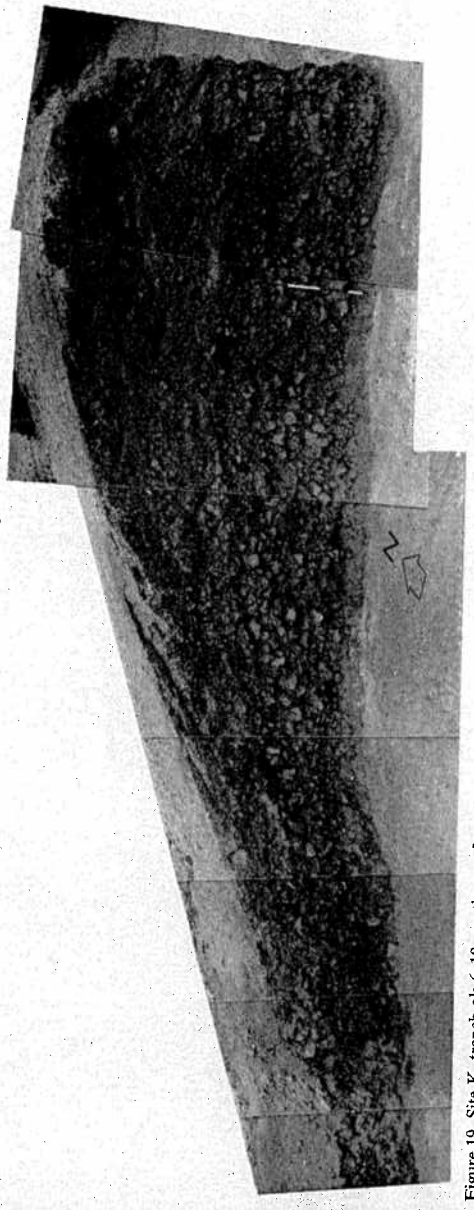


Figure 19. Site K, trench ak 6–10, north-west face. The tumbled brick rubble can be seen resting directly on the desert surface, which slopes down to the left. Immediately above it lies dumped spoil from the Birket Habu, with tip lines clearly visible. Notice how the coarser material, the distinct lumps, of the spoil tend to lie at the bottom of the tip lines. The ranging rod is 2 m long.

smallness of the mounds towards the north corner (i.e. X, Y and Z and row C). This may well be, however, because the material was instead dumped as a great terrace. In those parts of the Birket Habu lying furthest from Malḳata the dumping was in the form of large unbroken hills. But on the north-east and north-west sides dumping took the form of steep sided rectangular mounds set equidistantly from each other. From the existence of mounds Y and Z where it would have been easily feasible to spread the material out in the space behind one might guess that these mounds, by defining in an obvious way the perimeter of the basin, were part of an intentional 'landscaping'. For much of the north-western side the mounds are in a double row, separated by a broad 'avenue' (Figs 4, 7 and 20). It seems clear from a careful study of the surface features that to begin with it was intended that the gaps between the mounds of row A should continue through row B so that communication between the basin and the desert and town behind was easy from all points along this side. At a late stage, however, material was carried through the gaps in row B and dumped at the back, gradually filling them up, although preserving a hint of the original symmetry by leaving the entrances free, so that they remain like a series of notches, especially apparent as one moves towards the south-west. The only gap left entirely free was that between mounds B7 and B8, significantly at the point where the town of Malḳata came to end (now represented by our site J). The care taken with the formation of the mounds of row A is striking, and bizarre though the result may look on the ground, one cannot help feeling that it was an answer to the visual problem of treating enormous masses of excavated debris on a strictly laid out town site, a solution which would have to be regarded as an early example of landscaping.

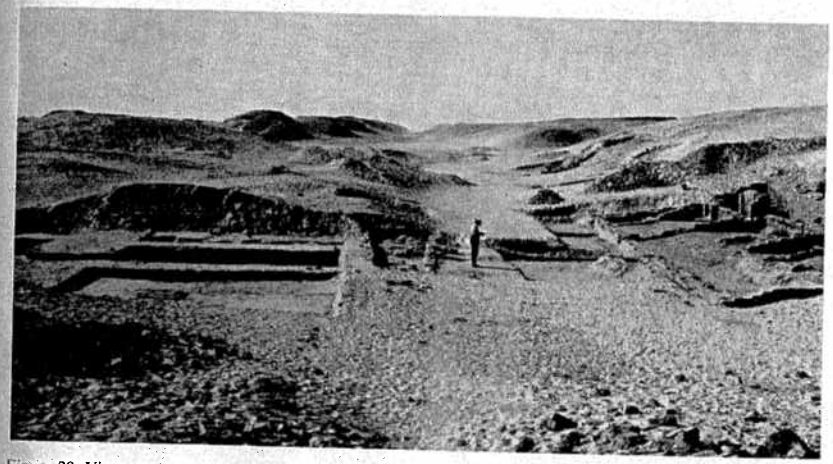


Figure 20. View, to the south-west, of the mounds of rows A and B of the north-west side of the Birket Habu. Sites C and D are in the foreground, with the main building of site C clearly visible. Trench M12 was subsequently cut across the foreground.

The dimensions of the harbour basin

Naturally, one task facing the expedition was the location of the original edge of the basin. Since Amenhotep's day it has gradually filled

up with alluvium from centuries of slow silting until it has reached the level of the surrounding terrace and blurred the edge. The search for the edge was begun in 1971 with the cutting of trench H (Fig. 21), and continued in 1973 with the N series of trenches and auger borings (Figs 8, 22 and 23). Trenches H and N3 established that the present uncultivated strip on this side of the mounds represents

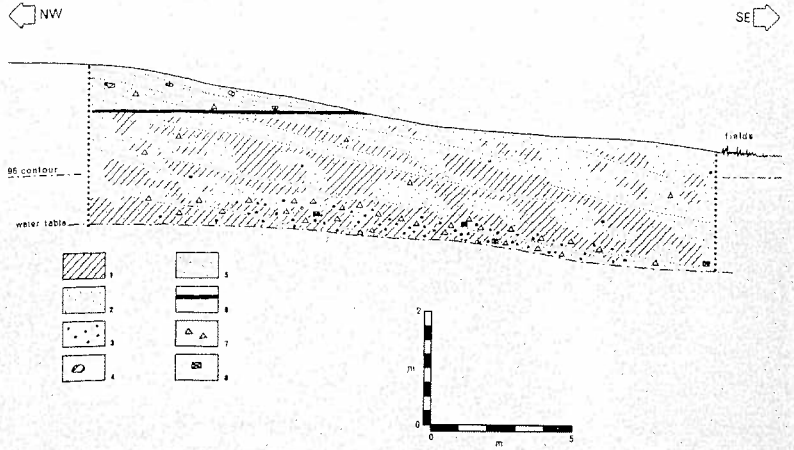


Figure 21. Birket Habu, trench H, at the foot of mound A2 (cf. Fig. 12B). The trench is cut into the artificial terrace. 1, Clay; 2, sand; 3, pebbles < 0·05 m; 4, isolated lumps of indurated alluvium; 5, tip lines (schematic); 6, dark grey layer of alluvium; 7, sherds; 8, burnt brick fragments. Note that the horizontal scale is exaggerated.

the artificial terrace, and that when walking on this one is actually on, if not slightly below, the Eighteenth Dynasty surface. Trenches N1 and N2, however, out in the fields, displayed a wholly homogeneous depth of nearly black alluvium, without even a trace of an intervening sandy horizon. We have accordingly interpreted these trenches as being inside the original basin, and cut into the alluvium which has quietly accumulated since the Eighteenth Dynasty. The edge of the basin, therefore, would appear to lie between N1 and N3. To narrow the search down further a series of auger borings was made in the space between. These would seem to imply that the edge lies between NB4 and N1, but at that point a modern irrigation canal, the Ramses Canal, runs more or less parallel to the side of the basin, and seemingly more or less on the line of the edge itself. This may effectively prevent the search from being continued on this side. An attempt was made to bore into the bank of the canal when the water level was at its lowest, but no great depth could be accomplished, and the sequence remains ambiguous (NB6). But even determining that the edge lies somewhere between N1 and N3 is an advance since it has always been a possibility that the basin inside the mounds was really quite small, as suggested by Engelbach & Macaldin (1938). The edge cannot have been vertical, unless revetted on a prodigious scale, for the simple reason that the rise and fall of a water level undermines sedimentary material in a vertical face, as was unhappily discovered during attempts to continue the excavation of trench N1 below the water table. The edge, to remain stable, must have had a slope no greater than that

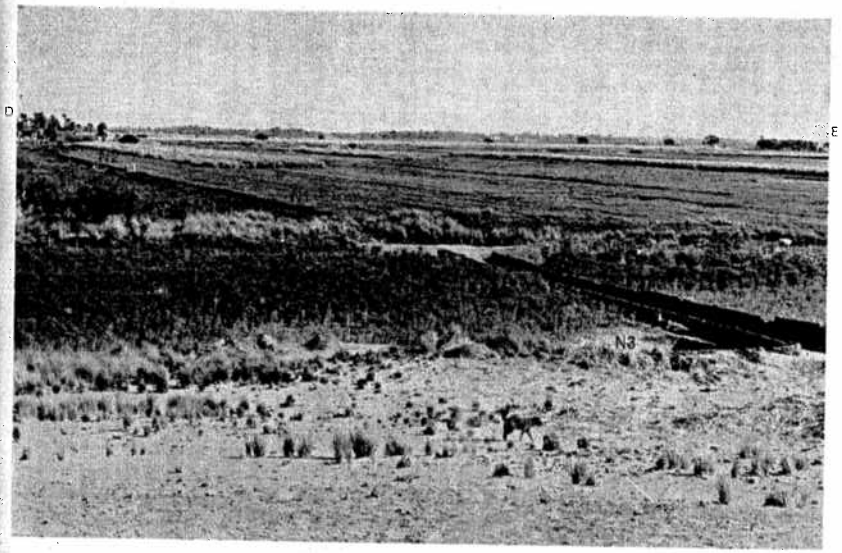


Figure 22. View across the Birket Habu, looking south from the slopes of mound A2. The trees which fringe the edges of mounds D and E are visible at the edges of the picture; thus the gap between them represents the 'entrance' to the Birket Habu basin and the site of the access canal. The positions of trenches N1–N3 are marked (cf. Figs 8, 12B and 23).

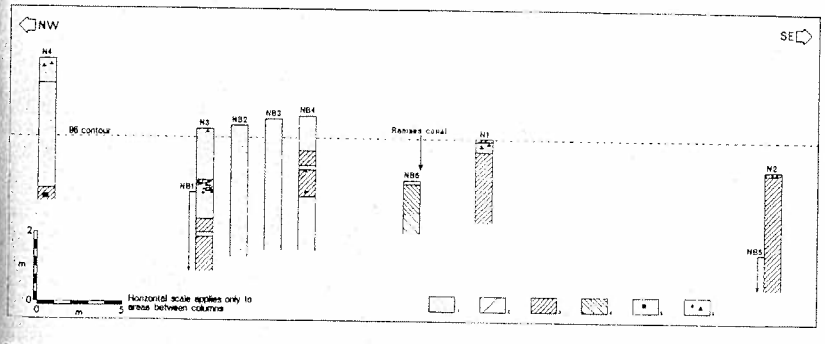


Figure 23. The N series of trenches and borings across the edge of the Birket Habu (see Fig. 8 for plan, also Fig. 12B). 1, Sand; 2, cultivated soil; 3, alluvium (clay with some sand); 4, dark blue-grey sand containing some clay, becoming pale grey lower down, with sand content increasing; 5, apparently a decomposed mud brick; 6, pot sherds.

of modern canals, and possibly a lot less to allow for ships to be beached and cargoes unloaded.

An attempt to estimate the depth

The next problem is to determine the depth of the basin. But here the assistance of conventional archaeology begins to falter. Both the base of the artificial terrace and of the basin itself lie beneath the water table, and attempts at pumping made in 1973 had no success. Boring is also of limited use, since in the case of the artificial terrace it is only the dump lines which betray its artificial character and this is something which boring does not reveal. Furthermore, if the floor of the basin were in a level of alluvium it might well have merged invisibly into the alluvium which has since silted it up. The same remarks apply to the bore records *vis-à-vis* the depth of the terrace. There remain a number of courses of action to be taken in future seasons, but for the moment the only one available is the somewhat hazardous one of estimating from the volume of material dumped around the edge.

This is an interesting case where impressionistic evaluations can vary widely. When standing beside the mounds one cannot fail but to be impressed by their size. But in the view from their crest their size is dwarfed by the area of the Birket Habu and one can easily imagine that if they were to be spread out again over such a space the resulting depth would be very slight. The making of a contour map of the whole mound system in 1973 makes it possible for the first time to form an objective assessment of volume (Fig. 4). Naturally a number of factors introduce an element of uncertainty and imprecision. Presumably the digging of the basin was taken as an opportunity for making mud bricks. The mounds have also suffered a certain amount of erosion, just as, at other points, they have had a certain amount of sand banked up against them by the wind. But the biggest uncertainty is the amount of material now buried beneath the modern cultivation, especially around the northern corner. In the following calculations this has had to be estimated, but it represents a substantial proportion of the whole material. A short cut has also been taken. Considering the general symmetry of the mound system it appears sufficient to limit the calculations to half of the Birket Habu, to the south-western half. This carries with it the assumption that the pattern of dumping divided the spoil equally, and that what appears to be missing around the north corner is actually spread out as a broad terrace beneath the fields. The method of calculation was to measure the areas inside each of the 2 m contours using a polar planimeter, and then to multiply by the height distance between them, i.e. by 2 (representing a metre above and below each contour). For obvious reasons this is an approximation which tends towards an overestimate, but not a serious one.

The first calculations are those for the mounds as they appear above the ground:

A6 to A18:	416,400 m³
B6 to B17:	721,600 m³
E:	1,487,040 m³
F:	445,760 m³

For the material beneath rows A and B the amount down to the 100 m contour beneath row B has first to be estimated; then beneath both rows the 98 contour has to be added. Finally the remaining depth of the terrace has to be included. A moderately cautious area was given to this, and a maximum depth of 3 m. The total came to 1,097,350 m³. Thus the total volume for this half of the north-west side (i.e. rows A and B and the underlying terrace) is 2,235,350 m³. For the amount buried beneath E and F one must also resort to an estimate. Two further contours were added to the map, presuming an edge to the basin at a distance from the mounds similar to that deduced for row A, and again allowing for a depth of 3 m. This added to E and F 962,400 and 433,920 m³ respectively. Thus the final totals for E and F are 2,449,440 and 879,680 m³, and the grand total for this half of the Birket Habu is 5,564,470 m³.

The area of this half of the basin, assuming an equal width of terrace all around, would be about $850 \times 1100 = 935{,}000$ m². If this is divided into the volume of spoil the result is a depth of about 5·9 m.

It is scarcely necessary to reiterate that this

figure is very much an approximation, with a number of assumptions lying behind it. The amounts buried around mounds E and F may well have been underestimated. Nevertheless, the feasibility of a figure like this deserves to be considered.

The ancient water levels

In considering what the behaviour of the Nile and its flood plain may have been like at this, or any, period it must be remembered that three variables have always been at work to some extent independently: the height of the river bed; the volume of water carried at different times of the year; the amount of silt carried and deposited. Rivers are complicated and sensitive things, and it is all too clear that existing information for reconstructing the earlier history of the Nile is extremely fragmentary. The old concept, for example, that one could assume a regular rise in the level of the river bed or alluvial plain (the two need not be the same) of 0·096 or 0·103 m in a century (Ventre, 1896; Borchardt, 1906) agrees neither with existing data nor with the long term behaviour of rivers generally. One should also note that the surface of the alluvial plain is not as flat as might at first appear. An examination of a detailed contour map of the Nile valley shows it to undulate, with a tendency to rise towards the river bank in response to the phenomenon of levee formation. The only data provided by ancient records concern the height of inundations. The one most relevant to the Birket Habu is on the quay in front of Medinet Habu, and dates to the seventh year of the reign of Rameses IX, thus about 280 years after Amenhotep III (Hölscher, 1951: 12). It seems to have reached a level of 74·87m above sea level, and the fact that it was recorded at all may signify that it was exceptional. As yet, our own survey has not been precisely tied to absolute values above sea level, but it would seem, as a working approximation, that the 96 contour of the expedition survey (related to an arbitrary datum of 100) is 76 m above sea level. This would put the inundation of Rameses IX's seventh year well above the level of the flood plain of Amenhotep III's day, by at least a metre, but the artificial terrace would have remained well clear. The size of the inundation, however, in all periods for which records exist, has been subject to considerable variation (Bell, 1970; Verner, 1972), and a single reading like this may be misleading, although the very fact of its existence suggests that it is a maximum value for its period.

For an even later period (*c.* 945–650 BC), however, there is a whole series of similar commemorations of Nile floods on the quay in front of Karnak temple (von Beckerath, 1966; Ventre, 1896; Borchardt, 1906). These display a considerable range of flood heights, but with an average of about 74·00 m. (Ventre, 1896: 100, allowing for the slight error of just over 0·20 m suggested by the figures given by Borchardt, 1906: 37.) Some of these records also have the added value of saying by how much the waters rose: in the region of 20 cubits, or about 10·52 m (cf. Bonneau, 1971: 34, 156, n. 761). The 20 cubit mark at Karnak is about 74·22 m above sea level, so that the zero point would be about 63·70 (Borchardt, 1906: 37). Inundations of this magnitude appear to be considerably greater than those experienced in the 19th century AD, for which Ventre gives an average of 8·25 m. This may indicate that the zero point was below the ancient low-water mark. This was, indeed, suggested by Ventre who used the modern values for the inundation to place the ancient low-water mark at 66 m (Borchardt's data would suggest 65·80 m). This would perhaps indicate that the ancient Egyptians were attempting to measure the rise of the inundation waters from the river bed.

Although separated from the Birket Habu by many centuries these values may well have considerable relevance, for, contrary to earlier opinion, it would seem that the rate of sedimentation over the centuries has not been constant. In particular it would seem that a large part of the alluvium which covers Pharaonic sites, at least 2 m of it, has been deposited since Hellenistic times, implying that in the New Kingdom and immediately following period the level of the flood plain must have risen more slowly (Butzer, 1959: 26–27). As noted above, the only point at

which the Eighteenth Dynasty ground level (other than on the wadi floor beneath the North Palace) could be determined with some probability, on site E, was 2·2 m beneath the level of the modern cultivation. It was, however, dipping towards the cultivation, being close to the desert edge, and in trenches H and N3 could not be located above the water table. In calculating the volume of the terrace it was assumed to have dropped to a level of 93·00 m in the terms of our own survey, i.e. about 3 m below the local ground level (which is itself lower than the ground outside the Birket Habu), thus about 73·00 m above sea level. This means that the inundations recorded at Karnak would have stood on average 1 m above this level, comparing with an average 0·93 m for the depth of inundation water in the 19th century AD (the average height of the inundation recorded by Ventre, 1896: table A being 76·93). In view of the approximations involved and the difference in time between Amenhotep III and these various records this seems a realistic result. If Ventre's low water mark of 66 m (or 65·80) is accepted, low Nile would have been about 7 m below Amenhotep III's ground level. In so far as one must allow for the general levels of Nile bed and low water to have risen in the intervening years, and Ventre's assumption possibly incorrect, with the low water level at or nearer 63·70 m, the real zero for the Karnak quay, this must be regarded as a minimum figure for the depth of low Nile below the Eighteenth Dynasty ground level. It does, however, agree closely with the difference of 7 m or more between the present level of the Birket Habu and low Nile earlier this century (Engelbach & Macaldin, 1938: 54; Ventre's data suggest a low Nile at Karnak of 68·68 m, to which 0·18 m must be added for Luxor values; the 1943 edition of the 1:25,000 maps for Luxor gives the ground level in the vicinity of the N series of our own work as 76 m).

Despite all the estimations and approximations, some of which should be eliminated as the work of the Expedition proceeds, it would not appear likely that the Birket Habu was usable for ships during low Nile. For to whatever depth one deduces low Nile to have been beneath ground level in Amenhotep III's day, one has to add an amount equivalent to the draught of the ships wishing to use the Birket Habu. The most recent reconstructions of New Kingdom river ships (Landström, 1970) give them draughts of between 1 and 1·3 m, but fully laden this would have to be increased. If the Birket Habu was dug out as deeply as this, a difficult task in itself, then the estimates of spoil now invisible beneath the fields must be greatly increased. It would therefore seem that unless the amount of spoil from the Birket Habu has been seriously underestimated, it is unlikely to have been usable during the period of low Nile, roughly the six months between February and July.

The annual variation in the level of Nile waters must have added considerably to the problems of digging out the Birket Habu, flooding the workings for part of the year. For this reason it would have been more or less essential at an early stage to connect the workings to the river by a canal which could be opened to allow the subsiding inundation waters to drain away, and perhaps sealed off for a time to delay the rising waters from flooding the site for as long as possible, although the rising water table would have given the workings only a temporary respite.

Chronology

As noted earlier our work has demonstrated that the creation of the Palace Compound proceeded simultaneously with that part of the excavation of the Birket Habu which produced mound B1. The excavations of the Metropolitan Museum of Art produced a large number of dated inscriptions from Malḳata, mostly pottery jar labels. The earliest with the date of Amenhotep III's 8th regnal year were two which came actually from the Palace of the King (Hayes, 1951 : fig. 16, 14 type 197 : 39). Excepting a re-used example of year 9 there are no more dates until year 20, and none in any quantity until year 30. These jar-labels were clearly made in response to varying factors and should not be taken as a constant part of the pottery repertoire. Furthermore, when set against the prodigious

quantities of unmarked pottery used at Malḳata, a single jar-label becomes almost meaningless. The only safe conclusion is that work on Malḳata had begun sometime before year 30.

Year 30 was the year of the first of Amenhotep's jubilee, or *sed*-festivals, and is known to have lasted 67 days (van Siclen, 1973). As will be discussed below it is known that part of the festival was celebrated at Malḳata, and one of its celebrations performed possibly on the Birket Habu itself. But this cannot have been the Birket Habu in its final form. In the first place the small hut (Ca) discovered in 1971 standing on the artificial terrace but subsequently buried by the heaping up of mound B1 contained inscribed jar-sealings, one of which bears the inscription: 'Wine of (the palace) splendour of Aten rich in *sed*-festivals' (Fig. 24A; cf. Hayes, 1951: 159.HH), the palace name being possibly of Malḳata itself. The allusion to *sed*-festivals implies that it cannot have been made long before the first one in year 30, and must be taken as a sign that even at this late stage in his reign there was still a long way to go before the Birket Habu was complete, to the extent that even mound B1 was not finished. The evidence does not, however, stop here. There is also the strange case of site K, a projecting spur between mounds B10 and B11 (Fig. 7). Our excavations have shown that at a time probably when these two mounds were already standing rubble from a substantial brick building was brought up between them and dumped on the desert behind. Many bricks were stamped with the twin cartouches of Amenhotep III and his principal wife, Queen Tiy. Mixed in with the rubble were numerous fragments of wall and ceiling paintings in a free style and showing an unusually sophisticated use of colour. More than 60% of the sherds present in the rubble came from amphora-like storage jars many of which had borne ink labels and stamped sealings. These constantly mention a *sed*-festival, and where year dates are preserved on the labels refer to years 29 and 30 showing that it is the first *sed*-festival (Fig. 24B; cf. van Siclen, 1973). There is, of course, no direct indication as to where this building stood, but it is hard to escape the conclusion

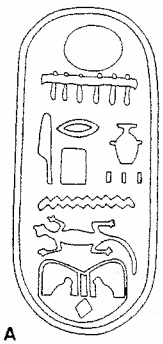


Figure 24A. Impression on a mud jar-sealing from hut Ca. The text reads: 'Wine of (the palace) "Splendour of Aten rich in *sed*-festivals".'

B. Two hieratic jar labels from the rubble level of site K. No. 68 reads: 'Regnal year 30. A[le . . . .for] the *sed*-festival . . .'; No. 39: 'Regnal year 29. Wine . . . .'.

that it was beside the half-completed Birket Habu, and had to be demolished as it was extended. Furthermore, after the rubble had been dumped on the desert it was partially covered with a thick deposit of mud and sand from the continued excavation of the basin (Fig. 19). There could be no more certain evidence of its incompleteness by year 30. A progression from a small to a large and more useful harbour as a result of a greatly expanded building programme can be seen at the contemporary temple of Soleb, described earlier. In the case of the Birket Habu, unless the access canal was re-sited and the mounds moved further back, its overall dimensions and layout must have been decided at an early date.

Why was it made?

The purposes for which the Birket Habu was probably designed should be examined in two contexts: the immediate needs of the urban and temple complex which was being developed beside it and certain general historical and cultural trends evident in the latter part of the Eighteenth Dynasty. The Malḳata complex appears to have been a truly residential one, occupied more or less continuously by the royal family and the court for at least the last decade of Amenhotep's life (Hayes, 1951: 36–7). In this it appears to be unique for the west bank, since the royal residence at Thebes in the earlier Eighteenth Dynasty was located on the east bank, near the Karnak temple (Fig. 3); textual references do indicate that palaces earlier than Amenhotep III existed also on the west bank, but their remains have never been recovered, while the palaces associated with some of the west bank mortuary temples built after the reign of Amenhotep III are much smaller than Malḳata and appear to have been occupied only sporadically by the kings who had them built (Helck, 1958: 5–7; Vandier, 1955: 691, 703–5, 714, 760–70; Stadelmann, 1972). Given the dominant role of the king in the administrative system and the necessity that the chief offices of state be located near the royal residence, it is not surprising that a considerable urban or semi-urban development appears to have existed near the palace-complex (Fig. 9). Not only would the palace and town have to be supplied with foodstuffs, but the official functions of a royal residence would have drawn a mass of shipping to the site. The king's palace at Malḳata included large and small public halls appropriate for consultation with his leading officials and for the carrying out of important public ceremonies such as the reception of the annual tax on Egyptian agricultural and industrial products, the reception of ambassadors, tribute, gifts and trade-goods from abroad and the celebration of important religious rites. The *sed*-festivals of Amenhotep III were held at Malḳata, and these rites, renewing the king's spiritual power by re-enacting his coronation, were attended by priests and officials from all over Egypt (Hayes, 1951: 82–6; Černý, 1952: 122–3; Vandier, 1944; 188–90; van Siclen, 1973). In these circumstances docking facilities for Malḳata would probably have been a necessity.

But it must be admitted that although the everyday usefulness of the Birket Habu can readily be appreciated its size is out of all proportion to purely practical considerations. Docking facilities have as their main aim the provision of quay space along which vessels can lie to discharge and take in cargoes. The modern history of docks shows a preference for a number of moderate sized oblong basins, which minimizes the area to be dug out (cf. Vernon-Harcourt, 1885). At Malḳata the necessary quay space could have been obtained by a canal, perhaps running along the desert edge. Medieval Cairo provides an example, with a central canal and separate ports linked by roads, first Fustat and later Bulak (see above, p. 103). From the New Kingdom there is also the case of Medinet el-Ghurab, built, like Malḳata, on the desert edge and nearly 1·5 km from the nearest waterway, the Bahr Yusef. But although a major palace complex occupied throughout the New Kingdom there is no trace of anything resembling the Birket Habu.

A search for wholly practical considerations may, however, be too modern an approach. Egyptian architects possessed a sublime ability to marry the practical, the ceremonial and the symbolic. Even such a mundane

feature as an irrigation basin could be charged with religious significance if it was involved in a ritual designed to secure a good inundation and abundant crops (Yoyotte, 1959: 31–3). The possibility that the Birket Habu is more than a harbour-master's dream run riot leads to a consideration of the inscriptions of Amenhotep III's reign.

The inscriptional evidence

At some time, fairly late in his reign, a great stela was erected in his mortuary temple containing a summary of his programme of religious architecture (thus Malḳata itself is passed over) (Helck, 1961: 194–9). First comes a description of the mortuary temple itself. One of its parts was its *mr* 'filled with a high Nile, a lord of fish and fowl, bathed in flowers'. The term *mr* can mean either a canal or an artificial lake, in this case probably both (Erman & Grapow, 1928: 96–7; Faulkner, 1962: 111). The suggestion that it was only filled when the Nile rose is readily acceptable from the discussion above on the depth of the Birket Habu and by no means excludes the possibility that it served first as the means by which some of the great monoliths were transported, once the Nile had risen, to the site of the temple. Unlike the palaces and the associated Amen temple at Malḳata the funerary temple, which was extremely large, was built mainly of stone, much of which (sandstone, granite, quartzite and Turah [near Cairo] limestone) could not be obtained locally (Helck, 1961: 195; Ricke, 1965; Vandier, 1955: 688–90). We know that some 70 years later a temple in an even more remote location at Abydos was built of stone delivered by ships straight to the building site by means of an artificial canal and basin (*s*) (for the Abydos harbour, see the Nauri decree, especially lines 11, 12, 24; Griffith, 1927: 198–9. For the unloading of ships at Abydos, Gunn, 1933: 92–3). One official of Amenhotep III actually boasts of having delivered an enormous colossus to the site on a 'barge' (*ḥmnty*) (Helck, 1961: 273). It is not necessary, therefore, to see the Birket Habu involved in the construction of the funerary temple from which it was separated by nearly a kilometre.

There follows a section describing the king's work in the temple of Luxor, which he seems to have converted, from being a modest shrine, into a temple of major proportions. Following this comes a description, as long as that devoted to the Luxor temple, of a project to create a *Maru*, a term incapable of ready translation, although its nature is, as will become clear, fairly apparent. The passage is worth quoting in full:

> 'A further monument which His Majesty made for his father Amen: the making for him of a *Maru*, being a pious foundation opposite Luxor temple, a place of recreation for my father (Amen) on his beautiful festival. I have erected a great temple within it, looking like Ra-Horakhty when he rises on the horizon, planted with all kinds of flowers. Beautiful is Nun (here a divine personification of the ground waters) who is in its lake (*mr*) at all times. Its wine is more plentiful than water, as when rises the Nile, born of the Lord of Eternity. Numerous are its possessions: the place where is received the revenues of all foreign countries.'

(Helck, 1961: 196; Hayes, 1951: 241; Badawy, 1956.) It cannot be stressed too much how careful one must be in using an inscription of this nature which is essentially a religious text, extolling the king's munificence to the gods. Too literal an acceptance would undoubtedly mislead. It has, nevertheless, been discussed already in terms of the Malḳata area (Hayes, 1951: 241; cf. Badawy, 1956). Its location 'opposite Luxor temple' seems to fit well, but the preposition could also be translated 'in front of', i.e. to the north-east of Luxor temple and thus on the east bank (and for this preposition in an architectural context see Haeny, 1970: 60, and notes 29, 106). Even so, one designation of the Theban necropolis on the west bank is 'she who is opposite her lord' (*ḥft-ḥr-nb.s*), a use of the same preposition which places the necropolis in the same relation to Karnak as Malḳata is to Luxor. Hayes (1951: 241) took the term 'great temple' as a formalized description of the mud-brick Amen temple at Malḳata (Fig. 7), and seems to imply that the lake referred to is not the Birket Habu but occupied the great forecourt of the Amen temple, which would thus have looked very

much like the reconstructions of the contemporary mortuary temple of Amenhotep son of Hapu (Robichon & Varille, 1936; but note Hölscher, 1951: 20, n. 58 for the later discovery that the lake was really a well). An examination of the forecourt during the 1970 survey lent no support to this suggestion. The statement that water was perennially present does not accord with what can be deduced about the depth of the Birket Habu, although over such a huge area parts of it may well have remained waterlogged, and it would even have been possible to dam back some of the water by closing the canal. On the other hand a place where foreign taxes were received would seem to be well in keeping.

Maru-Aten

Fortunately we know what one *Maru* looked like. For one, the Maru-Aten, has been completely excavated at el-Amarna (Peet & Woolley, 1923), and an attempt has already been made (Badawy, 1956) to compare its layout with the one at Thebes described by Amenhotep III. The Maru-Aten, inside its enclosure walls, contained three basic elements: a large shallow lake measuring about 120 by 60 m and 1 m deep, surrounded by plants and trees artificially planted and maintained; widely spaced formal buildings not suitable for extended occupation; a small number of houses, probably a caretaker settlement. The rear part of one of the formal buildings had been used for the storage of amphoras whose labels and sealings showed that most had contained wine. This same building had been brightly painted, as had other parts of the complex. Standing beside its lake it offers *one* possible prototype for the building represented at Malḳata site K. It is also interesting to note that the sand and gravel dug out from the lake had been heaped into a neat row of three long and low mounds running away south-westwards from the site, a reminder of the Birket Habu itself (and marked as three small black rectangles on the plan in Frankfort & Pendlebury, 1933: plate I; cf. Timme, 1917: 13, 22, Blatt 6; an early photograph is amongst the unpublished el-Amarna negatives belonging to the Egypt Exploration Society no. 1922/82).

As to what Maru-Aten represented, bearing in mind the description on Amenhotep III's stela and the general tenor of the reign of his successor, Akhenaton, the builder of el-Amarna, all that can really be said is that it was intimately bound up with the solar cult at a time when a marked pantheistic element was present. The dependence of nature on the lifegiving forces of the sun is extolled in hymns of this period (Pritchard, 1950: 365–71), and Maru-Aten certainly *looks* like a place where an idealized picture of nature could actually be seen and celebrated. Herein lies the other most important difference from the Birket Habu, other than scale: its seclusion and privacy. No trace has been found at Malḳata or around the Birket Habu of any attempt to prevent ordinary people, walking, for example, from the South Village, through the gaps in the mounds and on to the edge of the great basin. But whilst no simple equation is possible between the two sites, this discussion should have pointed to a particular direction taken by architectural symbolism during the Eighteenth Dynasty.

Amenhotep's jubilee

A second relevant inscription occurs in a private tomb at Thebes, belonging to the steward of Queen Tiy, named Kheruef. It is part of a scene which depicts various episodes in the first *sed*-festival of year 30 (Fakhry, 1943: 449–508, pl. XL; Helck, 1961: 289–95). The sequence begins at a jubilee palace and with a distribution of gifts to palace officials. The text continues: 'an order was given concerning the lake (*mr*) of His Majesty, to sail in the royal boat. They took up the tow ropes of the evening barque. They towed them at the great place, they stood at the foot of the throne. It was His Majesty who did this in accordance with the writings of old.' The curious phraseology here arises from a metaphor associating the act of sailing with the endless progress of the sun around the universe, symbolized by paired boats (Thomas, 1956). The king and queen are next seen emerging from a stylized representation of the jubilee palace, described as 'his palace of the House of Rejoicing', the second element common on stamped bricks in the Malḳata

complex. A group of standard bearers precedes them. They are finally shown standing in the barque, drawn as the elaborate boat of the sun and referred to in the accompanying texts in the same dualistic terms. The main text for this part includes the following passage about the king: 'Appearance of the King . . . while he was in the palace of the *sed*-festival which he had made on the West of Thebes. His Majesty began the journey at high Nile in order to convey the gods of the *sed*-festival . . . .'

The importance of these brief and fragmentary texts is twofold: they provide an external verification for what the excavated material from Malḳata suggests, namely that it was here that Amenhotep celebrated part of this first great jubilee festival. Secondly, there is the prominence given to the ceremonial boat journey on the *mr*, something quite unusual in representations of the *sed*-festival (for a convenient summary of which see Uphill, 1965). The conclusion can scarcely be avoided that it was the unfinished Birket Habu that was the site of this ceremony, whilst the references to the jubilee palace, apparently built for this purpose alone, provide yet a further point from which the rubble at site K can be viewed.

There is no point here in trying to unravel the almost endless process of association and metaphor which could arise from these inscriptions. The king, his jubilee festival, the voyage of the sun, large expanses of water, the pre-eminence of the sun over all forms of life, all seem linked in some way, and at Malḳata with a large urban complex as well.

Was it ever finished?

The entire project was initiated by Amenhotep III, but as site K graphically shows the digging out of the Birket Habu was still continuing after a palace used in year 30 had been demolished. Our excavations have shown that building had begun to spread from the Palace Compound towards the Birket Habu in the area of mound B1. But careful field survey and the comprehensive examination of the site by a magnetometer have been positive in suggesting that they spread no further. But what of the broad terrace separating the mounds and the basin? Was it to have been left as an open sandy tract with *halfa*-grass tufts springing up in irregular patches? As a harbour and commercial development one might envisage it gradually filled with buildings separated by streets leading back along the gaps between the mounds to the broad avenue. Perhaps a *wḥryt*, described above (p. 105), where large ships could be built or repaired could have developed. Or was it intended, as at Maru-Aten, to surround the basin with trees and gardens? We may never know. For after the death of Amenhotep III in his regnal year 38 or early 39 it is probable that major work on the project ceased, for his successor, Akhenaten, concentrated on building new temples at Karnak, on the east bank, and developing a new royal residence and administrative capital at el-Amarna in Middle Egypt. Akhenaten's successors favoured Memphis as a residence, to the general detriment of Thebes as a major urban centre, and it is therefore not surprising that the incomplete Malḳata complex, although occupied at least in part as late as the reign of Horemheb (1348–1320 BC), appears to have been completely abandoned shortly thereafter. No evidence for any substantial population at Malḳata after the end of the Eighteenth Dynasty was discovered by us or any preceding expedition (Hayes, 1951: 232–3, 242).

In the Twentieth Dynasty a flourishing community grew up around the new mortuary temple at Medinet Habu, effectively on the northern corner of the Birket Habu (Kemp, 1972: 666; Černý, 1973: 87–8). This had a long history into the Hellenistic period, and the site of the northern corner was ultimately occupied by the Ptolemaic temple of Ḳasr el-'Aguz. Texts of the Twentieth Dynasty which deal with the life of the other nearby community at Deir el-Medina (Fig. 3, no. 9) frequently mention one or more *mryt*, 'river bank' or 'harbour' (Černý, 1973: 94–7). It seems to have been not far from Deir el-Medina, and was a place to which ships came and barter was done. It was associated with a 'gate' or 'guard house'. But whether it was in any way connected with the northern corner

of the Birket Habu remains unknown. The area lies within the concession granted to the University Museum and awaits excavation.

The historical context

Turning to the more generalized historical context in which the Birket Habu was conceived, two characteristic developments must be taken into account; one is of administrative and economic significance, and the second political and ideological. The great size of the Birket Habu no doubt reflects to some extent the expanded diplomatic, commercial and military relations between New Kingdom Egypt and the Sudan, the Levant and the Aegean, for these relations were maintained principally by sea and river traffic implying larger fleets and perhaps larger vessels than existed in earlier periods. Internally major towns, and especially the national administrative centres, were increasingly important as collection and redistribution points for the produce and artefacts produced by a state governed by a powerful and highly-centralized bureaucracy. By the reign of Amenhotep III these facts had also resulted in a great increase in the political and economic power of the Egyptian kings, and perhaps even to a reaction against that power. As part of a deliberate effort to emphasize the unique status of the kingship Amenhotep III inaugurated a period, lasting for several centuries, in which royal monuments (funerary temples, temples dedicated to the gods, including the king, figures of the king and the gods, and royal palaces) were planned and executed on an unprecedentedly enormous scale. The size of the Birket Habu, and the ambition shown in the associated temple, palace and urban development, must be seen also as an expression of this essentially ideological effort.

On a more detailed level the development of Malḳata and the Birket Habu seems to imply a transfer of importance from the old urban centre of eastern Thebes to a new and virgin site on the west bank. Perhaps it was not possible to develop at the older town the facilities required by the expanded activities described above but perhaps also the move asserted the uniqueness of the royal personality and isolated its residence from the major centres of the national god, Amen, at Karnak and Luxor (Fig. 3). Seen in this way, Malḳata is a stage in the transfer of political primacy from southern to northern Egypt during the late Eighteenth and the Nineteenth Dynasties, for it foreshadows the foundation of el-Amarna by Akhenaten, successor of Amenhotep III. Amarna, a virgin site located roughly halfway between Thebes and Memphis, became a town in which the cult of a new and ultimately exclusive god, the Aten, was developed and where the king's importance, as sole prophet of the new god, reached a new height.

see Addendum on p. 182

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