

NEW DATA ON THE EASTERN DESERT WARE FROM SAYALA (LOWER NUBIA) IN THE *KUNSTHISTORISCHES MUSEUM*, VIENNA

By H. Barnard,¹ A.N. Dooley and K.F. Faull²

The UNESCO Nubian Monuments Salvage Campaign in the 1960's not only entailed the famous lifting of the monuments at Abu Simbel, Amada, Wadi al-Sabuca and Kalabsha, above the expected level of Lake Nasser, but also many rescue excavations at less imposing sites. One of these resulted in the study of the late 3rd century AD remains at Sayala (Fig. 1) by the *Österreichisches Nationalkomitee der UNESCO-Aktion für die Rettung der Nubischen Altertümer* (KROMER 1967, BADAWI 1976). These remains comprised 19 structures on the west bank of the Nile, identified as a complex of rest houses (*Weinstuben* or *Locanda*), and four contemporary grave fields (C/I–C/IV) of at least 367 simple graves, some with more than one burial, on the east bank. Both sites were interpreted to be somehow connected to the Roman garrison at Hieria Sycaminos (Maharraqa), just north of Sayala. It was there that the Roman frontier is thought to have been until AD 298 when Emperor Diocletian withdrew the Roman troops to Syene (Aswan). The ancient historian Procopius informs us in *De Bellis* 1.19.27–37, written about 250 years after the event, that the abandoned area, the Dodecaschoinos, was given to the Nobatai (the Nubians?). He furthermore reports that arrangements were made to pay both the Nobatai and the Blemmyes a yearly amount of gold on the condition that they would no longer attack the Roman Empire (EIDE *et al.* 1998, 1188–1193).

Among many vessels and sherds of Roman and Meroitic pottery found in Sayala were a few dissimilar sherds of relatively small handmade vessels

with proportionally thin walls (Table 1). These are now kept in the *Traviatagasse* store rooms of the *Kunsthistorisches Museum* in Vienna as they were included in a gift from the Egyptian government out of gratitude for the Austrian involvement in the Nubian Campaign. Similar sherds have been found at many other sites in the Nile Valley and in the Eastern Desert, both in southern Egypt and in northern Sudan (Fig. 1), always in small quantities, among much larger amounts of sherds from Meroitic or Roman/Byzantine Egyptian vessels (BARNARD, in press).³ Most contexts could be dated to the 4th–6th century AD, by associated pottery, coins or radiocarbon dates (STROUHAL 1984, MAGID 2004), but the ware may have been produced as early as the 2nd century AD and as late as the 8th century AD. The vessels were made of a sandy fabric, with very few organic inclusions. Their surfaces were carefully wiped, smoothed or burnished and decorated with impressed or incised patterns. These are often remarkably asymmetric and frequently augmented by a white inlay or a partial red slip (Plate 1). Occasionally, vessels are shaped to enhance the decorative pattern (EDW 251, EDW 288). Rarely elements of the design appear to have been applied after the vessel was fired (EDW 276, EDW 278).

The corpus seems limited to serving vessels that, given their distinctive appearance, must have stood out among others and most likely acted as cultural or ethnic markers when used. Recently recovered data, however, leaves the former scholarly association of these vessels with the Blemmyes

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³ An overview of all references to Eastern Desert Ware can also be found at www.barnard.nl/EDWdata/background.html.

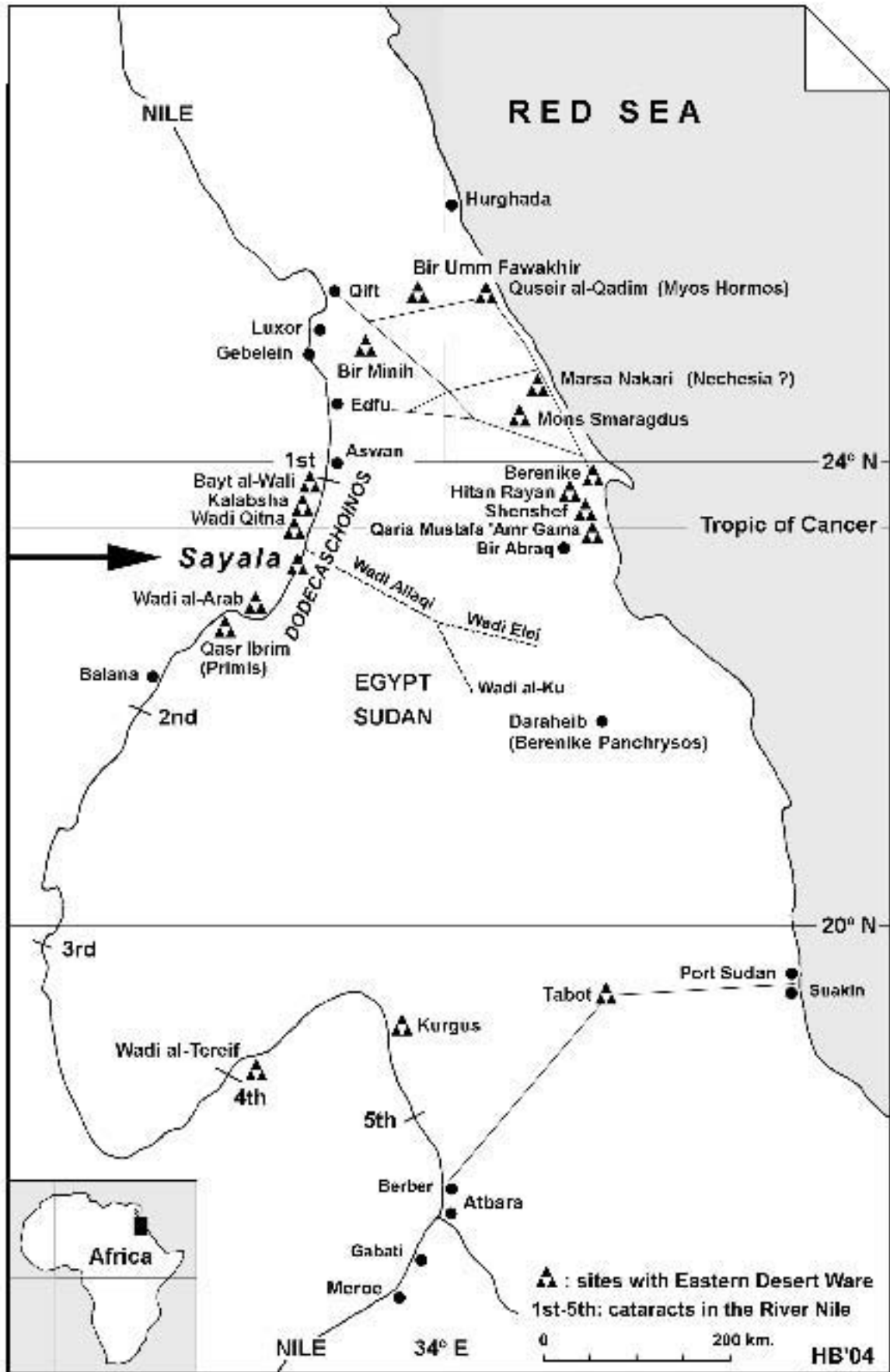


Fig. 1 Map of southern Egypt and northern Sudan showing the position of Sayala and other place names mentioned in the text

less plausible. It disagrees with the observation on which this assumption was based, that they correspond in geographical and chronological distribution. It is furthermore not certain that in the 4th–6th centuries AD the name still referred to an ethnic or cultural entity, or should be interpreted as a term mainly used by outsiders to simplify a more complicated reality (BARNARD, 2005).⁴ Given the distribution and the appearance of the vessels they are now more prudently identified as ‘Eastern Desert Ware (EDW)’. This corpus may have been produced and used by pastoral nomads in the Eastern Desert.

EASTERN DESERT WARE IN THE KUNSTHISTORISCHES MUSEUM

In order for the Eastern Desert Ware from Sayala to be compared with the rest of the corpus, a new detailed description of 16 sherds from 13 contexts is now presented. In September 2004 all sherds were weighed, drawn and photographed. Of the four complete vessels 18 digital photographs were taken (Plate 1), each after turning the vessel 20°. These pictures were assembled into three dimensional images.⁵ To allow easy comparison with previous drawings of similar vessels, sections were drawn to the right of the front view of each sherd (Figs. 4–8). The reconstructed rim diameter, the average thickness and the estimated vessel equivalent (the preserved radius of the rim) are given as indicators of the accuracy of the reconstruction. The colors of the surfaces and of the fabric of each vessel were compared with those of the Munsell Soil Chart. No fresh breaks of the sherds were forced and the actual colors of the breaks may therefore be slightly different. No breaks were present in vessels EDW 288 and EDW 290. Three vessels (EDW 281, EDW 283 and EDW 289) appeared to have been made of the rusty-red to orange fabric with clearly visible, poorly sorted white inclusions (quartz and feldspar), identified as EDW-1 (BARNARD and MAGID, in press). Another (EDW 278) had additional flakes of golden mica, best visible on the surfaces of the vessel, a fabric identified as EDW-3. All other vessels were made of a fabric similar to EDW-1, but sufficiently different to be recorded as ‘unclassified’. Form and decora-

tion were classified using an adapted version of the system put forward by Strouhal in 1984 (STROUHAL 1984, BARNARD 2002, BARNARD and STROUHAL 2004). Finally, parallels with vessels found elsewhere, based on their macroscopic description, are given together with additional remarks.

KHM number	Provenance	Reference
East bank (Gräberfelder, BADAWI 1976)		
76251	Grave complex C/II	p. 29 (Abb. 12/2) Tafel 28/2 (p. 130)
West bank (Weinstuben, KROMER 1967)		
76802	Structure I, outside south wall	see EDW 275
76803	Structure I, outside south wall	see EDW 276
76810	Structure I, outside west wall	p.19, p. 97 (Abb. 30/4)
76827	Structure I, in store room (Kabause)	see EDW 277
76828	Structure I, in store room (Kabause)	see EDW 278 and 279
76838	Structure I, under north bench	see EDW 280
76844	Structure I, under east bench	see EDW 281
76890	Structure II, in main room	p. 30, p. 98 (Abb. 31/4)
76909	Structure II, behind north bench	see EDW 282
76917	Structure II, under east bench	see EDW 283, 284 and 285
76918	Structure II, under east bench	see EDW 286
76961	Structure III, along west wall	p. 39, p. 98 (Abb. 31/3)
77069	Structure V, in store room (Kabause)	see EDW 287
77182	Isolated find	p. 71, p. 98 (Abb. 31/1)
77183	Isolated find	p. 71, p. 98 (Abb. 31/2)
???	Mislabeled, not 76810 or 76827	Tafel 32/2 (p.167)
Not previously published		
77196	Grave 5	see EDW 288
77217	Grave 26	see EDW 289
77221	Grave 29, burial 3	see EDW 290

Table 1 The provenances of the Eastern Desert Ware (EDW) found in Sayala and the correlations between the numbers referred to in this article and those given by the *Kunsthistorisches Museum* (KHM) in Vienna

⁴ See PAUL 1954 for an impression of the complex ethnic composition of the modern inhabitants of the area.

⁵ These are also stored at a password protected part of www.archbase.org

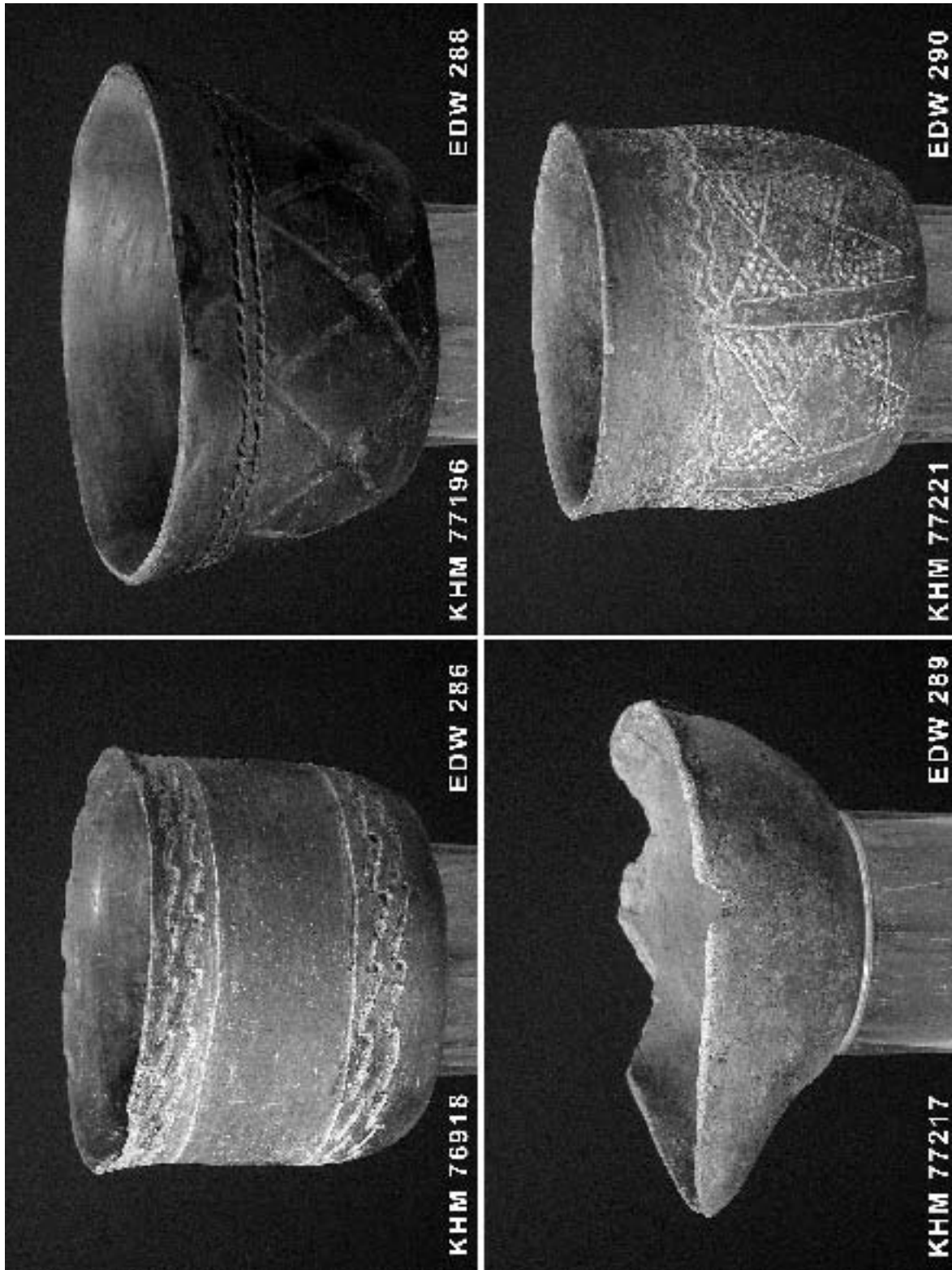


Plate 1 Four complete Eastern Desert Ware (EDW) vessels found in Sayala (Lower Nubia) and now in the *Kunsthistorisches Museum* (KHM) in Vienna

To illustrate the similarities between EDW from different sites, six sherds from Qasr Ibrim and two from Kurgus (both in the Nile Valley south of Sayala) and four sherds from Wadi Gamal East (Gelli), in the Mons Smaragdus area, are also presented here (Figs. 9 and 10). The occurrence of Eastern Desert Ware at the latter site is remarkable as the ancient Egyptian diplomat Olympiodorus tells us, in Fragment 1.37 cited by patriarch Photius, that to visit the emerald mines in the area one needed the permission of the Blemmyes, which he locates south of Philae (Aswan) at a considerable distance across arid wasteland (EIDE *et al.* 1998, 1126–1128).

Given the paucity of complementary archaeological information it was decided to subject about 200 sherds of Eastern Desert Ware, not in the *Kunsthistorisches Museum*, to various destructive research techniques.⁶ These include petrographic thin-sectioning and trace-element fingerprinting.⁷ Another research technique, which will be discussed here, aims to investigate the use of the vessels by identifying the organic residues captured in the ceramic matrix of the unglazed vessels by means of combined gas chromatography-mass spectrometry (GC/MS).

Sample preparation for residue analysis

Several versions of the method to extract and identify such residues were tested before the details below were adopted.⁸ Sample preparation started with removing the surfaces of a 2 × 2 cm fragment of each selected sherd with an aluminum-oxide grinding stone. The remaining

core of the sherd was crushed, using an aluminum-oxide mortar and pestle, and stored until use in a sterile glass vial with a Teflon lined cap.

From each vial 400 mg of pottery powder was transferred into a test tube with 1 ml of a chloroform-methanol mixture (2/1, v/v). Powder and solvent were mixed (on a vortex mixer) and sonicated, at room temperature, for 30 min.⁹ After centrifuging at 2000xg for 15 min the supernatant was transferred into a second test tube. Another 1 ml of solvent was added to the sediment which was again mixed, sonicated, centrifuged and decanted into the same test tube. Three such extractions resulted in 2.5 ml of liquid in which some of the ancient organic residue had dissolved. The solvent was evaporated under a gentle stream of nitrogen after which the dry residue was taken up in 60 µl ethyl-acetate and transferred into an injector vial, designed for use with the automated injector of the GC/MS. The solution was then treated with 40 µl BSTFA containing 1% TMCS.¹⁰

The initial practice of adding an internal standard was abandoned as this did not facilitate the qualitative analysis of the samples. To prevent contamination the preparation was completed using gloves from which the talcum powder was removed. Residual pottery powder was removed, from gloves and tools, with three rinses of water, formic acid and acetone respectively. To monitor the procedure, empty sample vials were included as well as vials with the powder of new ceramic vessels or of vessels in which known foodstuffs had been prepared. Unavoidable but easily identifiable

⁶ The research group studying Eastern Desert Ware, since January 2001, includes Anwar Abdel-Magid Osman (University of Bergen), J.L. Bintliff (Leiden University), J.F. Borghouts (Leiden University), S.M. Burstein (CSU Los Angeles), J.H.F. Dijkstra (Groningen University), J.W. Eerkens (UC Davis), A. Manzo (University of Naples), H. Neff (CSU Long Beach), P.T. Nicholson (University of Wales, Cardiff), C.C. Rapp (UC Los Angeles), R.H. Pierce (University of Bergen), P.J. Rose (Cambridge University), S.A. Rosen (Ben-Gurion University), M. Serpico (University College London), S.E. Sidebotham (University of Delaware), S.T. Smith (UC Santa Barbara), E. Strouhal (Charles University Prague), R.S. Tomber (University of Southampton), J. van der Vliet (Leiden University), W.Z. Wendrich (UC Los Angeles), K.A. Willemse (Erasmus University) and G. Pyke. The progress of the research project can be monitored at www.barnard.nl/EDWdata/.

⁷ See MALLORY-GREENOUGH and GREENOUGH 1998, GLOWACKI and NEFF 2002 for an introduction in this technique and BARNARD and STROUHAL 2004 from some preliminary results of its use on Eastern Desert Ware.

⁸ The method described here is based on an adapted version of the methods used by CONDAMIN *et al.* 1976, PATRICK *et al.* 1985, CHARTERS *et al.* 1995, SHIMOYMA *et al.* 1995 and MALAINEY *et al.* 1999.

⁹ With a laboratory sonicator ultrasound is applied to the suspension thus stimulating the residues into solution.

¹⁰ This final step, for which the vials are heated to 60°C for one hour, is necessary to allow polar molecules to pass through the GC/MS. BSTFA containing 1% TMCS is N,O-bis(trimethyl-silyl)trifluoroacetamide containing 1% trimethyl-chlorosilane. This is the agent used to derivatize many of the compounds in our reference database (NIST/EPD/NIH 02).

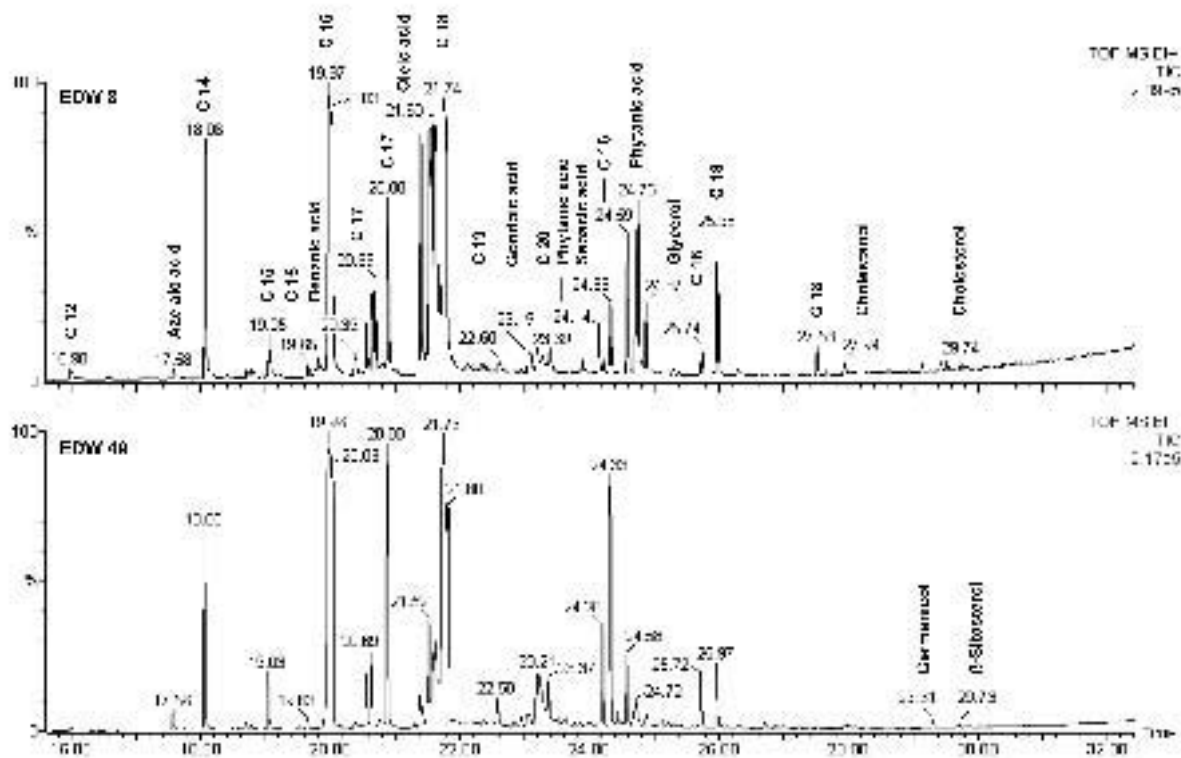


Fig. 2 Part (15.6–32.4 min.) of the chromatograms produced by EDW 8 (top) and EDW 49 (below), TOF MS = time-of-flight mass spectrometry, EI+ = electron positive ionization, TIC = total ion current (about 210,000 in each). The height of the peaks, labeled with their retention times, represents their relative intensity. The molecules most likely causing the response are given on top (Table 2), except where EDW 49 differs from EDW 8 (towards the tail end of the chromatogram)

pollutants included phthalates, introduced by the plastics in laboratory equipment, and siloxanes, most likely released by the glass inside the GC/MS.

Analysis of the extracts by GC/MS

The instrument used to analyze the samples was a gas chromatograph feeding into an EI/CI time-of-flight mass spectrometer, built by Waters/Micromass, purchased by the Pasarow Mass Spectrometry Laboratory at the University of California, Los Angeles through NSF grant number CHE 0078299. The injector vials were loaded in the automated injector set to inject 1 μ l of each sample into the injector port heated to 250°C. The GC oven was held at 50°C for 2 min

and then raised 10°C/min for 30 min reaching a maximum, at 32 min after injection, of 350°C. It stayed at that temperature for another 10 min after which it was allowed to cool down and receive the next sample. The vapors released from the samples were carried through the CG column by a 1.2 ml/min flow of helium and fed into the ionization source of a time-of-flight mass spectrometer.¹¹

Most samples were first run split 1:50 and, if the response appeared low, repeated at split rates of 1:20, 1:10 or splitless. The resulting chromatograms and mass spectra were permanently stored on CD-ROM and studied off-line using MassLynx 4.0 and the 2002 version of the

¹¹ Differences in the time of evaporation and in the velocity of the molecules in the GC column separate the sample into its components. Released in the source of the mass spectrometer these are positively ionized, and partly fragmented, by high velocity electrons (EI+). This allows for the mass of each ion to be measured by

recording the time it needs to travel to a detector after being accelerated by a strong electro-magnetic pulse (time-of-flight). The column used was a HP-5MS fused silica capillary (stationary phase 5% methyl silicone, 50 m long, 0.32 mm internal diameter, 0.25 micron film thickness) made by Agilent Technologies.

Label	Systematic name	Synonym
Benzoic acid	phenyl-formic acid	dracyclic acid
Azelaic acid	nonanedioic acid	HOOC-(CH ₂) ₇ -COOH
C 12	dodecanoic acid	lauric acid
Sebacic acid	decanedioic acid	HOOC-(CH ₂) ₈ -COOH
C 14	tetradecanoic acid	myristic acid
C 15	pentadecanoic acid	—
C 16	hexadecanoic acid	palmitic acid
C 17	heptadecanoic acid	margaric acid
Oleic acid	9-octadecenoic acid	C 18:1
C 18	octadecanoic acid	stearic acid
C 19	nonadecanoic acid	—
Gondoic acid	11-eicosenoic acid	C 20:1
C 20	eicosanoic acid	arachidic acid
Phytanic acid	3,7,11,15-tetramethyl-hexadecanoic acid	

Table 2 Details of some of the molecules identified by GC/MS in EDW 8 and EDW 49 (Fig. 2)

NIST/EPA/NIH Mass Spectral Library which enabled comparison of the spectra of the samples with those of almost 150,000 known molecules in the library. The ancient molecules detected are only those that remain trapped in the ceramic matrix for over 1500 years, dissolve in methanol or chloroform and in ethyl-acetate, survive the sample preparation described above, pass through the GC/MS and ionize. Many molecules appear to satisfy these criteria, but differences in durability and solubility of the compounds will make their relative abundances markedly different from those in actual foodstuffs.

Organic residues found in Eastern Desert Ware

The compounds found in the ancient vessels were identified by visually comparing their spectra with those suggested by a computer search in the reference library. These identifications, while quite convincing, can only be assigned with some caution as they were not confirmed by analyzing the authentic compounds by the same method.

Almost all of the 60 sherds studied so far appear to have preserved both palmitic and stearic acid (Table 2). These two fatty acids are present in almost all organic fats and oils. Many samples also contained myristic, oleic and arachidic acids. These too are common in many substances of animal and vegetable origin rendering the determination of their origin difficult. Furthermore, possible sources of the organic residues include not only food but also the trash surrounding discarded vessels and human remains decaying close to their grave goods. It can be safely assumed that any organic matter in the clay or the temper from which the vessel was made was destroyed during the firing of the vessel (500–800°C). The presence of fatty acids in almost every Eastern Desert Ware vessel, including surface finds and those found in domestic contexts, indicates that they were probably used for food and not solely produced as receptacles for water or as grave goods. There is no indication that any of the vessels contained a gift of food when it was placed in the grave where it was found. Although it is possible that they were used once, for a funeral feast, it seems more likely that the vessels were personal items of the deceased.

Other samples, like EDW 8 and EDW 49 (Fig. 2), contained a multitude of organic compounds. It is unclear whether these residues represent the first food to come into contact with the vessels, during which the matrix was saturated, or are the result of an exchange of molecules each time the vessel was used. The most significant difference between EDW 8 and EDW 49 is the occurrence of cholestanol and cholesterol in the former and germanicol and β -sitosterol in the latter (Fig. 3). Cholesterol and cholestanol are typically synthesized by animals while the steroid β -sitosterol and the triterpene germanicol are of vegetable origin.

Further compounds found in EDW 8 and EDW 49 include the following (Fig. 2, Table 2). Glycerol, in EDW 8, was most likely connecting three fatty acids to form a triglyceride (triacylglycerol). Phytanic acid, in EDW 8, is derived from chlorophyll by ruminant animals and occurs in their meat and milk.¹² Sebacic and azelaic acid, in EDW

¹² STERN *et al.* 2000 argue that multi-branched fatty acids can also be the result of post-depositional bacterial activity, much like dicarboxylic fatty acids, while

HANSEL *et al.* 2004 see them as indicative for the presence of processed fish.

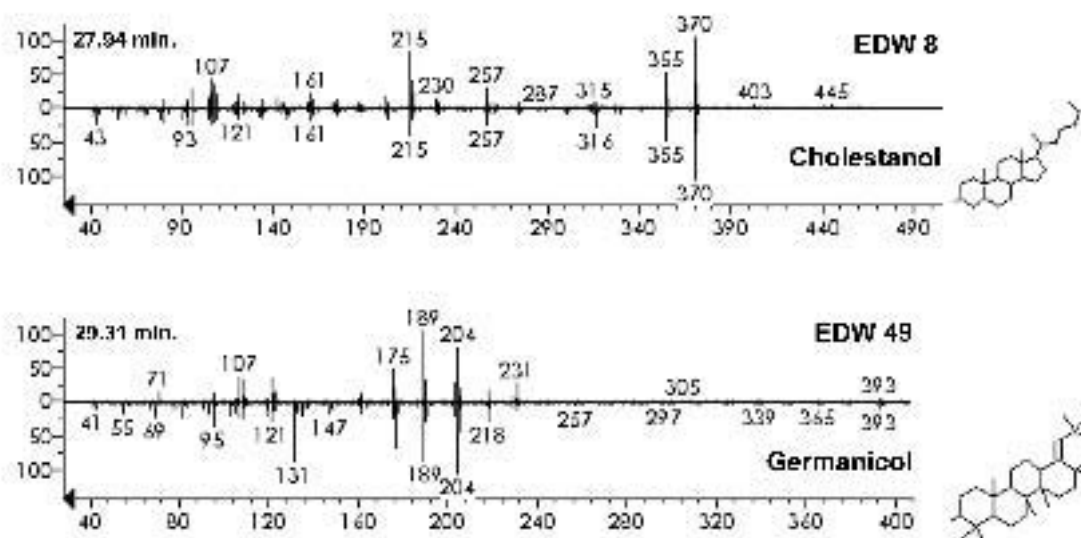


Fig. 3 Fishbone representation comparing spectra of two unknown compounds, found in the matrix of Eastern Desert Ware (above), with their matching spectra from the 2002 IST/EPA/NIH Mass Spectral Library (below). The retention times of the unknown spectra are given (on the left) as well as the structures of the molecules from which the reference spectra emerge (on the right)

8 and EDW 49, are oxidation products of longer fatty acids and could be the result of aging or of post-depositional bacterial activity (Eerkens 2002). Gondoic acid, both in EDW 8 and EDW 49, occurs in certain fish species and in some members of the *Brassicaceae* (*Cruciferae*) family, like rape seed, mustard and nasturtium.¹³ Benzoic acid, in EDW 8, is naturally present in certain tree resins and berries. Although the evidence is ambivalent it may be concluded that EDW 8 once contained a meat dish whereas EDW 49 may have been used for vegetarian food. The vessels from Sayala will have served a similar function as corroborated by the association of many with ancient rest houses.

Apart from looking for marker molecules, as in the case study above, another method to evaluate the results of archaeological residue analysis may be found in looking at the ratios between the fatty acids (MALAINEY *et al.* 1999). As these are different from those in actual foodstuffs, this method requires the preparation of known food followed by the analysis of the residue left behind in ceramics. We have done so for 25 foodstuffs expected to have been present in the area at the time and will report on the results in the near future.

¹³ As does erucic acid (13-docosenoic acid, C 22:1) that has been found in several other EDW vessels.

CATALOGUE

Format: *EDW number*. Context, date. Weight. Average thickness. Munsell color and treatment inside. Munsell color and treatment outside. Technique and direction of decoration. Rim diameter (estimated vessel equivalent). Munsell color of break, fabric. Form and lay-out (prevalent pattern). Remarks. Possible parallels.

Eastern Desert Ware from Sayala (Kunsthistorisches Museum):¹⁴

EDW 275 KHM 76802, Sayala Structure I, outside south wall, late 3rd century AD. Weight 12 g. Average thickness 5.3 mm. Inside 10R 2.5/1, burnt, smoothed. Outside 10R 4/4, burnished, red slip. Decoration impressed with chisel, filled in (direction unknown). Break 10R 5/6, fabric unclassified. Form and lay-out H 1, D 4 (chevrons). Body sherd, too little remains for certain classification. Possible parallel Wadi Qitna P 1126 (STROUHAL 1984, 161, fig. 128).

EDW 276 KHM 76803, Sayala Structure I, outside south wall (L/I/22&24), late 3rd century AD. Weight 19 g. Average thickness 5.1 mm.

¹⁴ Information courtesy of the *Kunsthistorisches Museum, Ägyptisch-Orientalische Sammlung*, Vienna.

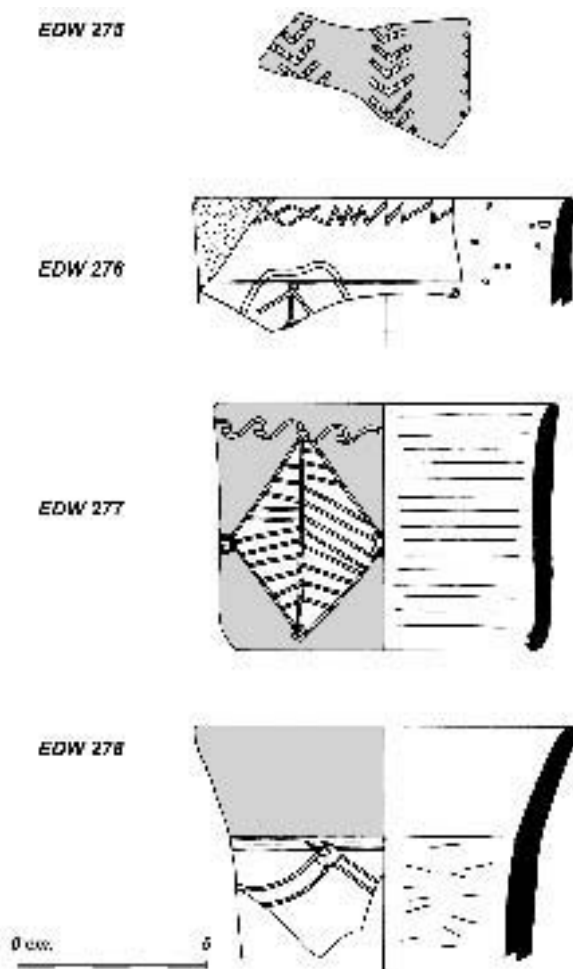


Fig. 4 Eastern Desert Ware 275–278 from Sayala

Inside 2.5YR 5/6, wiped. Outside 5YR 5/6, burnt, smoothed. Decoration incised with chisel (direction unknown). Rim diameter 10 cm. (27% preserved). Break 2.5YR 4/1, fabric unclassified. Form and lay-out H 1, D 3 (lines, zigzag). Two joining sherds, very brittle, atypical decoration some of which is likely done after firing.

EDW 277 KHM 76827, Sayala Structure I, in store room (*Kabause L/I/2*), late 3rd century AD. Weight 115 g. Average thickness 4.4 mm. Inside 5R 4/4, smoothed. Outside 10R 4/6, burnished, red slip. Decoration incised with chisel, colored, filled in (direction unknown). Rim diameter 9 cm. (89% preserved). Break 2.5YR 5/6, fabric unclassified. Form and lay-out H 1c, D 5 (rhomboids, running dog). Almost complete vessel, height 6.5 cm. On 07 Dec. 1977 treated with Mowilith 50 (*Farbwerke Hoechst*), soluble in acetone. See also KROMER 1967, 168 and 170, Tafel 31/1 and 34/3.

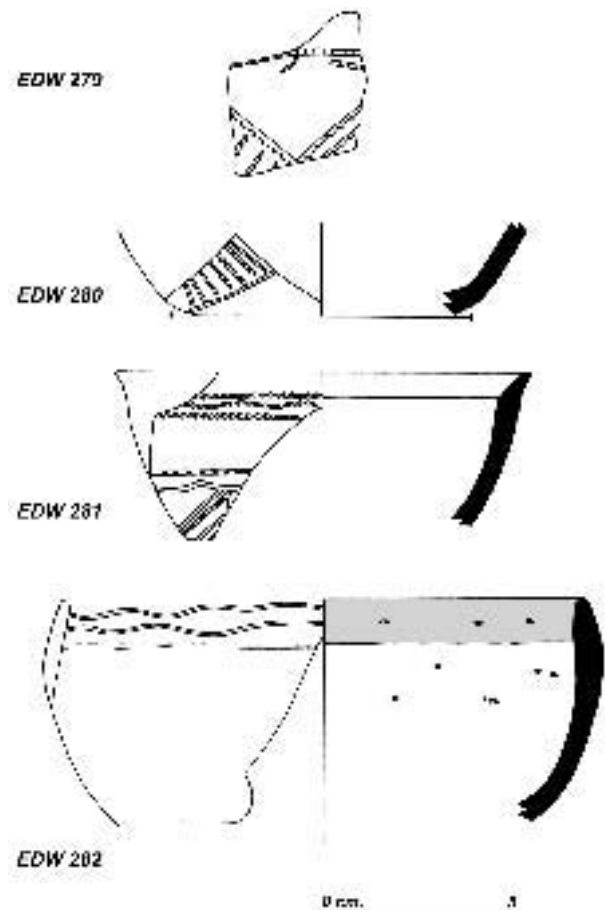


Fig. 5 Eastern Desert Ware 279–282 from Sayala

EDW 278 KHM 76828(a), Sayala Structure I, in store room (*Kabause L/I/3*), late 3rd century AD. Weight 44 g. Average thickness 6.5 mm. Inside 7.5R 5/6, smoothed. Outside 7.5R 4/4, burnished, red slip. Decoration incised with chisel, colored (direction unknown). Rim diameter 10 cm. (45% preserved). Break 10R 6/4, fabric EDW-3. Form and lay-out H 1d, D 3 (lines, round brackets). Carefully squared rim, purposefully chipped after firing to enhance the decoration.

EDW 279 KHM 76828(b), Sayala Structure I, in store room (*Kabause L/I/4*), late 3rd century AD. Weight 9 g. Average thickness 5.3 mm. Inside 2.5YR 4/4, smoothed. Outside 2.5YR 4/3, smoothed. Decoration impressed with triangular tool (direction unknown). Break 2.5YR 5/4, fabric unclassified. Form and lay-out H 0, D 0 (rhomboids). Body sherd, too little remains for certain classification.

EDW 280 KHM 76838, Sayala Structure I, under north bench (*L/I/29*), late 3rd century AD. Weight 7 g. Average thickness 5.6 mm. Inside

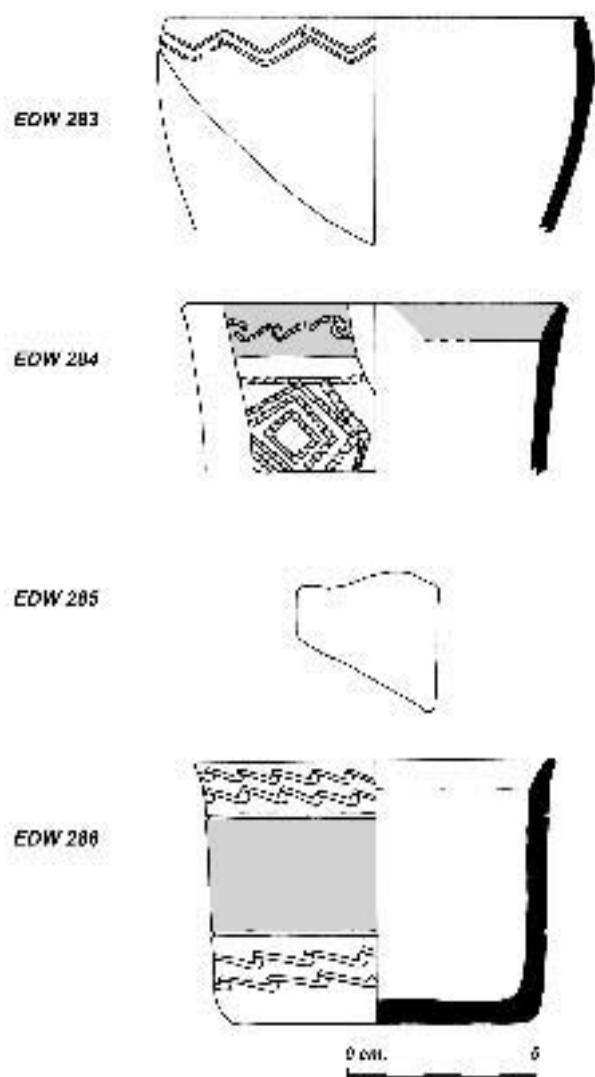


Fig. 6 Eastern Desert Ware 283–286 from Sayala (Plate 1)

10R 4/4, smoothed. Outside 10R 4/1, smoothed. Decoration impressed with triangular tool, filled in (direction unknown). Break 10R 4/6, fabric unclassified. Form and lay-out H 1d, D 0 (rhomboids). Base (diameter 8 cm.) of a conical cup with impressed and filled in rhomboids.

EDW 281 KHM 76844, Sayala Structure I, under east bench (L/I/33), late 3rd century AD. Weight 11 g. Average thickness 5.1 mm. Inside 10R 4/6, wiped. Outside 10R 5/3, wiped. Decoration impressed, incised with triangular tool (direction unknown). Rim diameter 11 cm. (10% preserved). Break 10R 5/6, fabric EDW-1. Form and lay-out H 2b, D 3 (lines, waves).

EDW 282 KHM 76909, Sayala Structure II, behind north bench (L/II/24), late 3rd century AD. Weight 30 g. Average thickness 5.4 mm.

Inside 5YR 4/3, smoothed. Outside 10R 5/6, red slip, wiped. Decoration incised with chisel (direction unknown). Rim diameter 14 cm. (16% preserved). Break 2.5YR 2.5/1, fabric unclassified. Form and lay-out H 2a, D 2 (waves). Carefully squared rim, red slip spills over on inside rim, see also KROMER 1967, 98, Abb. 31/5.

EDW 283 KHM 76917(a), Sayala Structure II, under east bench (L/II/61), late 3rd century AD. Weight 28 g. Average thickness 3.9 mm. Inside 2.5YR 5/4, wiped. Outside 5YR 5/4, smoothed. Decoration incised with chisel (working left to right). Rim diameter 11 cm. (19% preserved). Break 2.5YR 5/3, fabric EDW-1. Form and lay-out H 2a, D 2 (zigzag). Two non-joining rim sherds of the same vessel, carefully squared rim, see also KROMER 1967, 98, Abb. 31/6.

EDW 284 KHM 76917(b), Sayala Structure II, under east bench (L/II/61), late 3rd century AD. Weight 11 g. Average thickness 4.5 mm. Inside 2.5YR 5/4, wiped. Outside 7.5R 4/6, burnished, burnt, red slip. Decoration impressed with triangular tool, colored (direction unknown). Rim diameter 10 cm. (10% preserved). Break 2.5YR 3/1, fabric unclassified. Form and lay-out H 1c, D 3 (rhomboids, running dog). Red slip spills over on inside rim, see also KROMER 1967, 97, Abb. 30/5.

EDW 285 KHM 76917(c), Sayala Structure II, under east bench (L/II/61), late 3rd century AD. Weight 8 g. Average thickness 5.0 mm. Inside 10R 3/2, smoothed. Outside 10R 5/3, burnished. Break 10R 5/6, fabric unclassified. Form H 0. Undecorated, may not be EDW. Body sherd, too little remains for certain classification.

EDW 286 KHM 76918, Sayala Structure II, under east bench (L/II/56), late 3rd century AD. Weight 175 g. Average thickness 4.9 mm. Inside 5YR 4/6, smoothed. Outside 7.5R 4/6, burnished red slip. Decoration incised with triangular tool, colored (direction unknown). Rim diameter 9.5 cm. (100% preserved). Break 2.5YR 5/6, fabric unclassified. Form and lay-out H 1c, D 3 (lines, running dog). Almost complete vessel, height 7.0 cm. See also KROMER 1967, 152 and 173, Tafel 16/2 and 37/5.

EDW 287 KHM 77069, Sayala Structure V, in store room (*Kabause* L/V/10), late 3rd century AD. Weight 18 g. Average thickness 5.7 mm. Inside 2.5YR 5/4, wiped. Outside 2.5YR 5/4, wiped. Decoration incised with chisel (direction unknown). Rim diameter 10 cm. (18% pre-

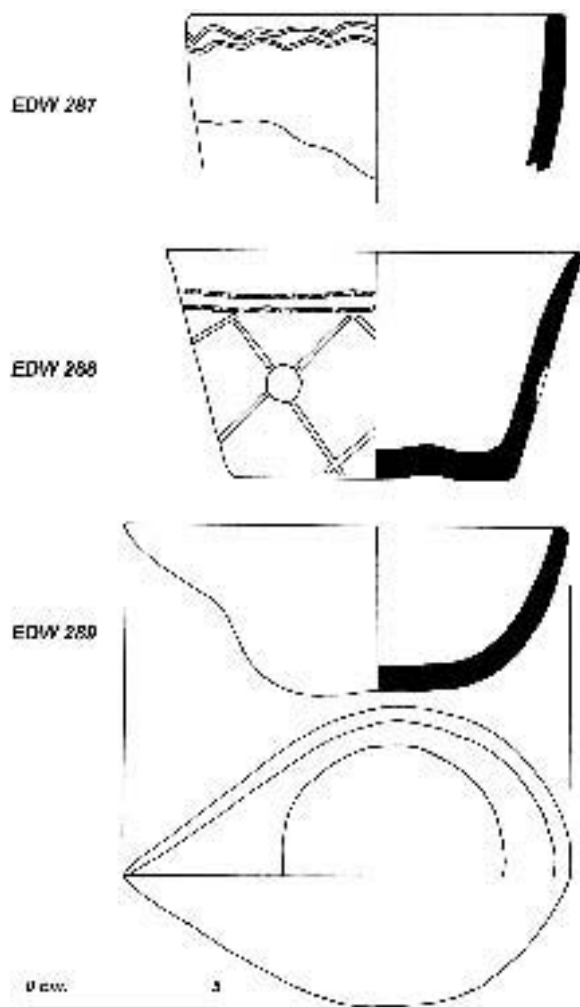


Fig. 7 Eastern Desert Ware 287–289 from Sayala (Plate 1)

served). Break 2.5YR 5/4, fabric unclassified. Form and lay-out H 2b, D 2 (waves). Carefully squared rim, see also Kromer 1967, p. 96–99, Abb. 31/2. Possible parallels Sayala 76251 (BADAWI 1976, 29–30, Abb. 12/2, Tafel 28/2), EDW 105 (Tabot), EDW 249 (Wadi Sikait).

EDW 288 KHM 77196, Sayala Grave 5, 3rd–4th century AD. Weight 220 g. Average thickness 5.8 mm. Inside 2.5YR 3/2, smoothed. Outside 2.5YR 4/3, burnished. Decoration plastic and impressed, incised with chisel and triangular tool (direction unknown). Rim diameter 11 cm.

(100% preserved). Color of break and fabric unknown. Form and lay-out H 2c, D 7 (sun-motif, X-motif). Carefully squared rim. Whole vessel, height 6.0 cm. Possible parallel Wadi Qitna P 974 (STROUHAL 1984, 160, fig. 127).

EDW 289 KHM 77217, Sayala Grave 26, 3rd–4th century AD. Weight 114 g. Average thickness 5.5 mm. Inside 10R 5/6, wiped. Outside 10 R5/8, wiped. Rim diameter 7.9 × 11.7 cm. (100% preserved). Break 10R 5/6, fabric EDW-1. Form H 6c. Undecorated feeding bowl (7.9 × 11.7 × 4.5 cm.). Possible parallel Wadi Qitna P 870 (STROUHAL 1984, 172, fig. 131).

EDW 290 KHM 77221, Sayala Grave 29/ burial 3, 3rd–4th century AD. Weight 170 g. Average thickness 4.6 mm. Inside 10R 4/6, wiped. Outside 7.5R 4/6, burnished, red slip. Decoration impressed, incised with chisel, filled in (direction unknown). Rim diameter 9.5 cm. (100% preserved). Color of break and fabric unknown. Form and lay-out H 1a, D 5 (triangles, X-motif, zigzag). Red slip spills over on inside rim, decoration remarkably irregular. Whole vessel, height 7.5 cm.

Eastern Desert Ware for residue analysis (GC/MS):¹⁵

EDW 8 (not illustrated) 5th century AD trash dump (BE98-21). Weight 25 g. Average thickness 4.6 mm. Inside 5YR 4/2, burnished, compacted. Outside 2.5YR 3/2, burnt. Decoration impressed with triangular tool (working left to right). Rim diameter 14 cm. (16% preserved). Break 5YR 4/1, fabric EDW-1. Form and lay-out H 2a, D 3 (round brackets). Possible parallel EDW 1 (Berenike).

EDW 49 (not illustrated) 5th century AD trash dump (BE98-21). Weight 25 g. Average thickness 5.7 mm. Inside 7.5YR 3/1, compacted. Outside 2.5YR 4/2, smoothed, Decoration incised, punctuated with triangular tool, colored, filled in (working left to right). Rim diameter 10 cm. (15% preserved). Break 2.5YR 4/3, fabric EDW-1. Form and lay-out H 3, D 7 (lines, rhomboids). Possible parallel EDW 34 (Kab Marfuca).

¹⁵ Information courtesy of the Pasarow Mass Spectrometry Laboratory; Departments of Psychiatry and Biobehavioural Sciences, Chemistry and Biochemistry, and the Neuropsychiatric Institute; University of California,

Los Angeles (USA). Measurements were done on the Waters/Micromass GCT GC/EL-CI ToF mass spectrometer, acquired through NSF grant CHE 0078299.

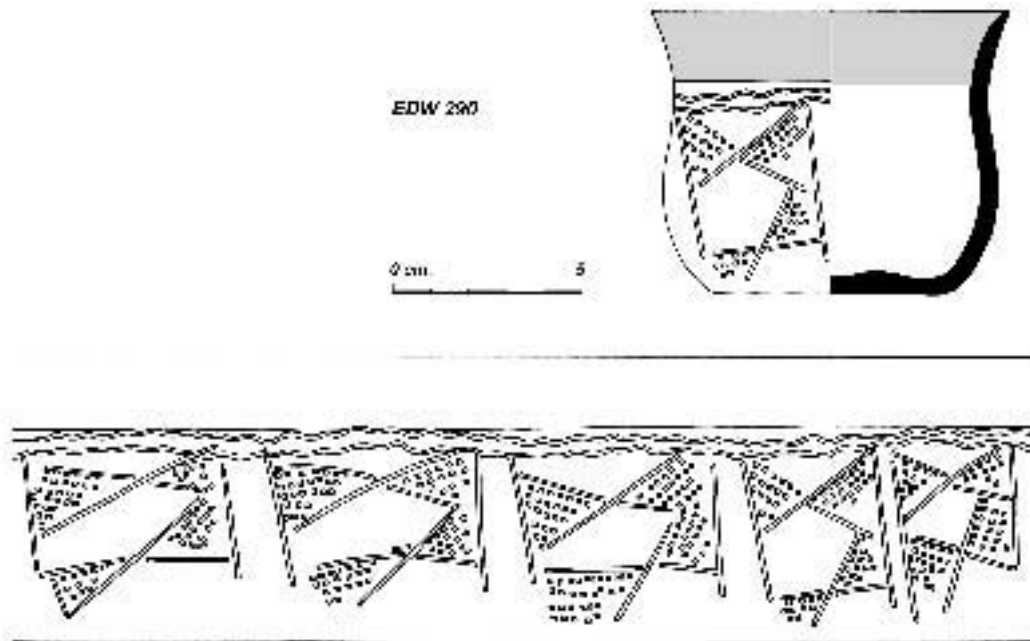


Fig. 8 Eastern Desert Ware 290 from Sayala, the complete decoration is shown below the standard representation of the vessel (Plate 1)

Eastern Desert Ware from Kurgus (British Museum, London):¹⁶

EDW 226 Kurgus KRG 2/29 KG 60. Weight 44 g. Average thickness 7.8 mm. Inside 10R 5/6, smoothed. Outside 10R 5/6, smoothed. Decoration impressed, incised with triangular tool (direction unknown). Rim diameter 17 cm. (10% preserved). Break 5YR 2.5/1, fabric unclassified. Form and lay-out H 2b, D 7 (triangles, waves). See also BARNARD and STROUHAL 2004, 46–47, fig. 8.

EDW 227 Kurgus KRG 2/29 K 65. Weight 18 g. Average thickness 8.0 mm. Inside 2.5YR 3/2, smoothed. Outside 2.5YR 4/4, burnished, red slip. Decoration incised with chisel (direction unknown). Rim diameter 17 cm. (6% preserved). Break 5YR 2.5/1, fabric unclassified. Form and lay-out H 3, D 3 (waves). Red slip spills over on inside rim. See also BARNARD and STROUHAL 2004, 46–47, fig. 8. Possible parallel EDW 238 (Wadi Sikait).

Eastern Desert Ware found at Wadi Gamal South (Gelli):¹⁷

EDW 251 Surface find from area 3 (SCA number 1026) at Wadi Gamal South (Gelli), 24°N 31'12"/34°E 44'27", 4th–6th century AD. Weight 48 g. Average thickness 5.4 mm. Inside 2.5YR 3/1, burnt, wiped. Outside 2.5YR 4/3, smoothed. Decoration plastic, incised with chisel (direction unknown). Break 5YR 3/1, fabric unclassified. Form and lay-out H 2, D 2 (waves, X-motif). Unusual large body sherd, classification remains uncertain.

EDW 252 Surface find from area 4 (SCA number 1027) at Wadi Gamal South (Gelli), 24°N 31'12"/34°E 44'27", 4th–6th century AD. Weight 30 g. Average thickness 5.0 mm. Inside 5YR 4/1, burnt, wiped. Outside 10R 5/6, burnished, red slip. Decoration incised with triangular tool, colored (direction unknown). Rim diameter 11 cm. (10% preserved). Break 2.5YR

¹⁶ Information courtesy of the Egypt and Sudan Department of the British Museum and the Society for Archaeological Research in Sudan, London.

¹⁷ Information courtesy of H.T. Wright (Department of Anthropology, University of Michigan, Ann Arbor),

S.C. Herbert (Kelsey Museum of Archaeology, University of Michigan, Ann Arbor) and J.E. Gates (Darwin College, University of Cambridge). A full analysis of the Michigan and Delaware Eastern Desert survey collections is forthcoming.

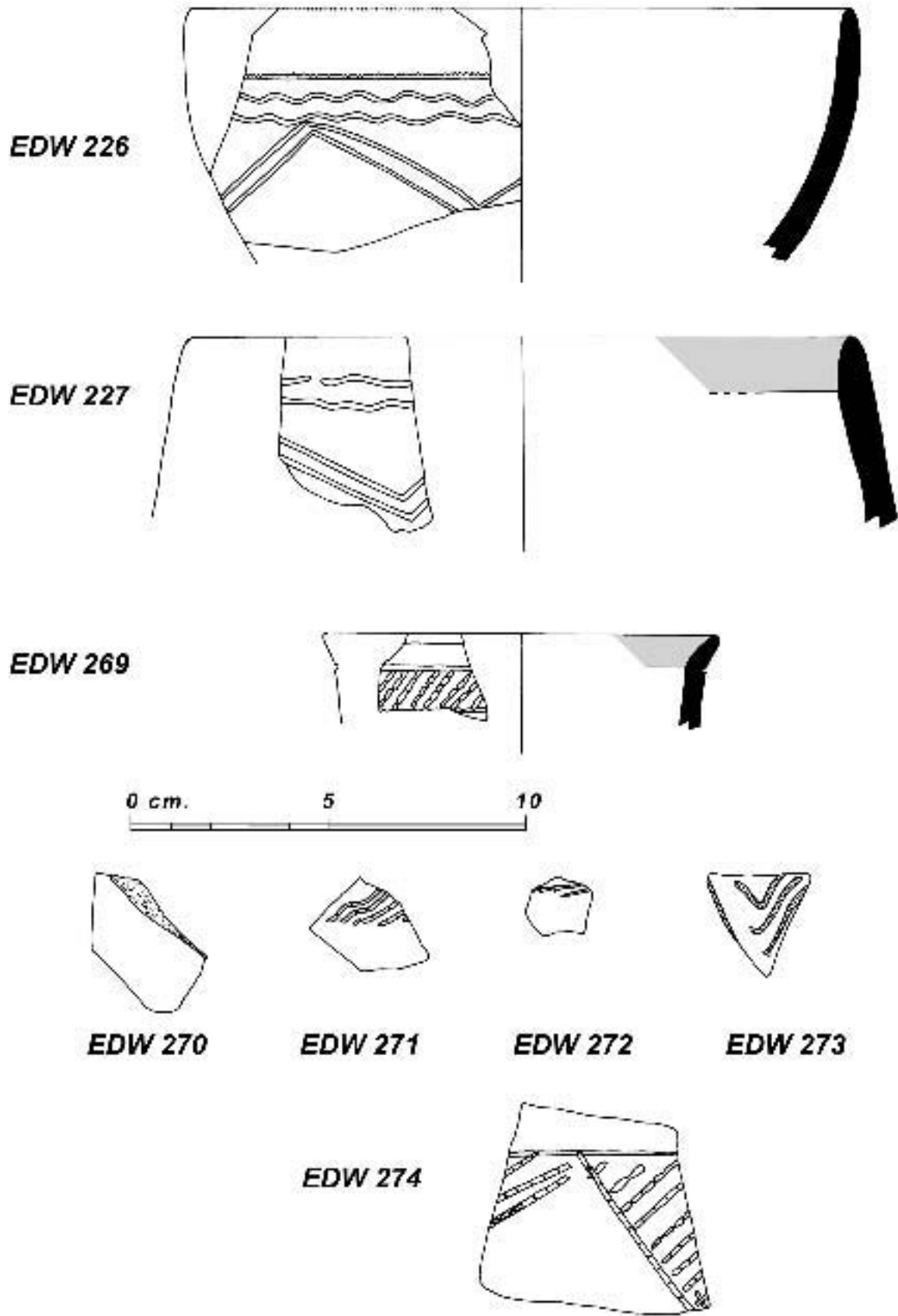


Fig. 9 Eastern Desert Ware 226–227 and 269–274 from Kurgus and Qasr Ibrim (in the Nile Valley)

6/6, fabric unclassified. Form and lay-out H 2d, D 3 (lines, running dog).

EDW 253 Surface find from area 4 (SCA number 1027) at Wadi Gamal South (Gelli), 24°N 31'12"/34°E 44'27", 4th–6th century AD. Weight 14 g. Average thickness 4.6 mm. Inside 2.5YR 6/4, wiped. Outside 10R 5/4, burnished, red slip. Decoration incised with chisel, colored (direction unknown). Rim diameter 9 cm. (6% preserved). Break 5YR 4/1, fabric unclassified. Form and lay-out H 1c, D 3 (lines, rhomboids, X-motif). Possibly parallel Gabati T1/42c (EDWARDS 1998, 191, fig. 6.30).

EDW 255 Surface find from area 4 (SCA number 1027) at Wadi Gamal South (Gelli), 24°N 31'12"/34°E 44'27", 4th–6th century AD. Weight 21 g. Average thickness 5.3 mm. Inside 10R 5/6, wiped. Outside 2.5YR 6/4, smoothed. Rim diameter 13 cm. (13% preserved). Break 10R 5/8, fabric EDW-1. Form H 2b. Undecorated, may not be EDW.

EDW 256 Surface find from area 4 (SCA number 1027) at Wadi Gamal South (Gelli), 24°N 31'12"/34°E 44'27", 4th–6th century AD. Weight 26 g. Average thickness 7.4 mm. Inside 10R 4/6, wiped. Outside 10R 4/6, burnished. Decoration incised with chisel (direction unknown). Rim diameter 15 cm. (10% preserved). Break 10R 5/3, fabric EDW-1. Form and lay-out H 2a, D 7 (rhomboids). Carefully squared rim.

Eastern Desert Ware found at Qasr Ibrim (Lower Nubia):¹⁸

EDW 269 Qasr Ibrim 2004, early post-Meroitic pit (25.021), early 5th century AD. Weight 4 g. Average thickness 5.3 mm. Inside 10R 5/6, burnished. Outside 7.5R 4/6, burnished, red slip. Decoration impressed, incised with chisel (direction unknown). Rim diameter 10 cm. (4% preserved). Break 2.5YR 5/6, fabric EDW-4. Form and lay-out H 1, D 3 (lines). Red slip spills over on inside rim.

EDW 270 Qasr Ibrim 2004, late Meroitic/early post-Meroitic rubbish dump (25.038), late 4th century AD. Weight 5 g. Average thickness 5.8 mm. Inside 2.5YR 5/4, wiped. Outside 10R 4/6, burnished, red slip. Break 2.5YR 3/1, fabric unclassified. Form H 0. Undecorated, may not be EDW. Body sherd, too little remains for certain classification.

EDW 271 Qasr Ibrim 2004, mixed context (25.077, 25.080), 4th–5th century AD. Weight 3 g. Average thickness 4.2 mm. Inside 5YR 3/2, burnished. Outside 2.5YR 3/2, burnished. Decoration impressed, incised with chisel (direction unknown). Break 5YR 2.5/1, silt. Form and lay-out H 0, D 0 (waves). Body sherd, too little remains for certain classification.

EDW 272 Qasr Ibrim 2004, classic X-group layer (25.101), early 6th century AD. Weight 2 g. Average thickness 3.9 mm. Inside 10R 4/1, smoothed, Outside 10R 4/6, burnished, red slip. Decoration impressed with triangular tool, filled in (direction unknown). Break 10R 3/1, fabric unclassified. Form and lay-out H 0, D 0 (lines). Body sherd, too little remains for certain classification.

EDW 273 Qasr Ibrim 2004, early post-Meroitic top soil (25.102), early 5th century AD. Weight 4 g. Average thickness 4.9 mm. Inside 2.5YR 4/4, wiped. Outside 10R 4/4, burnished, red slip. Decoration impressed with triangular tool (direction unknown). Break 5YR 2.5/1, fabric unclassified. Form and lay-out H 0, D 0 (waves). Body sherd, too little remains for certain classification.

EDW 274 Qasr Ibrim 2004, late Meroitic/early post-Meroitic pit (25.117), late 4th century AD. Weight 31 g. Average thickness 7.4 mm. Inside 2.5YR 4/6, wiped. Outside 2.5YR 4/6, burnished. Decoration impressed, incised with triangular tool (direction unknown). Break 2.5YR 4/6, fabric EDW-1. Form and lay-out H 2, D 7 (lines, triangles). Body sherd, too little remains for certain classification.

¹⁸ Information courtesy of the Egypt Exploration Society (London) and P.J. Rose (McDonald Institute for Archaeological Research, Cambridge).

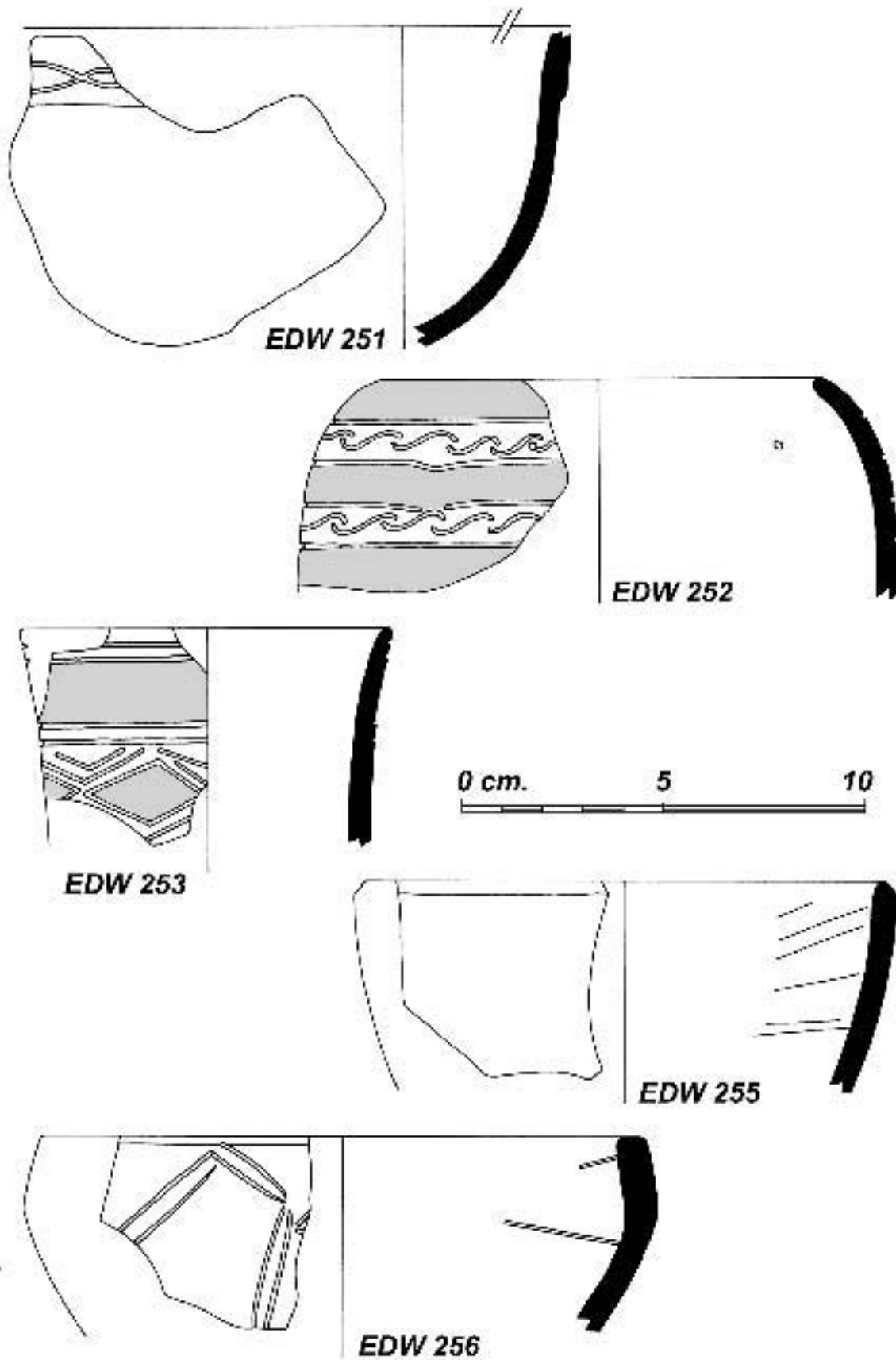


Fig. 10 Eastern Desert Ware 251–253 and 255–256 from Wadi Gamal South (Gelli) in the Egyptian Eastern Desert (in the Mons Smaragdus area)

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