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Explorations in el-Markha Plain, South Sinai: Preliminary Findings at Tell Markha (Site 346) and Elsewhere[1]

In honor of our late geo-archaeologist and good friend, Laurence Pavlish[2]

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Abstract

The 2002 University of Toronto and SCA (renamed MoA) expedition to el-Markha Plain, South Sinai, mapped and excavated the eastern portion of a small, seasonal copper smelting site and anchorage (Rothenberg's site 346), which W. F. Albright had discovered in 1948 and dated to the early New Kingdom. In 2002, this encampment yielded potsherds from Nile silt vessels (5%) and numerous pottery fragments (95%) from two types of "Sinaitic"/Red Sea fabrics, most of which date to the Middle Kingdom. The remaining artifacts represent copper lumps and slag, stone tools, fish bones, sea urchin spines, marine shells, and coral. The expedition also investigated an adjacent wadi bed and waterfall, and found isolated pottery scatters from Egyptian store jars at several places along the northwest edge of the plain. In addition, the team surveyed Rothenberg's site 345 (Ras Budran), Seih Baba, the mouth of Wadi Sidri, and selected portions of el-Markha Plain to the south of Abu Rodeis.

Introduction

The 2002 University of Toronto and Supreme Council of Antiquities' (now renamed the Ministry of Antiquities [MoA]) expedition to el-Markha Plain[3] focused its initial investigations upon a little known "seaport" found by W. F. Albright in 1948[4] at the northern coastal terminus of el-Markha Plain, at the point where the coastal plain becomes a narrow strip along the base of the coastal mountains. This site has been visited subsequently a few times, in 1967 by Beno Rothenberg (who labelled it site 346),[5] in 1991 by a French mission,[6] which noted that this site had been mostly destroyed, and briefly in 2000[7] and 2001[8] by this writer and other team members who made preliminary assessments at site 346 before returning to excavate here in 2002. The University of Toronto and SCA joint expedition worked in el-Markha Plain from June 16 until July 19 (2002), and consisted of Gregory Mumford (project director), Mustafa Rezk (SCA chief inspector, Abu Zenima), Larry Pavlish (geoarchaeologist; mapping), Rexine Hummel (ceramicist), Patrick Carstens (photographer), Monica Bontty (registrar), Sarah Parcak (remote sensing; site supervisor), Christopher Gilbert (site supervisor), Zoe McQuinn (site supervisor), and Debborah Donnelly (site supervisor; assistant ceramicist). The main objectives of this season consisted of excavating and re-assessing the virtually unknown "seaport" discovered by Rothenberg, re-locating Rothenberg's enigmatic site 345, and looking for other sites (especially pharaonic ones) elsewhere in el-Markha Plain.[9]

Site 346 in Context

The plain of el-Markha spans an area of 20 to 21 kilometers in length by 2.5 to 7 km wide, and lies between latitudes 28°48' N. and 29° 00' N (Figure 1):[10] Gebel Markha bounds the plain along the north; its eastern side is defined by a series of plateaus and hills near Gebel Hadûd, low hills around Wadi Baba, and high hills near Gebel Samra; Gebel Nisisāt encloses the remainder of the plain along its southern side. Prior to the emergence of more recent settlements and artificial irrigation, el-Markha Plain was characterized as quite barren with little vegetation excepting some short seyal trees.[11] To-date, the northwest edge of el-Markha Plain has yielded two pharaonic period sites, one of which is dated to the late Old Kingdom (site 345 at Ras Budran), while the other one (site 346; Albright's "seaport"), is now better attested as dating mainly to the Middle Kingdom (e.g., the presence of specific types of jars, bowls, and bread moulds),[12] but may include New Kingdom and Roman activity.

El-Markha Plain is located 160 km south of Suez, along the west coast of Sinai, and lies directly west of the pharaonic turquoise and copper mines at Wadi Maghara, Wadi Kharig, and

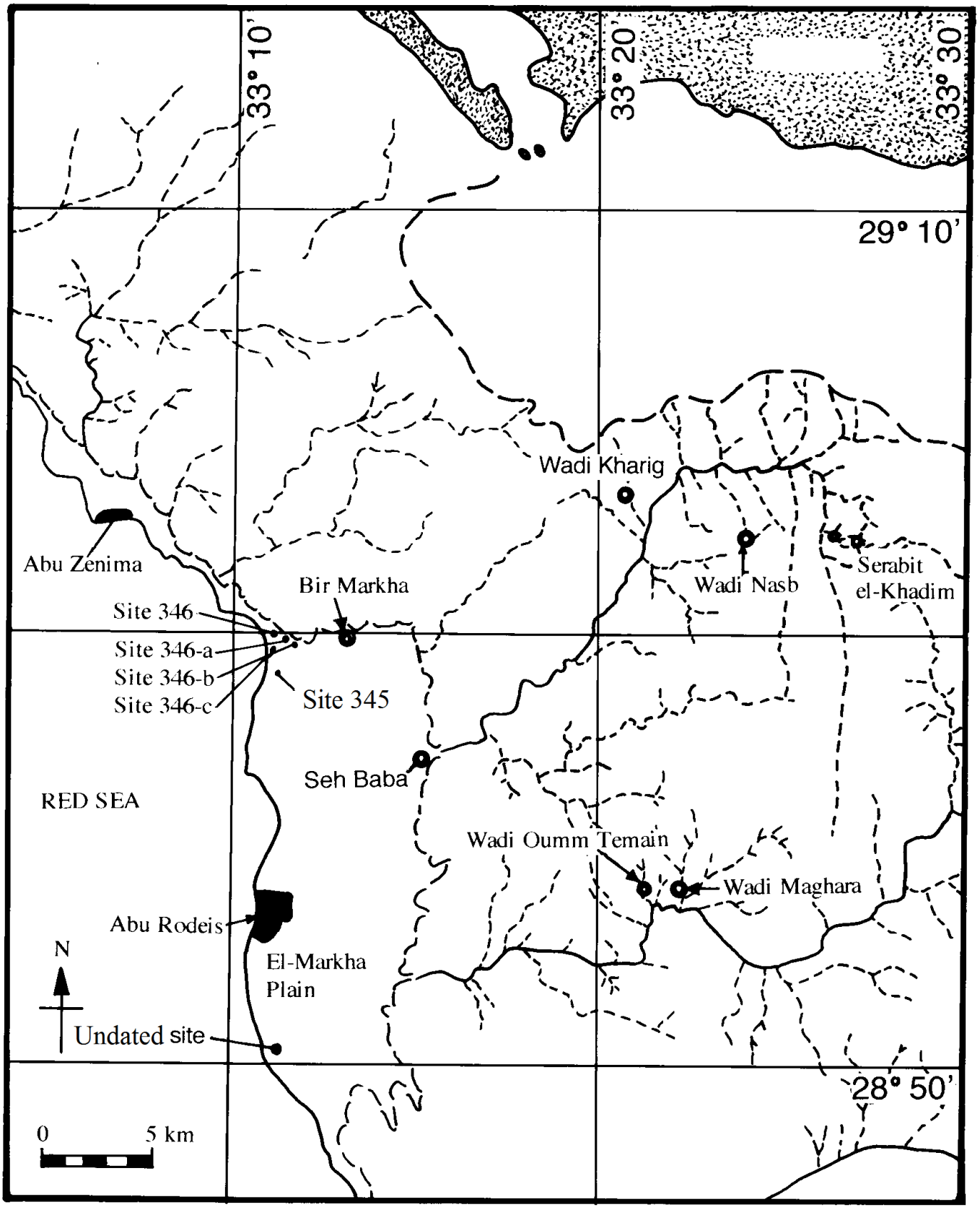

Figure 1: Map of el-Markha Plain (adapted from 1937 Survey of Egypt map, scale 1:100,000 sheet 5, Abu Zenima; drawn by G. Mumford)

Figure 2: View of site 346 center right, processing tents center left, and modern road cutting through site and adjacent bulldozer heaps (Photograph: P. Carstens)

Serabit el-Khadim.[13] It also lies east across the Red Sea from an Old Kingdom seasonal settlement and port at Wadi al-Jarf, and southeast from another pharaonic seasonal camp and anchorage at Ayn Soukhna, the latter of which contains evidence for Old Kingdom, Middle Kingdom, New Kingdom, and later activity.[14] Site 346's placement at the coastal terminus for both maritime and potential overland routes to the turquoise and copper mining region, and the proximity of a partly sheltered anchorage and water source (e.g., an adjacent seasonal waterfall, pool, and Bir Markha further south), make this site well-situated for expeditions crossing to or returning from the eastern mining region. Although Serabit el-Khadim could be reached by other overland wadi routes accessed further to the north, el-Markha Plain provides the shortest route from the Red Sea to this and other mining sites.

Despite misgivings that Albright's seaport might have been destroyed almost entirely, a reasonable sample of the mound's eastern end survives (Figure 2). Albright and Field had described the site as consisting of a small site covering a hillock at the northern end of el-Markha Plain, lying 100 meters from the Red Sea, and dated its surface pottery to the early 18th dynasty.[15] The mound itself apparently measured 50 meters north-south by 100 meters east-west in area and extended from a few cm in depth at its edges up to 1 meter high in various parts of its occupation debris.[16] Although Albright had cut an excavation trench across the site and collected, drew, and photographed pottery, his findings remain virtually unpublished aside from a few, brief summaries. Albright's team dated the surviving material culture assemblage from this site to "... about 1500 B.C., or a very little later, in the period of Hatshepsut and Thutmose III,"[17] comparing the pottery to Dynasty 18 forms from Harageh in the Nile Valley.[18] During Rothenberg's 1967 visit to this seasonal camp, he noted the presence of crucibles with charcoal and designated the site as 346.[19] A French team found a scattering of potsherds beside an inlet (*i.e.*, the anchorage) associated with the western part of this site, and agreed with Albright's New Kingdom date.[20] This date was also confirmed initially, but incorrectly, during the University of Toronto project's preliminary assessment of 45 diagnostic potsherds from a 2001 visit to site 346 (re-named "Tell Markha"), and partly from the following 2002 season,[21] and now requires some re-consideration and revision.

The 2002 Findings at the Anchorage and Site 346 ("Tell el-Markha")

The construction of a modern road had removed much of the western half of this site at some point in the 1980s,[22] but a 40 by 50 meter area survives to the east, with portions of the western

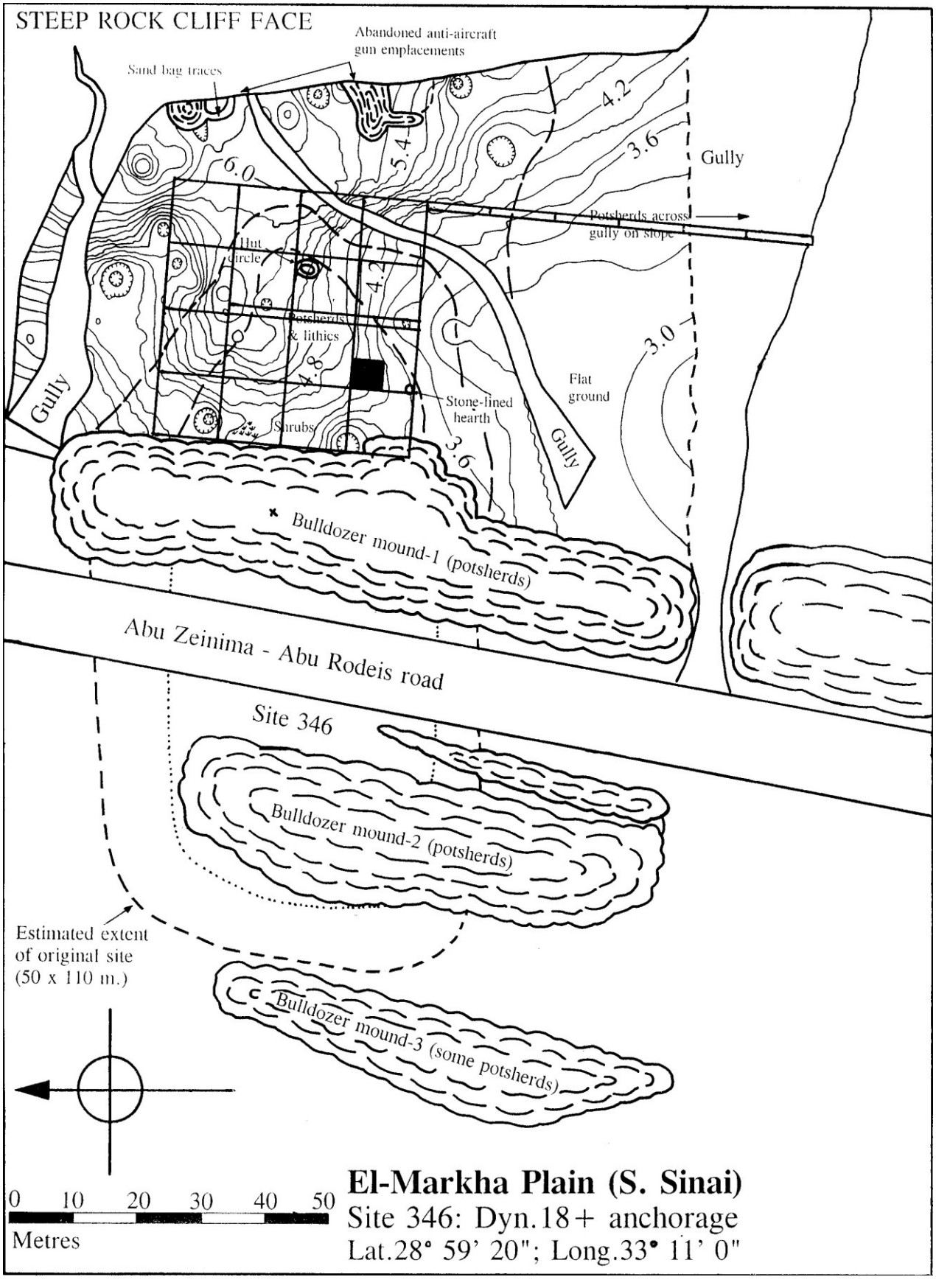

Figure 3: Topographic plan of site 346, superimposed grid layout, and a sketch plan of the site's environs (Plan: L. Pavlish and G. Mumford)

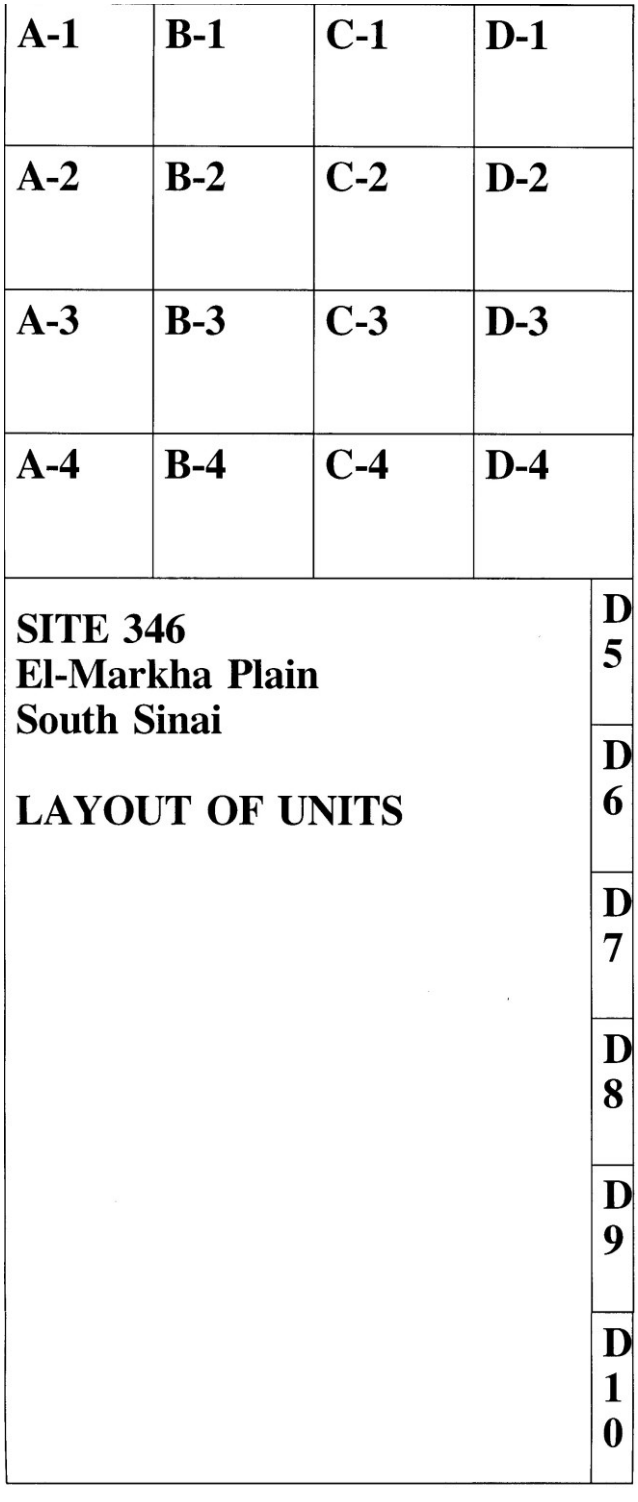

Figure 4: Detail of grid plan layout in which each square measures 10 x 10 meters, with a 1.5 meter wide trench across the southern wadi bed (Image: G. Mumford)

mound lying to the west, and other parts lying within and under bulldozer heaps on either side of the road. In 2002 the University of Toronto and SCA expedition generated a topographic map of the extant mound and its environs before beginning excavations

Figure 5: View of G. Mumford (left), L. Pavlish (center), and Monica Bontty (right) initiating detail planning across the site (Photograph: P. Carstens)

(Figure 3). The Toronto-SCA project laid out a 40 by 40 meter grid over the surface of the eastern part of the site, subdividing it into sixteen 10 by 10 meter units labelled A-D from west to east and 1–4 from north to south: this enabled the addition of grid squares further to the east and south if needed (Figure 4). For the ease of planning and excavation, we subdivided each of these grid squares into four 5 by 5 meter quadrants (*e.g.*, B4 Northeast; B4 Southeast; B4 Southwest; B4 Northwest), and planned in detail all features, materials, and artifacts on the modern surface of most of the grid squares, quadrants, and their interior areas by utilizing 1 by 1 meter portable string grids (containing a 10 x 10 cm string mesh) (Figure 5). Of note, five units along the site's edge (i.e., B1, C1, and D1–3) remain unmapped since they contained minimal to no surface features and few, if any, artifacts. This initial spatial planning and subsequent close analysis of the visible surface artifacts, materials, and features revealed a scattering of modern debris, ancient potsherds, coral, shell, and stones across the surviving mound (Figure 6). The detail planning and observation

Figure 18	Type and Number	Provenance	Diameter	Observations and Parallels
1	Jar rim TM. 054	East mound Grid B4 1-8	6 cm	**Fabric:** Black speckled fabric; **Core:** No core; **Inclusions:** Abundant fine yellow, decomposed limestone; **Exterior surface:** Thick cream slip; **Parallels:** Defernez 2004, 86, fig. 5.
2	Jar rim TM. 195	West mound (surface)	6 cm	**Fabric:** Grey speckled fabric; **Inclusions:** Abundant fine yellow, decomposed limestone, with some sand, and some red and black particles; **Surface:** Traces of white slip; **Parallels:** Defernez 2004, 86, fig. 5.
3	Jar rim TM. 050	East mound Grid B4 1-7	10 cm	Fabric: Rust colored fabric; **Core:** No core; **Inclusions:** Abundant fine limestone particles, with frequent red stones/rocks; **Exterior surface:** Thick cream slip; **Parallels:** Defernez 2004, 86, fig. 5.
4	Jar rim TM. 044	East Mound Grid B4 1-6	12 cm	**Fabric:** Black speckled fabric; **Core:** Brown core; **Inclusions:** Abundant fine yellow, decomposed limestone; **Exterior and interior surfaces:** Thick cream slip.
5	Bowl rim TM. 158	West mound Locus 1	20 cm	**Fabric:** Rust colored silt (Nile B2); **Core:** No core; **Inclusions:** Some sand and chaff; **Exterior and interior surfaces:** Thick red slip; **Parallels:** Defernez 2004, 85, fig. 4.
6	Bowl rim TM. 221	West mound Locus 1	19 cm	**Fabric:** Rust colored fabric; **Core:** Distinct brown; **Inclusions:** Abundant fine white decomposed limestone, with some fine sand. **Exterior surface:** Thick white powdery slip.
7	Bread mould rim TM. 116	West mound (surface)	10.5 cm	**Fabric:** Soft and crumbly, pale yellow brown fabric; Core: No core; Inclusions: Abundant white limestone particles, medium to large sand, and occasional red and black stone flecks ("lithics"); Surface: Crude/rough finish. Parallels: Wodzinska 2009, 214 (similar form).
8	Bread mould base TM. 330	West mound (surface)	-	**Fabric:** soft and crumbly, pale yellow brown fabric; **Core:** No core; **Inclusions:** Abundant white limestone particles, medium to large sand, and occasional red and black stone flecks ("lithics"); **Surface:** crude/rough finish. **Parallels:** Wodzinska 2009, 214–15; Marchand and Soukiassian 2010: 167.

Table 1: Middle Kingdom pottery from Tell Markha (site 346) (compiled by R. Hummel)

showed cinder, ash, and charcoal concentrating along the southern and eastern edges of the mound, in contrast to the ancient artifacts that appear mainly along the northern side of the mound (i.e., outside the area of cinder and ash concentrations). Of interest, this specific placement of the furnaces would have enabled the almost continuous, strong northern winds to blow any smoke away from the site, instead of across the encampment.

We selected one furnace for full excavation within Unit B4 (i.e., specifically the northwest quadrant of B4) (Figure 7), while extending a 1.5 meter wide by 30 meter long trench along the western side of Units C2, C3, and C4 to determine the depth and nature of the occupation through time. Concerning the furnace, it contained multiple chambers filled with hard-packed copper slag, ash, and sand, and was used for smelting copper (Figure 8). The narrow trench revealed an occupation depth of 30 cm at the eastern extremity of the mound. It contained rows of shallow depressions in compact, cement-like sand, which may have acted as stands for crucibles, or pottery jar holders (Figure 9), presumably being associated with the adjacent copper smelting process.[23] Parts of other furnaces were encountered, but only excavated in part, leaving Unit B4 to represent this component of activity at the site (Figures 10–13).

The excavated furnace in Unit B4, and a few partly excavated and exposed furnaces nearby, appear to have been used a few times within their individual locations. Christopher Gilbert's careful and meticulous excavation of the Unit B4 copper smelting furnace revealed an upper and lower stratum with a re-building of the simple, stone-lined furnace chamber and slag pit [24] The furnace and its immediate environs produced carbonized organic materials (perhaps charcoal from acacia wood and other trees and brush),[25] much ash, cinder, and limestone chips in the sand matrix, a greenish sandy layer (*i.e.*, presumably staining from the copper smelting), copper slag and nodules, and an underlying and adjacent compact fired clay and sand base and sides from the copper smelting process. Of note, the limited excavations did not find any obvious perforated examples from tuyeres, unless some of the crude bases, body fragments, and rims assigned to the "bread mould" and/or "crucible" category actually represented less diagnostic parts from some tuyères.[26] The multiple furnaces and sufficiently large quantities of copper slag, copper stained moulds/crucibles, and other tools, however, have confirmed the significance of copper processing in this part of the site. The site also produced granite pounders, slabs, and a couple of smooth-topped basalt anvils, or working platforms (Figure 14), while a

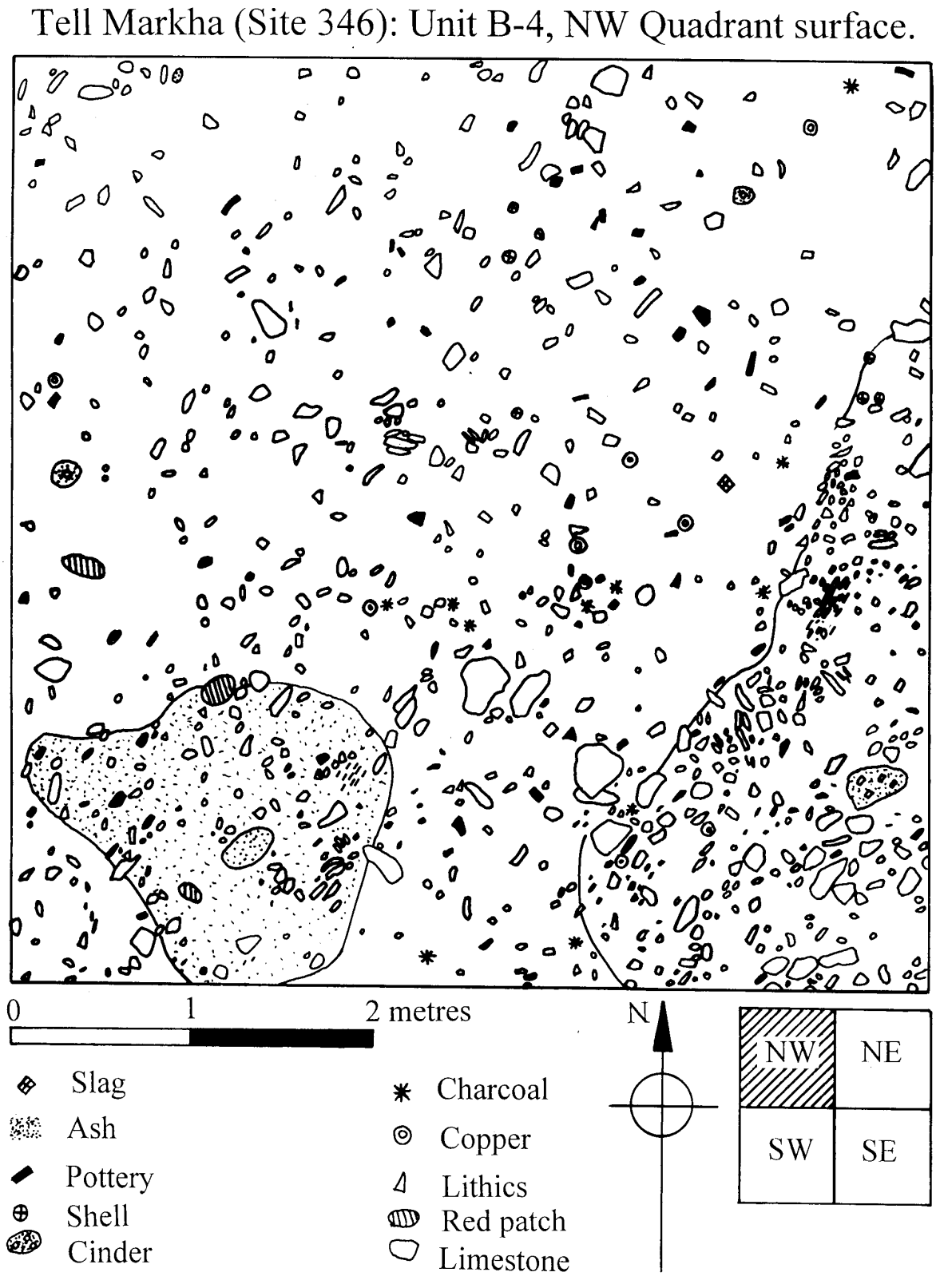

Figure 6: Top plan of the surface of Unit B4 NW quadrant, prior to excavating the copper smelting furnace (Inked drawing: G. Mumford)

Figure 7: L. Pavlish (left) and C. Gilbert (right) excavating the top of the copper smelting furnace in Unit B4, NW quadrant (Photograph: P. Carstens)

preliminary assessment suggests that these tools and the furnaces were used in a series of industrial activities: rough crushing, milling, and winnowing of copper ore, an initial reduction of crushed copper ore chunks in the furnace(s), and perhaps a subsequent pounding of the copper ore and slag to extract prills for a second stage of melting into rough copper ingots.[27]

The Toronto-SCA 2001 survey and 2002 excavations collected 636 diagnostic potsherds in total from the site's surface, the excavation units, and the spoil heaps associated with the road construction work, which had cut through the west side of the site. Like Albright, who had excavated somewhere in the western portion of the mound, this expedition found that the repertoire of pottery forms contained only a few types of repeated forms,[28] mainly bowls, jars,[29] and conical "bread moulds" (many of which had copper residue and may have functioned actually as crucibles or rough ingots) (Figures 15-16).[30] In contrast to Albright's preliminary and briefly published findings, however, our explorations and subsequent re-analysis of the 2002 season yielded mostly Middle Kingdom pottery, perhaps a few possible New Kingdom forms,[31] and some Roman period pottery. The discrepancy between the 18th Dynasty and/or "New Kingdom" findings at this site by Albright, Rothenberg, and the French survey, and our more recent survey and re-assessment of materials (now mostly dated to the Middle Kingdom), may reflect our main focus upon the eastern side of the site versus previous examinations that seem to have investigated the western, deeper part of the mound.[32]

Regarding the 636 diagnostic potsherds, and thousands of non-diagnostic body sherds, found at and near Tell Markha (site 346), only 5% of the pottery had been manufactured in Egypt: it consisted of a few different vessel types, namely mostly bowls with a few jars that had initially seemed similar to examples from the 19th dynasty (Figure 17).[33] In contrast, the majority (95%) of the pottery fabrics resembled the clays and materials found in South Sinai, and the Red Sea region in general, and contained two main types.[34] The first type is comprised of very coarse hand-made "moulds," which resemble the traditional form of Egyptian bread moulds,[35] but actually probably functioned as crucibles, or perhaps crude ingots. Many of the interiors of these "moulds"/crucibles held green stains and actual copper nodules, confirming a role in the copper smelting process at the site. The second type of local pottery represents a desert clay with a white slip covering, and in many cases incised decoration ("pot marks"). The second fabric's pottery forms included bowls with in-curving sides and storage jars. Some of the unexcavated and unpublished pottery from earlier projects at Tell Markha may still include New Kingdom forms. However, our main investigation of the mound's eastern side, the supplemental collection of potsherds from surviving

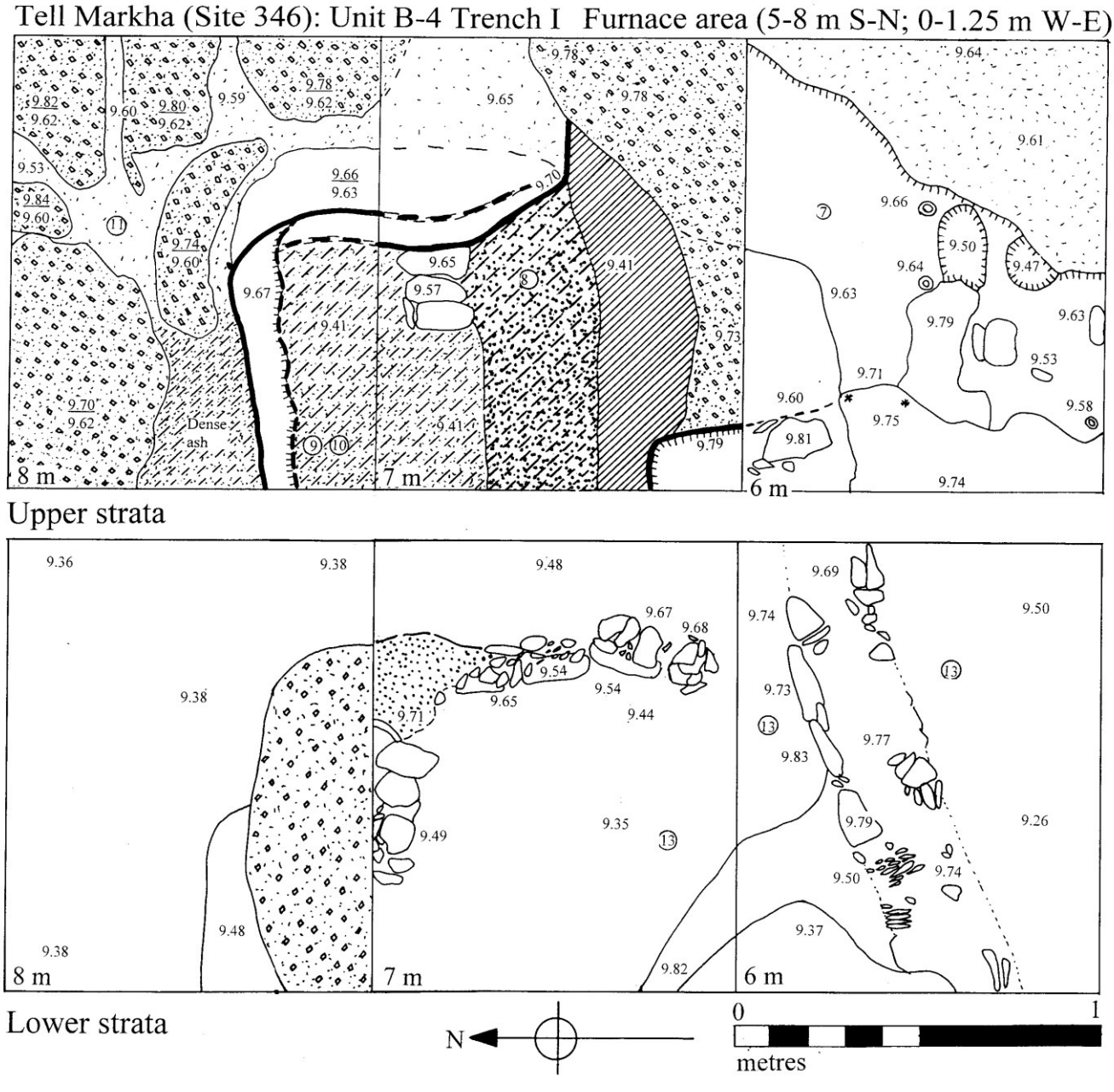

Figure 8: Excavation area of copper smelting furnace within Unit B4, NW quadrant (Field drawing: C. Gilbert; Inked image: G. Mumford)

surface areas of the western mound, and some selected shaving of and extracting potsherds from exposed strata in the largely destroyed western mound, suggest a date range better associated with the Middle Kingdom (Table 1; Figure 18). On the other hand, the surface pottery from the environs of the site also included some Roman pottery (with parallels from Wadi Gharandel),[36] while fragments from modern *zirs* (i.e., water jars) and other modern debris lay near the site, beside the modern road.

Both the pottery and non-pottery artifacts from Tell Markha attest to the role of this site in both copper processing, such as probable copper ore pounders and anvils (see above), and in supporting the daily life needs of the copper workers, including storage jars (presumably for water and other sustenance), grinding stones for grinding flour to prepare dough for bread (Figure 19), baking containers (e.g., typical bread mould-type forms that may have been re-used as crucibles), service/eating vessels (e.g., bowls), and perhaps even the remnants of a stone ring for a tent or makeshift hut. Local access to drinking water would have been available by cutting a well/pit in the adjacent wadi bed to reach the underlying ground water, while other sources included a nearby seasonal water pool (see below), and the more distant pool at Ain Markha, which lay several km to the southeast.

The expedition placed a 60 meter long trench across the shallow wadi bed to the immediate south of the site (Figure 20)

Figure 9: View of Unit C3 trench with rows of hollows for holding pottery vessels, crucibles, or other items associated with the adjacent furnaces, at site 346 (Photograph: P. Carstens)

and examined an adjacent, natural waterfall area (Figure 21), which is apparently still active during the periodic winter rainfalls and flash flooding. Larry Pavlish cut this trench to a depth of 2 meters in part of this wadi bed and found evidence for past, fluctuating water run-off channels and irregular rates of debris deposition. He also determined that in the past several decades 50 cm of stones and sand, which are mixed with modern debris, have filled the wadi bed, with the amount of deposition decreasing towards the west, away from the waterfall. Further in the past, and perhaps during the period of the copper smelting encampment, this waterfall probably led to a perennial pool of water and drinking source beside the site, and in turn flowed into an estuary connected directly with the Red Sea at some point in antiquity (Figure 22).[37]

The Role of Site 346 ("Tell El-Markha") in South Sinai

To-date, our conclusions about the role of site 346 ("Tell Markha") in South Sinai remain essentially the same as in our previous suggestions, with minor adjustments regarding its time period. The site appears to have functioned as a coastal anchorage, rest-point, and smelting installation for maritime expeditions departing from Ayn Soukhna and arriving at the anchorage in this northwest inlet of el-Markha Plain,[38] en-route to and returning from the turquoise and copper mines at Wadi Maghara, Wadi Kharig, and Serabit el-Khadim.[39] In addition, two small pottery scatters were observed 1–2 kilometers to the south of site 346 (being designated as sites 346a and 346b), before the point where the hills bordering el-Markha Plain turn eastward. At site 346 (Tell Markha), the presence of multiple copper smelting furnaces, furnace waste and slag, copper ore and nodules, and probable crucible fragments, reveal that further refinement of copper probably took place along the Sinai coast before copper was shipped back to Egypt (perhaps while guarding the beached ships and waiting for the main turquoise expeditions to complete their inland mission).[40] This smelting activity at site 346 is of particular interest owing to the discovery of Middle Kingdom and New Kingdom copper smelting elsewhere near the turquoise mines of Wadi Maghara[41] and Serabit el-Khadim,[42] the presence of large slag heaps at Bir Nasb, some undated slag heaps and a furnace at nearby Seih Baba, and the copper mines and smelting furnaces associated with the Middle Kingdom coastal site of Ayn Soukhna (across the Red Sea to the northwest).[43] The absence of ingots and tuyères, and the minimal amount of copper slag and ore at Tell Markha, suggest that copper was mostly being refined further here (after being mined and processed elsewhere),[44] but additional specialist analysis is essential before issuing any "final" conclusions regarding the specific nature of smelting operations at site 346.

Ras Budran (Site 345)

After initiating about a week of survey and excavation work at Albright's seaport (site 346), we enlisted the aid of our Bedouin workmen and Reis Ayad to re-locate Rothenberg's potential "pharaonic(?)" site 345.[45] This site lay 1.78 km south of site 346 and turned out to be a large, circular stone structure engulfed fully by windblown sand (Figures 1 and 23). The excavations and findings regarding this structure are provided in much more detail elsewhere (see this issue of *JAEI*). In brief, this site subsequently turned out to be a late Old Kingdom, circular stone fort, 44 meters in diameter, with a projecting western wall (a bastion, protected anchorage, or some other feature).[46] A few pieces of pottery from the site's surface confirmed the presence of Roman and later activity (e.g., a Mamluk period potsherd) in this region.[47]

Other Findings in El-Markha Plain

Aside from our initial main objective at Tell Markha (site 346), and a shift in our primary focus to Ras Budran (site 345), the 2002, and subsequent expeditions (2004; 2008), incorporated additional foot surveys in several areas of el-Markha Plain, namely along the foothills to the immediate south of Site 346 (Tell Markha), the vicinity of Seih Baba, the environs of Wadi Sidri, part of the southern coastal region of el-Markha Plain (to the

Figure 10: Sectioning the copper smelting furnace in Unit B4, NW quadrant (Photograph: P. Carstens)

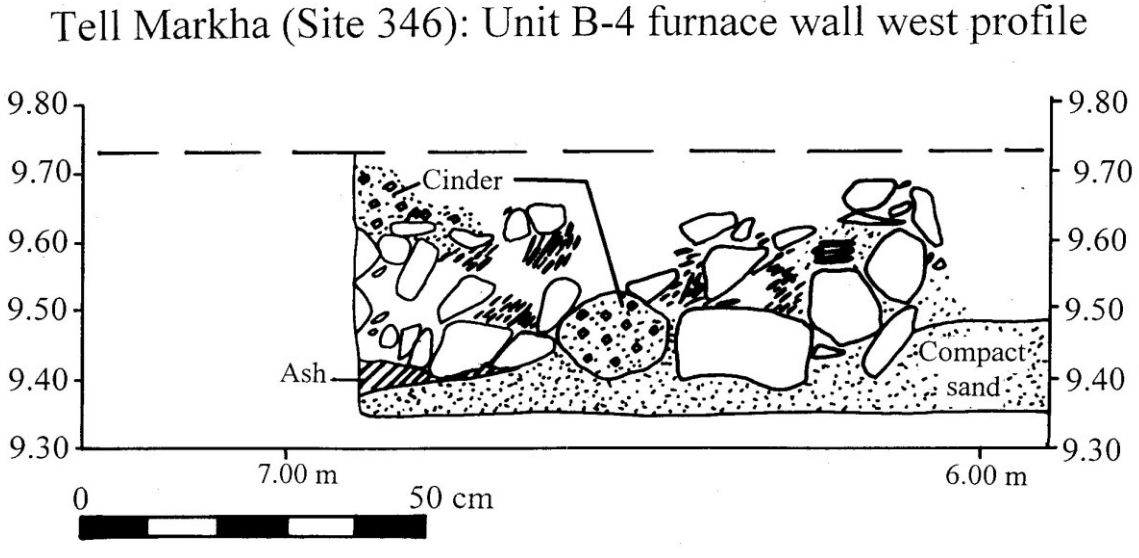

Figure 11: West side profile of the copper smelting furnace wall in Unit B4, NW quadrant (Field drawing: C. Gilbert; Inked image: G. Mumford)

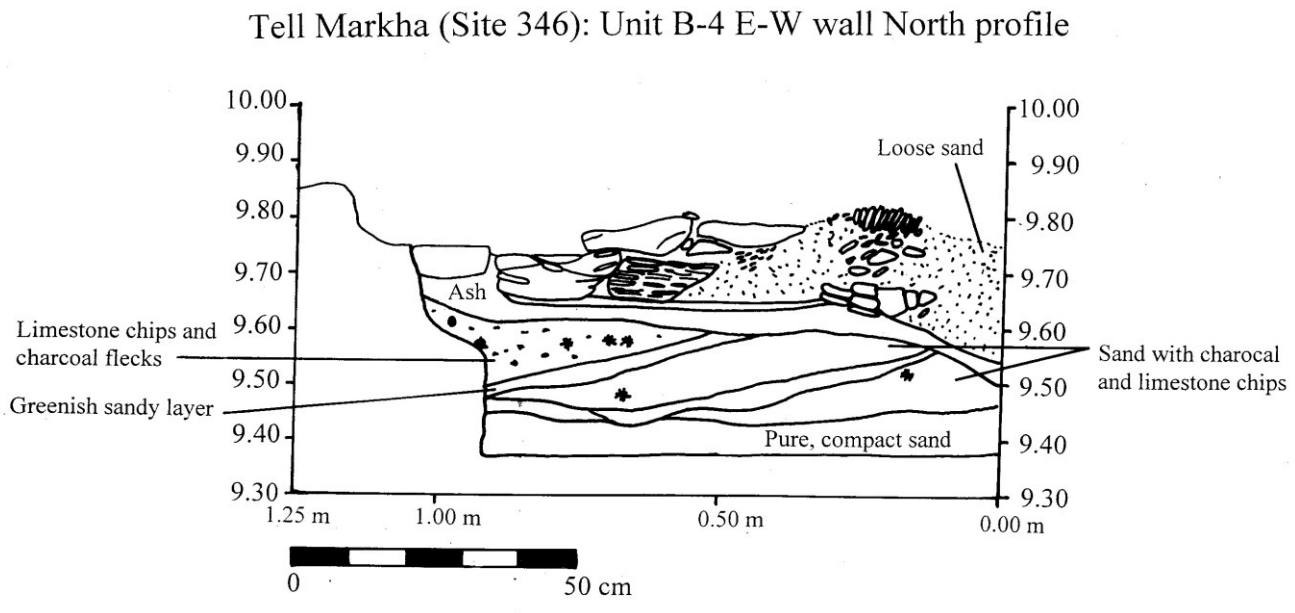

Figure 12: East-West North balk of furnace excavation area in Unit B4, NW quadrant (Field drawing: C. Gilbert; Inked image: G. Mumford)

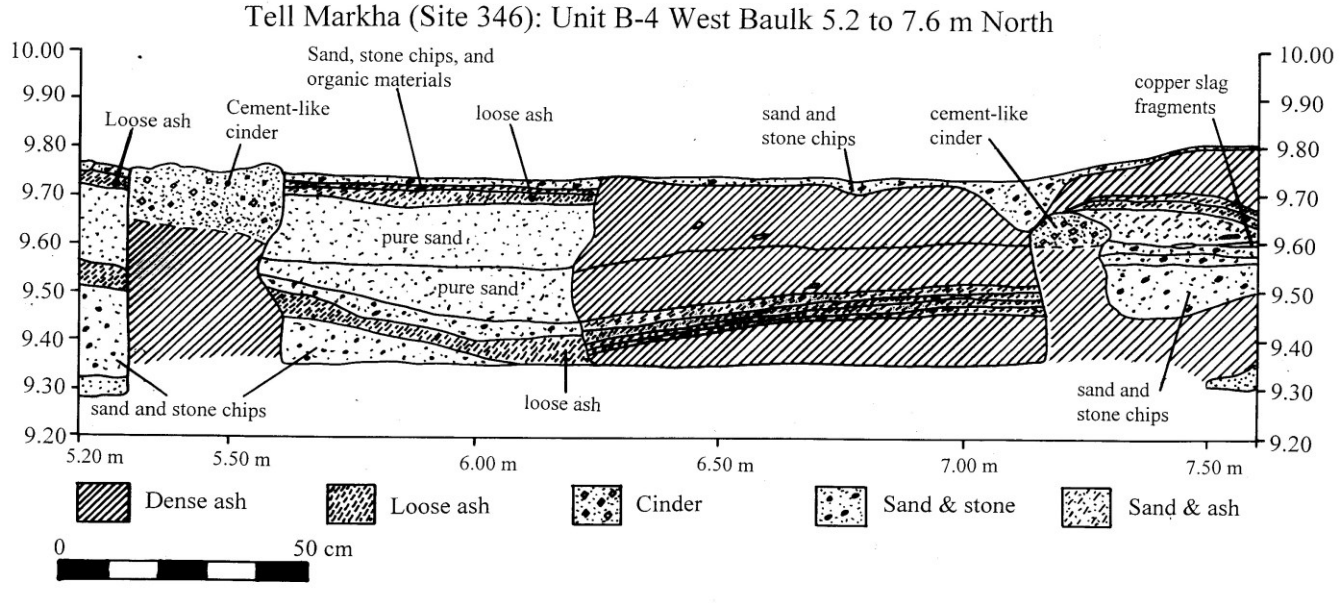

Figure 13: West balk of excavation unit in Unit B4, NW quadrant (Field drawing: C. Gilbert; Inked image: G. Mumford)

south of Abu Rodeis), and a small area 4–6 km to the north of el-Markha Plain. In addition, in past satellite remote sensing analysis by Sarah Parcak, she looked at various areas of vegetation and water that might contain archaeological sites,[48] and in more recent analysis she has located one or more suggestive features and potential circular forts(?) lying 3 km and 3.3 km to the south of Ras Budran, respectively, which require future ground verification (see S. Parcak in this issue of *JAEI*).

The Foothills to the South of Tell Markha

The 2002 expedition carried out a foot survey for 3 km along the north-south foothills between Tell Markha and the point where these foothills turned east, but did not proceed eastward to Ain Markha, the latter of which needs closer archaeological reconnaissance in future (For instance, historically, the pool at Ain Markha had palm trees, providing shelter from the sun, and formed

Figure 14: Part of a basalt anvil, or working platform (small find no. 3), from the West Mound at site 346 (Photograph: P. Carstens)

a popular Bedouin camping ground).[49] We did find three isolated scatterings of a few potsherds from store jars lying on the modern surface in a stretch 1–2 km south of Tell Markha (pottery scatters 346a, 346b, 346c; Figure 1),[50] while one team member (Debborah Donnelly) found and noted a fallen rock slab (in the first adjacent side wadi) that bore part of the fossil remains of a marine creature from the Cretaceous period.[51] Otherwise, a somewhat cursory return foot survey of the region between the modern road and foothills did not reveal any further archaeological remains.[52]

The Vicinity of Seih Baba (Site 347)

We visited Seih Baba at the northeast edge of el-Markha Plain, searching the area around the entrance to the wadi and climbing the southern hill overlooking the wadi's entrance (Figure 1, site 347).[53] This writer found one jar rim potsherd that resembled the jars from Tell Markha, but did not locate other artifacts or archaeological features. Past surveys around Seih Baba have noted much slag on the southern side of the entrance to Wadi Baba, with only some slag on the northern side. Petrie observed a furnace area composed of disintegrating granite blocks (previously labelled a "slag heap") measuring 15 foot wide by 5 foot high along the southern side of the entry to Seih Baba.[54] During Ball's investigations of this area he discovered a little ingot of copper at this site, for which an assigned date awaits further examination.[55] In 1967 Rothenberg noted that the material culture assemblage from Seih Baba included pottery, which he concluded remained "not yet datable."[56] The French

Figure 15: Perhaps "bread moulds" reused as crucibles, with copper adhering inside, at site 346 (Photograph: P. Carstens)

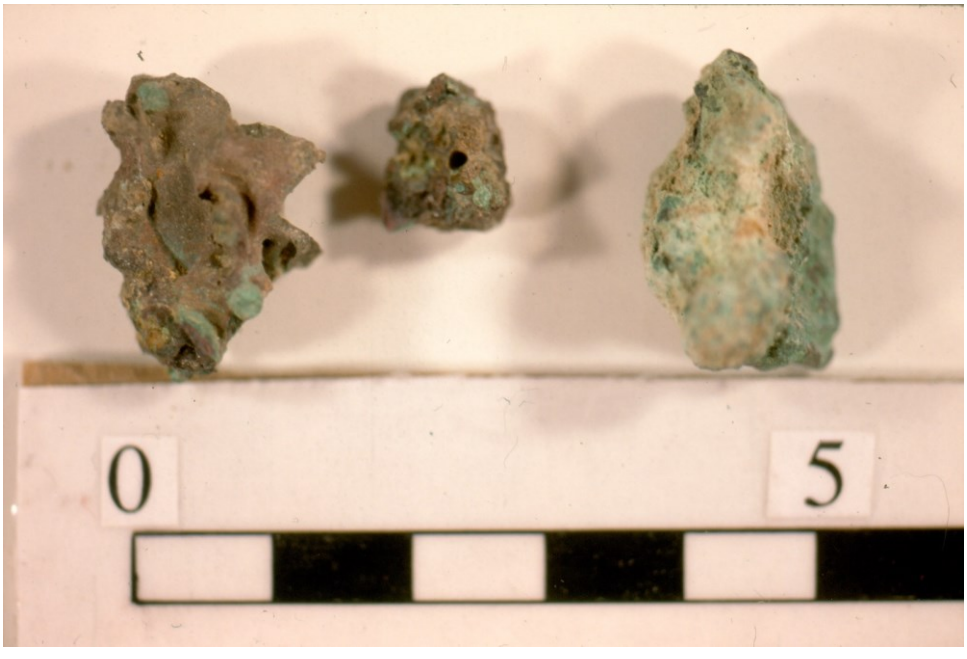

Figure 16: Examples of the copper slag found at site 346 (Photograph: P. Carstens)

Figure 17: Sample of the various pottery sherds, fabrics, and types from site 346 (Photograph: P. Carstens)

mission noted this site, but concentrated their main efforts in the turquoise mining region.

The Environs of Wadr Sidri

Part of the team spent a few hours looking along the northern foothills, rock face, and hill tops at the entry to Wadi Sidri,[57] but did not find any clear archaeological remains. Unfortunately, a military patrol cut short our survey work, which lay near a restricted area, but presumably this wadi system would yield more archaeological evidence since it leads directly to the Old through New Kingdom turquoise mining region at Wadi Magharah. However, the discovery of past, industrial activity in southern el-Markha Plain, near the coast opposite Wadi Sidri, suggests that this region also formed a transit route between the Red Sea and Wadi Magharah. This region would be well worth future investigation.

Southern El-Markha Plain

The el-Markha Plain project also conducted a foot survey in several selected locations in the mostly desolate southern part of el-Markha Plain, to the south of Abu Rodeis. We concentrated our foot survey in a few areas to the west of the north-south road, and carried out some general reconnaissance and targeted foot surveys around a few promising coastal inlets at the southernmost extremity of el-Markha Plain. The southern plain did yield one especially rewarding ancient industrial area with a small ring of stones (an old hearth?) (Figures 1 and 24–25), one or more heavily eroded stone basins (Figure 26), probable stone pounders, and perhaps some lithic debris amongst the numerous natural flint

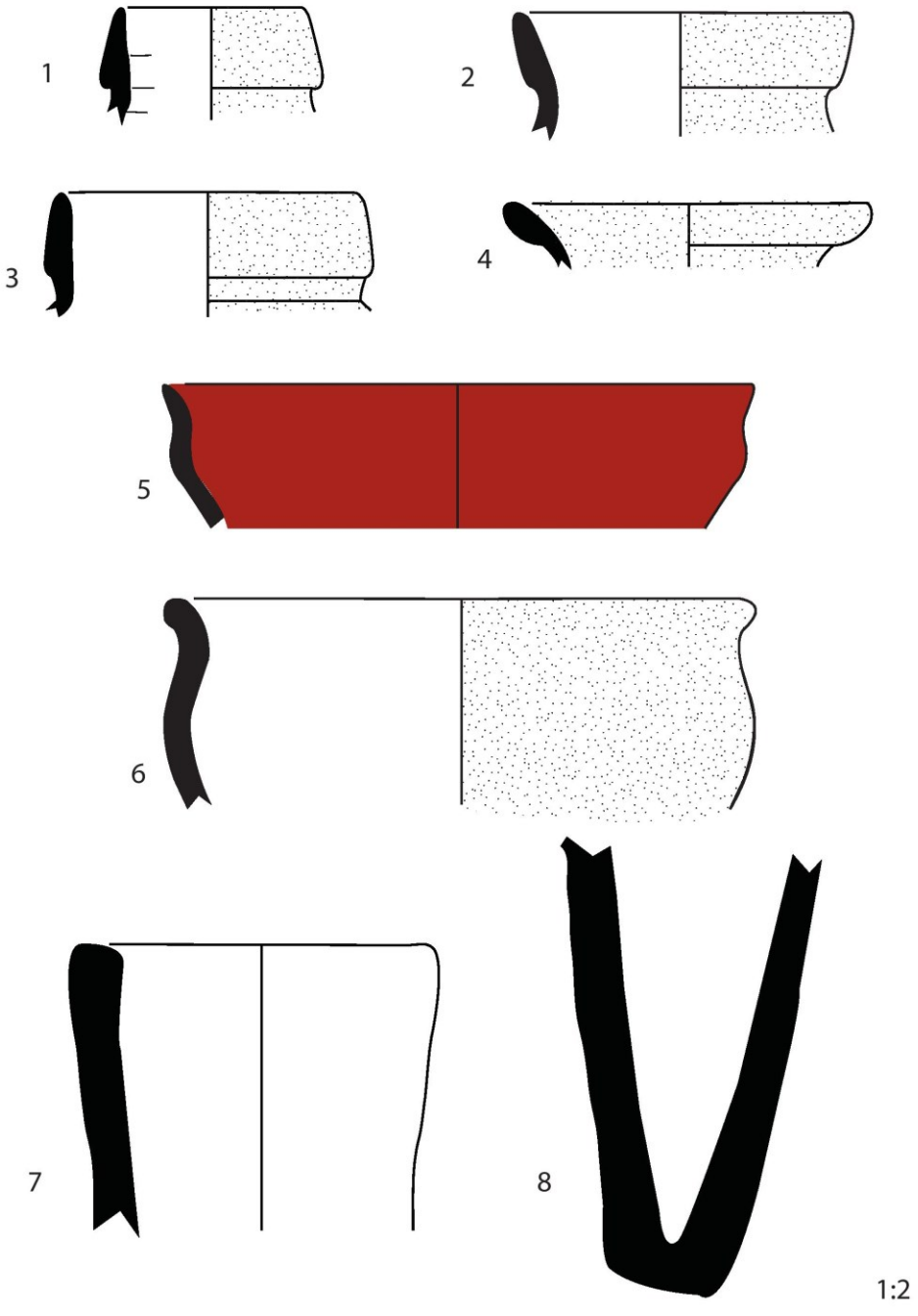

Figure 18: Representative selection of each type of pottery container found at Tell Markha; Table 1 records the rim diameters of the pertinent examples (Pottery images and plate: R. Hummel)

Figure 19: Grinding stone (small find no. 4) from grid square C4, locus 2, at site 346 (Photograph: P. Carstens)

Figure 20: View of geological test trench traversing wadi bed, looking north toward site 346; Mustafa Rezk (left) conversing with G. Mumford (right) (Photograph: P. Carstens)

pieces strewn across the plain.[58] The materials remains from this surface site suggest some sort of industrial installation involving the crushing of ore, perhaps in the pharaonic period, but also possibly later.[59] In contrast, the southernmost inlet and its environs did not produce any ancient material culture, despite a fairly thorough search in this area. We could not determine a definite date for the industrial area, which lacked visible potsherds, but it would definitely repay further investigation and may have been linked with the mining region in Wadi Magharah.[60]

Northern El-Markha Plain

Northern el-Markha Plain has produced the most intense region with pharaonic activity, including a late Old Kingdom fort (site 345), a Middle Kingdom smelting site (346), a possible New Kingdom anchorage (site 346), and three pottery scatters (sites 346a-c) (Figure 1). In addition, recent satellite image analysis by S. Parcak has revealed one or two potential ancient sites 3 km and 3.3 km to the south of Ras Budran, respectively, near the western end of a hard-packed wadi bed traversing el-Markha Plain from Seih Baba (which provided a natural roadway accessing the turquoise mining region). This writer had already noted that the location of the late Old Kingdom fort beside the sea and at the western end of a northern, hard-packed wadi bed at Ras Budran probably represented a conscious, pharaonic Egyptian selection of a combined anchorage and natural roadway to Seih Baba and the advent of the wadi system leading to the turquoise mines. Hence, the presence of a 20 meter diameter circular feature, albeit much smaller than the 44 meter one at Ras Budran, may reflect the local Bedouin description of a similar structure to the one at Ras Budran. The second structure described by Reis Ayad and other Bedouin was said to lie to the south, between Ras Budran and Abu Rodeis, and thereby forms a second potential link to the suggestive circular feature.[61] However, confirmation of the true nature of this enigmatic 20 meter diameter feature awaits future ground reconnaissance, especially since other smaller circular embankments, albeit 12 meters in diameter, are more frequently indicators of abandoned modern gun emplacements (presumably from the late 1960s and 1970s). Hence, we are not suggesting this

Figure 21: View of the waterfall area to the immediate southeast of Tell Markha (Photograph: P. Carstens)

Figure 22: View looking southwest across site 346 (eastern end bottom center), the modern road cutting through the site, bulldozer heaps, the old road, and el-Markha Plain to the South (Photograph: P. Carstens)

Figure 23: 2008 view of excavations at the late Old Kingdom fort at Ras Budran, looking north (Photograph: P. Carstens)

Figure 24: 2002 view of small tumulus with a circle of wadi stones (installation?/hearth?) in the southern part of el-Markha Plain (Photograph: S. Parcak)

Figure 25: 2002 view of a circle of stones (installation?/hearth?), not far from the stone basin (Photograph: G. Mumford)

20 meter diameter feature is ancient, but that it is worth visiting to determine its actual nature –especially in light of the Bedouin assertions about a similar structure to the fort at site 345.[62]

Conclusions

The el-Markha Plain project's initial examination of Tell Markha (site 346) has clarified its date range and nature a bit more, but awaits the full publication of the 2002 season in the near future, while the neighboring late Old Kingdom fort at Ras Budran (site 345) is undergoing continuing investigations and publication. The discovery of other sites, activities, and potential sites elsewhere in el-Markha Plain, and the areas left unexplored, reveals that much remains to be clarified in this strategic coastal plain that provided both a key access point and interaction zone for pharaonic expeditions heading to and from the turquoise and copper mining region in South Sinai. Once regional conditions become more secure, it is hoped that work may resume in South Sinai in the near future, clarifying the nature and scope of both the current study areas and other little known and unconfirmed archaeological sites.

Figure 26 (right): 2002 view of a badly eroded granite basin (perhaps for crushing ore?) in the southern part of el-Markha Plain (Photograph: G. Mumford)

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Notes

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[2] Laurence Pavlish represented a mentor, a good friend, an excellent colleague, and an indispensable team-member in the Tebilla and Sinai projects, other projects in which many of us participated, and life in-between projects, and with his passing away several years ago (27 August, 2007) he is sorely missed every day. He brought laughter to us all, from the most trying of times to the best of days, including a keenness of wit, humor, intelligence, knowledge, inquisitiveness, creativity, and energy that I have seldom encountered. It is our memories of you and all your exploits that never cease to bring a chuckle upon reflection. We often ask "What would Larry do?" when encountering a particular problem or issue, while pondering your varied past through probable solutions and/or take on things never fails to guide us through hale and hearty. Wishing you a continuing and equally adventurous and humor-filled afterlife Larry!

[3] Mumford and Parcak 2002; *idem* 2003; www.deltasinai.com.

[4] See W. F. Albright 1948a, 14–15, 10 fig. 2; *idem* 1948b, 10 and note 23; H. Field 1948a, 802, 808 photo; *idem* 1948b, 484–85; A. L. Perkins 1949, 40; W. Phillips 1948, 669. Albright described the site as lying just over 100 meters from the Red Sea, and situated on a hillock.

[5] Rothenberg 1970, 8 fig.2, 25 site 346-o. Rothenberg (1970: fig. 2, 25 site 346-o) found an "18th Dynasty" coastal site (no.346) beside el-Markha Bay in Southwest Sinai, and lay almost directly opposite the Wadi Araba route between the Nile Valley and the Red Sea coast. Site 346 is located a little over 8.1 km. to the southeast of Abu Zeneimeh (Abu Zanima; Zalimeh), at Israel Grid Coordinates 82,760 (North-South) and 70,100 (East-West) (Rothenberg, 1970: 8 Fig.2, 25 Site 346-o).

[6] M. Chartier-Raymond 1994, 34, 35 fig. 2.

[7] In summer 2000, the small team consisted of G. Mumford, K. Meikle, S. Parcak, and T. Davidson, who re-located Albright's seaport (site 346) during a long weekend, mid-dig break from work at Tell Tebilla and Mendes.

[8] The 2001 team included G. Mumford, S. Parcak, L. Pavlish, and P. Carstens, who visited the site (346) briefly, prior to the Tell Tebilla season, to pre-plan the logistics of working in this region in the future. We did not relocate Rothenberg's site 345 at this point, despite a brief look along the southern coastline, but left re-locating this site to a future season. Other Tebilla team members who aided in a second reconnaissance season in 2001 included Gregory Mumford (director), Sarah Parcak, Julie l'Hereaux, and Zoe McQuinn.

9 Starting in 2002, after uncovering the late Old Kingdom fort (site 345), the Markha Plain project has focused its main efforts on Site 345, which is also called Ras Budran after the local name for this part of el-Markha Plain; see Mumford 2005; *idem* 2006; *idem* 2012a; *idem* 2012b.

10 Barron 1907, 15.

11 Barron 1907, 16.

12 The expanded corpus of pottery from Tell Markha and further parallels from Ayn Soukhna and elsewhere, provide a Middle Kingdom date for the "funnel-necked jars" and other typical early Middle Kingdom forms (see Perunka 2011, 36, note 42). R. Hummel has avoided calling our Middle Kingdom jars "funnel-necked jars" since this term is more frequently applied to New Kingdom forms, and we wished to avoid potential confusion –despite the similarities in the Middle Kingdom jars' form versus a different fabric and manufacturing technique.

13 Mumford 1999a, 875–8; idem 1999b, 722–25.

14 Abd el-Raziq, Castel, Tallet, and Marouard 2012, 3–20; Abd el-Raziq, Castel, Tallet, and Fluzin, 2011; Marouard and Tallet 2012, 40–43; Tallet 2012, 147–68.

15 Albright 1948a, 10 fig.2, 13–15; Field 1948a, 669; *idem* 1948, 484 (seaport). Phillips (1948: 669) described the site as containing a surface scatter of broken pottery that covered an area of 50 by 100 meters. Albright (1948a: 14a) carried out several soundings at this encampment and noted that "... the site had been so badly denuded by wind erosion that remains are mostly on the surface." A brief summary report by Phillips (1948: 669) added that "... the debris of occupation had been almost completely removed by wind action." Albright (1948a: 14) did observe, however, that "... there is only one stratum and only slight indications of superimposed constructions ...," which agrees with our observations of both the fragmentary patches from the mound's western side and the eastern part.

16 Rothenberg's 1967–68 survey noted that this site measured 50 by 110 meters, and had a depth of 1 meter (see Rothenberg, 1970, 25 site 346).

17 Phillips (1948: 669). Although these vessels were drawn, photographed, and compared with Dynasty 18 forms from Harageh and other sites, the pottery sample from Site 346 awaits publication. Albright has mentioned elsewhere (Albright, 1948b: 10 and note 23) that a bowl sherd from the Merkhah port (el-Markha) is identical with one published bowl (of two bowls) found within Mine M at Serabit el-Khadim (Starr and Butin, 1936: 23–24, Pl.12 fig.24 bowl from Mine M). The identical bowls from Mine M are described as being flat-based bowls of coarse light red ware, with plain rims (Starr and Butin, 1936: 23–24).

18 Albright (1948a: 10 note 23) compared the repertoire of pottery vessels from the seaport in el-Markha Plain (site 346) to "... the most characteristic forms" of Dynasty 18 vessels illustrated on plates xlii to xlv of pottery from Harageh. The typical early Dynasty 18 forms from Harageh included flat-based bowls, small beakers (i.e., wine-decanters), biconical jars, larger jars, beer bottles, jugs, and pot-stands. These Harageh pottery forms include flat-based bowl types 3B, 3C and 3E(?) (Engelbach 1923, 17–18, pl. 42 temp. Thutmose IV), drop-shaped jar types 23, 24 and 25 (Engelbach 1923, 17–18, pls. 42–43 temp. Amenhotep I and Thutmose IV), squat almost biconical jars of types 31, 36 and 38 (Engelbach 1923, 17–18, pls. 43–44 temp. Amenhotep I–II and Thutmose III), beaker/wine decanter types 20F and 20P (Engelbach 1923: 17–18, pl. 42 early Dynasty 18), beer bottle/jar type 52N (Engelbach 1923: 17–18, pl. 44 temp. Amenhotep II), biconical jar type 78 (Engelbach 1923, 17–18, pl.44 temp. Thutmose III),jug/juglet type 96 (Engelbach 1923: 17–18, pl. 45 temp. Dynasty 18), and jar stand types 87–88 (Engelbach 1923: 17–18, pl.45 temp. Dynasty 18). Albright (1948a, 10) also mentioned that a flat-based bowl fragment from this site resembled a Dynasty 18 bowl from Mine M at Serabit el-Khadim (Starr and Butin, 1936: 23–24, Pl.12 fig.24 bowl, temp. Hatshepsut and Thutmose III).

19 Rothenberg 1970, 25 site 346.

20 In a 1991 survey of this region by M. Chartier-Raymond and others (1994: 34), the French team found that much of this site has been disturbed by recent construction activity, leaving only scattered New Kingdom sherds.

21 See Mumford and Parcak 2003, 98–102, figs. 4–7, 104–12 table 2. Much of this article had already been completed by the time of the 2002 season, and was supplemented by a preliminary assessment of the 2002 expedition's findings, which have been re-considered during the course of later work in el-Markha Plain and other pertinent research and publications (*e.g.*, especially from Ayn Soukhna).

22 Chartier-Raymond, Gratien, Traunecker, and Vinçon, 1994, 34 section on el-Markha.

23 One suggestion was a temporary holding place for cooling ingots.

24 For summary works dealing with copper working and smelting in Ancient Egypt, see Scheel (1989, 14–15 copper, 16 fig. 8 early bowl furnace, 21–33 melting and casting), Ogden (2000, 151–52), and Rossi (2010, 406). See Rothenberg (1972, 71–103, pls. 35–41, especially Furnace IV; *idem* 1990) for various studies on the New Kingdom Egyptian copper smelting operations at Timna in the southern Arabah, including copper furnaces, workshops, and associated equipment and workshops. See also Levy's recent volume on copper mining, smelting, and working in the Chalcolithic period through Early Bronze Age in the southern Levant (Levy 2007).

25 Presumably the copper smelters cut down acacia and perhaps other trees and bushes in the region for fuel, which would have been a limiting factor in the copper smelting operations in el-Markha Plain. Presumably the depletion of the already scarce lumber (*i.e.*, mostly acacia trees) and other fuel sources in el-Markha Plain would have brought a temporary halt to such copper smelting activities, like in the southern Arabah (*e.g.*, Timna copper mines), while acacia trees would have needed many years, perhaps centuries, to re-establish themselves in this desolate plain.

26 The project ceramicist, Rexine Hummel, carried out a very careful and meticulous examination of all the

diagnostic and non-diagnostic potsherds, and has re-assured me that there were no clear examples of any tuyères. Of additional note, the project geo-archaeologist studied the northern wind's strength, direction, and consistency, and concluded that it generated sufficient strength to create a natural forced air system that the copper smelters may have taken advantage of in placing the furnaces, and thereby may not have needed as many tuyères as other sites with less powerful and less consistent winds.

27 Scheel 1989, 14–15. The Markha Plain project has been in communication with Christopher Davey regarding his future participation in examining and publishing the copper smelting furnaces and activity at both Tell Markha and Ras Budran.

28 Albright (1948a: 14) described his sampled assemblage as containing mostly broken pottery, and some artifacts, of which the pottery was said to be homogeneous "... consisting almost entirely of a limited number of constantly repeated forms."

29 Many early Middle Kingdom jars (sometimes labelled "funnel-necked jars") occur at Ayn Soukhna to the northwest of Tell Markha (site 346), across the Red Sea (Perunka 2011, 36 note 42, 41–47 cat. nos. 19–44). See also Defernez (2011, 76, 78–79, 86 fig. 5), who placed most of the selected jars from Ayn Soukhna either in the early 12th dynasty, or the 12th dynasty in general.

30 See Perunka (2011, 41 cat. 18) for an example of a somewhat similar, albeit taller, Middle Kingdom bread mould base from Ayn Soukhna. The Tell Markha "bread moulds" seem to fit better into Marchand's phase 2, and phases 2–3, which date to the First Intermediate Period through Dynasty 11 (see Marchand 2004, 216–22, 229 figs. 74–85, 238 pl. 6a). Other similar 12th dynasty examples are illustrated by Jacquet-Gordon (1981, 17 fig. 4 nos. 3–4, and 5–7), Wodzinska (2009, 214–15), and Marchand and Soukiassian (2010: 167 examples from Balat, Dakhleh Oasis). However, Ayn Soukhna has also produced a few fragmentary crucibles from the early Middle Kingdom that seem similar to the ones from Tell Markha (site 346) (see Abd el-Raziq, Castel, Tallet, and Fluzin 2011, 130, figs. 140–41).

31 The project ceramicist has recently re-assessed the pottery from Tell Markha and indicates that Tell Markha did not produce any good characteristic New Kingdom markers. She notes that we had assumed that all the red slipped silt bowls might reflect New Kingdom forms because we were expecting and looking for New Kingdom forms (G. Mumford: i.e., based upon previous archaeological findings at Tell Markha). Rexine adds that while these red slipped bowls may be "New Kingdom," they could also be Middle Kingdom. It is possible to pick out a few examples that resemble New Kingdom shapes, but their fabric is very unusual. Even the carinated bowls from Tell Markha are First Intermediate Period through Middle Kingdom in date. The fabric of the Middle Kingdom jar types of which we have many is almost exactly like the fabric of the Middle Kingdom jars at Ayn Soukhna, which is also akin to Marl C (produced in the Fayoum). Rexine concludes that the one difference in the pottery at Tell Markha is that our jars appear to be coated with either red or cream slip (slightly edited personal communication from R. Hummel, 3 March, 2015).

32 The surviving eastern part of the mound did not exhibit any disturbance from prior excavations. This writer also noted a definite deeper and more complex stratigraphy in the surviving patches of the mound along the western side of the modern road. By trowelling and cutting exposed sections in this area, which had been extensively cut into by bulldozers, I noticed multiple layers of ash, sand, and potsherds, all of which indicated this site's longer term function as an industrial area, presumably for further smelting and refining copper from Southern Sinai before shipping it across the Red Sea to the Nile Valley. Our late (and most keenly missed) project geo-archaeologist, Larry Pavlish, noted that site 346 was ideally situated to take advantage of the almost continuous and very strong northern winds that would have aided in raising temperatures within the smelting furnaces.

33 Rexine Hummel and this writer (Gregory Mumford) have revised their ideas on the pottery's date from site 346 (Tell Markha) after having more time to consider the larger corpus from the 2002 season, the general literature on this and other periods, and the publication of more recent findings from the Middle Kingdom, coastal site at Ayn Soukhna, which lay across the Red Sea to the northwest (near Suez).

34 See the article by Mumford and Hummel (2015), in this issue of *JAEI*, regarding the two same types of "Sinai"/Red Sea fabrics (A and B) from the late Old Kingdom site at Ras Budran (site 345), which lies less than 2 km south of Tell Markha (site 346).

35 Perunka (2011, 41 cat. 18) illustrates a Middle Kingdom bread mould base from Ayn Soukhna; see also Wodzinska (2009, 214–15).

36 Mustafa Rezk, a field archaeologist and SCA inspector working with the Markha Plain project, had excavated at Wadi Gharandel previously and could confirm the identical nature of the Roman pottery from both this site and site 346 (Tell Markha), while the project ceramicist (Rexine Hummel) concurred with his conclusions based upon her familiarity with Roman pottery from the Nile Valley and East Delta.

37 Unfortunately, our explorations of the waterfall area remain incomplete owing to the presence of relatively modern debris that prevented further digging.

38 See Pomey (2012, 35–52) for a study on the Middle Kingdom ship remains from Ayn Soukhna, and a discussion of maritime expeditions to Markha Plain and onwards to Serabit el-Khadim.

39 See Mansour (2014), for a recent treatment on turquoise, turquoise mining, expeditions, and other aspects in relation to South Sinai and the routes to South Sinai.

40 Stevens and Eccleston (2007: 148) note that "... the organization of the metalworking industry in Ancient Egypt is not well understood for any period." This is certainly true for the seasonal smelting activity at Tell

Markha, about which we have very little hard data regarding the specific source(s) of the copper, the copper smelters, and their objectives. One can only surmise that this operation aimed mainly at supplementing Egypt's supply of copper.

41 Petrie 1906, 34–54; Mumford 1999a, 875–78.

42 See Beit-Arieh (1985, 89–116) regarding the New Kingdom copper smelting installations, equipment (e.g., stone bellows), casting moulds, and other items found at Serabit el-Khadim.

43 See Abd el-Raziq, Castel, Tallet, and Marouard (2012, 3–20) for a summary of the findings from Ayn Soukhna, including the Middle Kingdom copper working areas (pages 7–8, figs. 11–12), which are better preserved, but bear a resemblance to the fragmentary furnaces at Tell Markha (site 346). A more extensive report is provided in Abd el-Raziq, Castel, Tallet, and Fluzin 2011.

44 It is always possible, but speculative, that an unidentified minor copper source may have lain closer to Tell Markha. See Castel and Soukiassian (1989, 10–11, map and site nos. 2, 3, and 6), for a summary of known ancient copper sources and mines at Wadi Ba'ba, Wadi Kharig, Bir Nasib, and Regeita/Reqeita in South Sinai; Ogden (2000: 149, 150) discusses the presence of copper sources and smelting activities near and at Wadi Magharah, Serabit el-Khadim, and Timna. The Middle Kingdom installation at Wadi Maghara did yield a crucible containing ore, which reveals that copper smelting activity did occur at a smaller scale at various sites within the turquoise mining region. It is also possible that the copper smelting a Tell Markha may have been intended to aid the mining expedition, but we have very little evidence for any specific production of copper tools or even ingots.

45 A brief survey report by Rothenberg (1970: 25 site 345) placed site 345 about 200 meters from the shore and noted that it consisted of a large structure that had been covered by sand. The survey report mentioned the presence of slag and pottery, and only added that pottery was "not yet datable," but "seems ancient Egyptian" (Rothenberg 1970, 25 site 345).

46 Mumford and Parcak 2003; Mumford 2005; *idem* 2006; *idem* 2012a; *idem* 2012b. The Toronto-SCA excavations uncovered a large, circular, limestone structure buried in drift sand, lying about 200 meters from the modern Red Sea coast. This building extended 44 meters in diameter, and enclosed an area 32 meters in diameter with a 5 meter wide enclosure wall of local limestone blocks. Most of the structure had been covered with windblown sand, but excavation revealed the northern side survived up to 3.5 meters in some areas. The building displayed a westward projecting, rectangular "bastion" and probable battlements that were originally accessed by an interior stairway beside the western entryway. To the immediate north of the stairway lay a 1.2 meter by 4.2 meter chamber with a rough stone pavement. The chamber had been roofed by massive slabs (0.33 by 0.66 by 1.70 meters). The sand drift sand covering the floor area of the chamber were sieved fully, but failed to produce artifacts other than one broken copper nail and two copper lumps. The chamber's western interior doorway had been blocked up with rough stones set in a sandy clay mortar, which in-turn had been sealed by a sloping ramp of large wadi stones. The blocking-up of the fortress entryway was initially assigned to Egyptian fears regarding a Bedouin threat, date to the period in which the entrance to St. Catherine was sealed for protection against Bedouin raiders (Kamil 1991, 20–21).

47 The modern surface covering the fort has produced several post Old Kingdom potsherds, including two diagnostic forms. One neck fragment resembles a late Roman through early Byzantine period flagon, while a ring base from a glazed bowl has been ascribed to the 7th to 11th centuries AD. This bowl bears decorative blue Islamic motifs on a white background.

48 See Mumford and Parcak 2002; idem 2003; Parcak in this issue of *JAEI*.

49 See Barron 1907, 16. This pool also represents the nearest current source of water to coastal sites 345 and 346, lying 3.5 to 4 km. to the east, beside the foothills of Gebel Markha. Hence, in light of the mostly barren and unshaded nature of the plain of el-Markha Plain, any Egyptian expeditions traversing the northern plain en-route to the turquoise mining regions of Serabit el-Khadim and Wadi Maghara, would have been attracted to both this landmark and water source, even if only for a brief stop. Ain Markha is said to contain a pool of brackish but drinkable water (see Barron 1907, 16).

50 Mumford and Parcak 2003, 94 fig. 2 map 346a-b, 97–98, 99 fig. 4.10.

51 Our late geo-archaeologist, L. Pavlish, confirmed the general date and nature of this discovery, which we reported to the appropriate authorities in Cairo for further investigation (a team apparently came out and assessed the find in the following year).

52 Our foot survey was conducted by having each team member spaced apart approximately 5 or so meters each, covering about 40–50 meters from north to south along the foothills, with a return northern trip covering a similar swath to the west of our initial southern search. Naturally, a much closer and rigorous search might yield further findings. I also carried out a foot survey along the adjacent hill top beside Tell Markha, but with few results.

53 Seih Baba provided the most direct access to the Old, Middle, and New Kingdom mines at Wadi Kharig, Wadi Nasb (Naseb), and Serabit el-Khadim (i.e., Rothenberg's Site 702B in the Old Kingdom) to the northeast, while more direct access to the Old-New Kingdom mines at Wadi Magharah is gained via Wadi Baba, Wadi Boudra, and Wadi Sidra from the southeastern side of Markha Plain (see Chartier-Raymond 1994, figs. 2–3).

54 Petrie 1906, 18–19.

55 Barrois 1932, 105.

56 Rothenberg 1970, 25 site 347.

57 The team included G. Mumford, S. Parcak, and M. Rezk (our SCA inspector and archaeological colleague), the latter of whom has spent many years excavating and surveying in South Sinai.

[58] Mumford and Parcak 2003, 94 fig. 2 map "EB I<?> site."

[59] See Klemm and Klemm (2013, 6–8, fig. 1.5), who describe Old and Middle Kingdom gold ore crushing installations and equipment, which are not too dissimilar from copper crushing utensils. They illustrate a Middle Kingdom red granite mortar (crushing basin) and pounders from Daghbag (Eastern Desert), which are fairly similar to the ones observed in southern el-Markha Plain.

[60] The industrial site in the southern part of el-Markha Plain was erroneously marked "EB I" on the map of Markha Plain (Mumford and Parcak 2003, 94 fig. 2), and should instead have contained a question mark (e.g., EB I?) to indicate that the site might have represented one of the various "Early Bronze I/II" sites (now mostly placed in EB II) that occur throughout South Sinai (see Beit-Arieh 2003).

[61] See Mumford's report on Ras Budran and Parcak's article on Markha Plain and beyond in this issue of *JAEI*.

[62] The same Bedouin have worked with us on the late Old Kingdom fort, but unfortunately could not guide us more precisely to the second, and reportedly similar, sand engulfed structure, which apparently lie in a generally more restricted part of Markha Plain.