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The *m(w)ṣh* Stamp Impressions and the Neo-Babylonian Period*

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THIS article re-examines a class of stamp impressions which has received relatively little attention since the publication of the first exemplar.[1] This is the מוצה (hereafter

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1 E. Sellin and K. Watzinger: *Jericho* (*Wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft* 22), Leipzig, 1913, p. 158, Pl. 42:K. See Figs. 3–7 below for examples of the principle types.

m[*w*]*ṣh*) group, written in one line of three characters as מצה (hereafter *mṣh*), or in two lines of two characters each as מו/צה (*mw/ṣh*). Discussion of this stamp type has been overshadowed by that of the earlier *lmlk* and the later *yh(wd)* groups. It is our opinion that the type under discussion probably belongs to the Neo-Babylonian period.[2]

INTRODUCTION

Table 1 lists all known examples of this type of impression. The first example of the three-character type was excavated by Sellin and Watzinger at Jericho.[3] The largest collection of impressions was uncovered by W.F. Badè at Tell en-Naṣbeh; it includes 28 of the one-line, and two of the two-line, variety.[4] Influenced by the probable identification of Tell en-Naṣbeh with biblical Mizpah, Badè was inclined to read the final character as *pe*, rather than *he*, making the one-line inscription מצף, *mṣp*, i.e. ancient מִצְפָּה. Few scholars accepted this reading; in most cases the final character was clearly a *he*, and it was certain that all the one-line impressions bore the same inscription.[5]

The two *mw/ṣh* impressions were misread at first. Avigad identified this two-line class as belonging to the *m(w)ṣh* type in 1958.[6] He recognized that the first character, *mem*, was written in reverse and that what had been taken as a *gimel* was really a *waw*. Instead of reading the impression clockwise *yod* (or *aleph*), *ṣade, he* (or *nun*), *gimel*, as suggested by McCown, he read it in two horizontal lines as *mw/ṣh*, providing what he believed was a plene spelling of the name of the town Mozah.[7] These impressions are generally circular, and appear on the vessels' walls.

One of the three-character variety was then uncovered at Jericho,[8] and four in the excavations at el-Jib (Gibeon).[9] These, unlike the two-line variety, are oval

2 First suggested by C.C. McCown: *Tell en-Nasbeh*, I, *Archaeological and Historical Results*, Berkeley — New Haven, 1947, pp. 6, 202; see also E. Stern: *Material Culture of the Land of the Bible in the Persian Period 538–332 B.C.*, Warminster, 1982, pp. 207–209.

3 Sellin and Watzinger (above, n. 1), p. 158, Pl. 42:K.

4 McCown (above, n. 2), pp. 165–167; Pls. 56:15–28, 57:15–16.

5 Also discarded were attempts to read the second character as *aleph*, i.e. *m'h*, and Albright's suggestion to Badè that the inscription be read *maṣṣah*, the jars thus stamped being used to hold wine for the feast of unleavened bread, see McCown (above, n. 2), pp. 165–167.

6 N. Avigad: New Light on the MṢH Seal Impressions, *IEJ* 8 (1958), pp. 113–119.

7 *Ibid.*, pp. 114–116.

8 J.R. Bartlett: Appendix A: Iron Age and Hellenistic Stamped Jar Handles from Tell es-Sultan, in Kathleen M. Kenyon and T.A. Holland: *Jericho* IV, Oxford, 1982, pp. 537–545, esp. p. 542, Fig. 220.5 and Pl. III.b.

9 J.B. Pritchard: *Hebrew Inscriptions and Stamps from Gibeon*, Philadelphia, 1959, p. 27, Figs. 10:1, 11:1; *idem, Winery, Defenses and Soundings at Gibeon*, Philadelphia, 1964, pp. 4, 20, Figs. 50:4, 50:7, 51:6.

and are impressed on the vessels' handles. Another variation was found at Ramat Raḥel:[10] a three-character *mṣh* inscription on a circular field with all characters — not only the initial *mem* — inverted. Like the circular impressions from Tell en-Naṣbeh, it was made on the side of the jar. Four of the three-character variety were uncovered in the City of David excavations;[11] another example was found at Belmont Castle (Ṣuba) in 1987 in the debris packing the walls of a Crusader castle.[12] Finally, there is an example of unknown provenance at the Bible Lands Museum, Jerusalem. A total of 43 examples of this group of stamps has thus been recovered, forming a small corpus from a geographically circumscribed area.

Cross reported the discovery of yet another 'new type' of three-character *m(w)ṣh* impression in 1969, but did not provide details, photograph, or line drawing. Unfortunately, it has not been possible to locate this impression, and the poor quality of the only existing photograph made it impossible for us to establish its reading.[13]

Lidzbarski was the first to suggest identifying the *m(w)ṣh* impressions with the Mozah of Joshua 18:26.[14] In 1948 Ginsberg suggested that *mṣh* was an abbreviation for *mṣ(p)h*, based on a similar analogy to the one he used to explain the *lmlk mmšt* impressions as abbreviations for *lmlk mmš(l)t*, which he believed to be a designation for Jerusalem.[15] Established on an analogy to a dubious graphic abbreviation, this interpretation received little support.[16] Avigad suggested three possible roles for the stamps: 1) that *m(w)ṣh* was a tax collection centre; 2) that these impressions marked commodities such as wine, oil, or grain produced at *m(w)ṣh*; and 3) that *m(w)ṣh* was a crown estate, producing income for the Persian Satrap, requiring its own stamp. Avigad preferred the third possibility.[17] Cross felt that the stamps marked wine produced at the village of Mozah, and Stern claimed the impressions were trademarks for wine produced by the governor's estates at Mozah.[18]

10 Y. Aharoni: *Excavations at Ramat Rahel: Seasons 1961 and 1962* (*Serie Archeologica* 6), Rome, 1964, pp. 18, 23, Pl. 20:8.

11 Personal communication: D. Ariel.

12 A. Millard: Note on Two Seal Impressions on Pottery, *Levant* 21 (1989), pp. 60–61.

13 F.M. Cross: Judean Stamps, *EI* 9 (1969), pp. 22–23, n. 28. It was found at Nebi Samwil by Klaus Baltzer, who gave it to the German Protestant Institute of Archaeology in Jerusalem. We thank Prof. Cross for providing us with a copy of a photograph of the impression. It was, however, absolutely clear that this impression was not one of the previously attested forms. Moreover, the handle upon which it was stamped was very thick and unridged, totally unlike the ridged handles on which the definite *m(w)ṣh* impressions appear. We do not, therefore, include it in the present study.

14 M. Lidzbarski: *Ephemeris für Semitische Epigraphik*, 3, Giessen, 1915, p. 45.

15 H.L. Ginsberg: MMŠT and MṢH, *BASOR* 109 (1948), pp. 20–22.

16 Avigad (above, n. 6), p. 118, n. 28.

17 Avigad (above, n. 6), p. 119.

18 Cross (above, n. 13), pp. 22–23; Stern (above, n. 2), p. 209.

Table 1. List of *m(w)ṣh* stamp impressions.

Master Schema No.	Architectural find-spot	Square	Reg. No.	Fragment	Colour	Museum No.		Location	Photograph	Dimensions	Type	Publication	
Tell es-Sultan (Jericho):													
1	NE Area			H	Lt. Brown	—	?	—	—	20 × 15	A1	Pl.	42:K
2	Trench 1	lxxiiic		H	—	124	Am	—	—	16 × 14	A2	Pl.	III:b
Tell en-Naṣbeh (Mizpah):													
3	Tb 168	Y22	×3	H	10YR8/2	582	BI	Case 3	—	17 × 13	A2	I	56:23
4	Square	AG26	×3	H	5YR7/6	797	RM	31.331	591	21 × 16	A1	I	56:26
5	Square	AH26	×1	H	10YR7/3	798	RM	31.332	585b	18 × 13	A2	I	56:25
6	Dump of	AB25	×4	H	5YR7/6	1448	RM	32.2505	1059	16+ × 14	A2	I	56:18
7	Dump of	Z25	×9	H	10YR7/3	1463	BI	3–LU–3G	1050	17+ × 15+	A2	I	56:17
8	Square	Z25	×10	H	10YR8/2	1471	BI	Exhib C	1059	20 × 15	A2	I	56:15
9	Square	Z24	×23	H	10YR7/3	1503	BI	3–LU–3G	1059	17 × 13	A2	—	
10	Square	T14	×16	H	7.5YR7/4	1522	RM	32.2510	1059	20 × 16	A2	—	
11	Dump of	T23	×7	H	7.5YR8/4	1699	BI	3–LU–3G	1059	20 × 17	A2	—	
12	Square	V23	×27	W	7.5YR7/6	1795	BI	3–LU–3J	1083	17 × 17	B	I	57:16
13	Square	AF18	×34	H	7.5YR8/4	2431	BI	3–LU–3G	1449	17 × 13	A2	—	
14	Square	AF20	×39	H	5YR7/4	2448	BI	3–LU–3G	1507	21 × 15	A2	—	
15	Square	AG19	×51	H	7.5YR7/4	2439	RM	35.3087	1449	17 × 13	A2	—	
16	Dump of	AF20	×7	H	7.5YR7/4	2449	RM	35.3089	1531	16 × 9+	A2	—	
17	Rm 447	AG20	×24	H	5YR7/6	2455	RM	35.3093	1449	20 × 16	A2	—	
18	Square	AE20	×45	H	10YR8/3	2466	BI	3–LU–3G	1507	17 × 12	A2	I	56:21
19	Rm 470	Y19	×15	H	7.5YR8/4	2490	RM	35.3098	1449	17+ × 13	A2	—	
20	Dump of	AE17	×11	H	10YR8/3	2521	BI	3–LU–3G	1501	18 × 12	A2	—	
21	Rm 501	SW	×15	H	10YR8/3	2530	BI	3–LU–3G	1449	20 × 16	A2	—	
22	Rm 435	AE18	×26	H	10YR8/3	2534	BI	3–LU–3G	1481	17 × 13	A2	—	
23	Rm 538	AC15	×20	H	10YR8/3	2584	BI	3–LU–3G	1510	15 × 13	A2	—	

24	Rm 462	AE20	×6	H	5YR7/6	2713	BI	3–LU	1508	21 × 15	A1	I 56:28
25	Square	AD19	×43	H	7.5YR8/4	2716	BI	Case 3	1504	21 × 12	A2	I 56:20
26	Rm 522	AE19	×39	H	—	2720	BI	Lost	1510	? × ?	A2	I 56:16
27	Ci 361	AC16	×18	H	10YR8/3	2816	BI	Exhib B	1515	17 × 13	A2	I 56:19
28	Ci 361	AC16	×83	W	—	2830	RM	35.3217	1515	? × ?	B	I 57:15
29	Dump of	AE19	×4	H	10YR7/3	2871	RM	35.3225	1501	16 × 14	A2	I 56:22
30	Dump of	AD19	×4	H	5YR7/6	2874	BI	3–LU–3G	1513	24 × 18	A1	I 56:27
31	Rm 569	AD19	×11	H	10YR8/3	2876	BI	Display	1526	17 × 13	A2	I 56:24
32	Square	AF18	×33	H	7.5YR7/4	—	BI	3–LU–3G	—	20 × 16	A2	—
el-Jib (Gibeon):												
33	Pool	Area A		H	Buff	96	?	—	—	21 × 16	A2	Fig. 11:1
34	Clr 136	17–N–9		H	Buff	S511	UM	—	—	22 × 16	A2	Fig. 50:4
35	Clr 136	17–N–9		H	Buff	S512	UM	—	—	22 × 16	A2	Fig. 50:7
36		17–H–19		H	Buff	S495	?	—	—	? × ?	A2	Fig. 51:6
Ramat Raḥel (Beth ha-Kerem?):												
37	Pit 484	R26		W	7.5YR8/4	—	IAA	64–1809	—	17 × 17	C	Pl. 20:8
Jerusalem (City of David):												
38	D1	L. 361	6640	H	7.5YR8/4	—	TS	—	—	22 × 16	A2	—
39	E1	L. 2115	17188	H	7.5YR7/4	—	TS	—	—	17 × 13	A2	—
40	E1	L. 2130	19520	H	7.5YR7/4	—	TS	—	—	18 × 13	A2	—
41	E1	L. 1413	7267	H	5YR7/4	—	TS	—	—	20 × 13+	A2	—
Belmont Castle:												
42	Trench 113 L.12				7.5YR7/4	—	BS	—	—	22 × 18	A2	Fig. 13
Unknown:												
43	?	?	?	H	7.5YR7/4	834	BL	—	—	19 × 12+	A2	—

Abbreviations used:

- Architectural find-spot: Ci = Cistern; Clr = Cellar; Rm = Room; Tb = Tomb.
- Fragment type: H = Handle; W = Wall.
- Present location of the object: BI = Badè Institute; RM = Palestine Archaeological (Rockefeller) Museum: BS = British School of Archaeology in Jerusalem; UM = The University Museum in Philadelphia; Am = Amman; BL = Bible Lands Museum, Jerusalem; TS = Terra Sancta; IAA = Israel Antiquities Authority.
- Dimensions are given in mm. (length by width).
- Colour: based on Munsell colour charts.

ARCHAEOLOGICAL CONTEXT

Inter-Site Distribution

The *m(w)ṣh* impressions come from an area 16 km. long and 27 km. wide, bounded by Tell en-Naṣbeh in the north, Ramat Raḥel in the south, Jericho in the east and Belmont Castle in the west (Fig. 1). This is, therefore, a southern phenomenon, virtually restricted to the area generally ascribed to the tribe of Benjamin. It is significant that 70% of the impressions of known provenance come from Tell en-Naṣbeh. If it is accepted that *m(w)ṣh* equals 'Mozah', then one town (Mozah) was supplying another (Tell en-Naṣbeh) with more of a particular product than any other town in a geographically circumscribed area was receiving. Tell en-Naṣbeh had a central function in the distribution of a particular commodity in a small area.

Intra-Site Distribution

Plotting the find spots of the *m(w)ṣh* impressions on a map of Tell en-Naṣbeh reveals that they tend to cluster, rather than being evenly distributed. Although a discussion

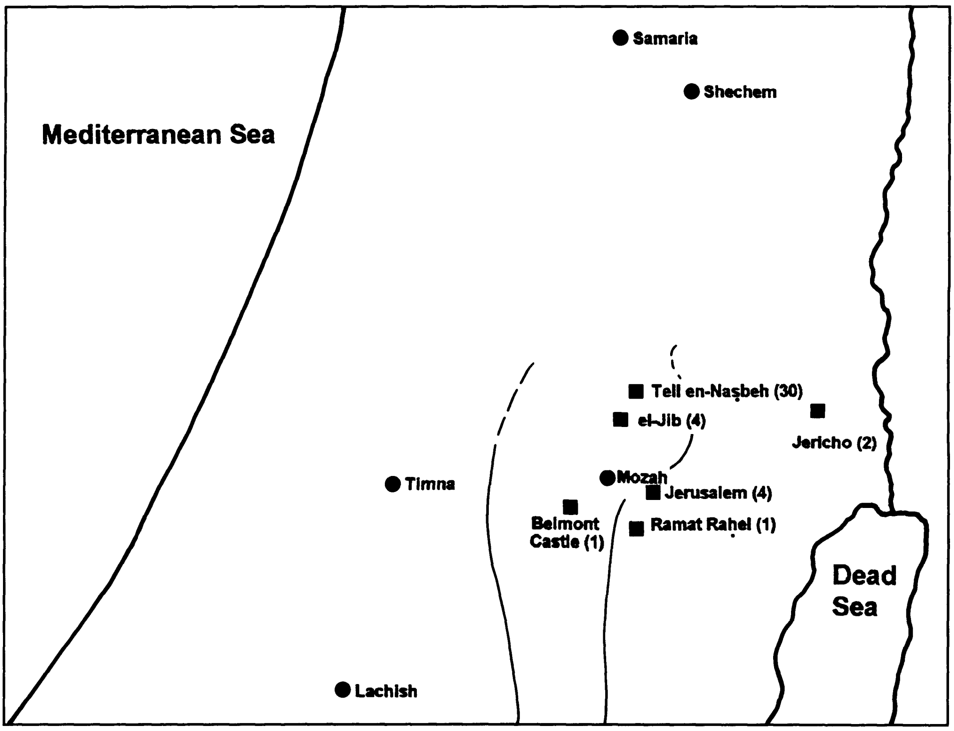

Fig. 1. Distribution map of *m(w)ṣh* impressions and reference sites. Curving line indicates approximate boundaries of Moza clay formation.

- ■ Site yielding *m(w)ṣh* impressions; number of impressions in parentheses
- ● Site yielding NAA comparative data

of Tell en-Naṣbeh's stratigraphy is beyond the scope of this article, a few salient points can be made: 1) Tell en-Naṣbeh is generally identified with biblical Mizpah of Benjamin; and 2) 2 Kings 25:23–25 and Jeremiah 40–41 relate how Mizpah served as the capital of the Neo-Babylonian Judaean province. If these accounts are accurate, some remains from the early sixth century B.C.E. should be found at Tell en-Naṣbeh.

Two impressions were found in Cistern 361, which, as recognized by Wampler and later affirmed by Stern, contained a Greek black-figure oinochoe, dated by Stern to *c.* 530 B.C.E., i.e. right at the beginning of the true 'Persian' period.[19] This cistern probably went out of use at around that time.

Two impressions were found in debris of Squares T23 and V23, three in Squares Z24–25, and a sixth from 'Tomb' 168.[20] This area contains remains of a massive wall which once connected the huge northern city gate with what the excavators termed the 'early' gate in Squares AA24–25 and AB24–25.[21] The structures on the published site map are built over the remains of a great inner–outer gate complex. The most likely time for such monumental defences to go out of use and be replaced by a spacious four-room house complex and many other structures would be the Babylonian period, when many new edifices would have been required to house the provincial bureaucracy.

The major cluster of these impressions, 15 of the 30 discovered, comes from the south-western corner of the site, within a radius of *c.* 15 m. This is not a random distribution. Most are from fills collapsed into rooms and shifted around in a restricted area by levelling, building and perhaps farming activities. An examination of the map reveals remains of two long magazine-like chambers connected diagonally in this area, one in Squares AD–AE19 and the other in AE19–20. The walls of both rooms are built over the walls of the earlier Iron Age town. There are no traces of partition walls in these rooms, and one cannot ascertain whether these are more than foundations. The jars stamped with the *m(w)ṣh* impressions may have come from these chambers, and even if not, probably came from a storage facility in the vicinity. The seven remaining impressions are not grouped in clear clusters. The find-spots of Greek pottery, and to a lesser extent of the *yh(wd)* impressions, correspond fairly well to those of the *m(w)ṣh* impressions and the buildings erected in the post-ring road phase at Tell en-Naṣbeh.[22] This may indicate that structures erected in the Babylonian period continued in use into the Persian period.

19 J.C. Wampler: *Tell en-Nasbeh*, II, *The Pottery*, Berkeley — New Haven, 1947, p. 137; Stern (above n. 2), p. 209.

20 'Tomb' 168 was thus labelled early in the excavation and was not renamed, although it contains none of the usual tomb architecture or deposits. Perhaps it was a dwelling or storage area and contains material redeposited from outside?

21 McCown (above, n. 2), Fig. 57, Square W23.

22 McCown (above, n. 2), pp. 202, 205.

Little is known about the Jericho impression found by Sellin and Watzinger. Apparently it was found outside the mound on the sloping retaining wall/glacis. It was probably dumped over the edge of the mound from some structure on the north-eastern part of the tell.[23] Kenyon's impression came from Phase lxxiiic of Stage XLVIII of Trench I, which she described as 'a thick silt level above the collapse of the final Iron Age building' and as 'a thick horizontally laminated silt level'.[24] Apparently this was debris that washed over the remains of the Iron Age structures near the foot of the mound. This deposit was said to contain 'very many fragments of Iron Age pottery, showing that this was the material lying on the surface of the mound during this period'.[25] Later a Roman pit was cut into this debris.

The find from Ramat Raḥel is apparently from a pit cut by a wall, whose foundation trench contained transitional Persian–Hellenistic pottery.[26] The pit contained pottery ranging from the late Iron Age, i.e. the sixth century B.C.E. (not illustrated in the report!), to the transitional phase between the Persian and Hellenistic periods. Stamp impressions from the Persian period were also recovered from the pit. The data in hand — one impression in a fourth-century B.C.E. pit — are insufficient to determine the vessel's original context.

The finds from el-Jib are insufficient to determine much about their distribution. One was found in the 'Pool', along with materials ranging from the Iron Age to the Persian period.[27] Two were found in 'Cellar' 136 (Square 17–N–9). The pottery from this locus is 'predominately Iron II', although it is not stated whether the other material from Cellar 136 is earlier or later than Iron Age II.[28] A fourth impression was found in the top 40 cm. of unstratified debris in Square 17–H–19, possibly placing it in association with some substantial 'late' walls.[29]

Little is known about the pre-Crusader remains from Belmont Castle. No Iron Age architecture has been recovered; the impression came from mixed debris (as late as the Roman period) packed inside the walls of the Crusader castle.[30]

The samples from Jerusalem come from the clearest stratigraphic contexts. Two are from Stratum 9, the earliest phase of the Persian period in the City of David, and of these, one is from a Persian fill above an Iron Age floor. The building remains associated with this impression were too fragmentary to reconstruct. The other

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23 Sellin and Watzinger (above, n. 1), p. 158.

24 Bartlett (above, n. 8), p. 541; Kenyon and Holland (above, n. 8), p. 113.

25 Kenyon and Holland (above, n. 8), p. 113.

26 Aharoni (above, n. 10). On p. 18 it is said to have been found in 'a very large accumulated heap of shards more than a meter high', while Pl. 17:2 refers to this mass of pottery as a pit.

27 Pritchard (above n. 9, 1959), p. 27, Figs. 10:1, 11:1.

28 Pritchard (above, n. 9, 1964), p. 4.

29 Pritchard (above, n. 9, 1964), pp. 4, 20, Figs. 50:4, 50:7, 51:6.

30 Personal communication: R.P. Harper.

comes from limestone chips which washed downhill from a quarry. Approximately 90% of the pottery found with the chips was Iron Age; the rest was later. A third impression is probably from a Roman period (Stratum 5) dump, while the fourth is from a non-stratified context.[31]

A few points are clear from the above discussion. The impressions are from deposits from the very end of the Iron Age (Jericho and possibly el-Jib) or the beginning of the Persian period (Jerusalem and several of the Tell en-Naṣbeh pieces). This supports the suggestion that they date from the Babylonian period. The fact that they are also found in later phases of the Persian period shows only that a number of jars stamped with these impressions continued in use for some time before being discarded.

Jar Type

Although not discussed in the 1947 report, Wampler assigned MS 24, which preserves the entire handle and attached vessel wall (Fig. 2), to his vessel type 240,[32] in the same tradition as the *lmlk* jars, but with a broad, rounded bottom, which he dated from 600 B.C.E. into the Hellenistic period.[33] Stern also notes this similarity, as well as

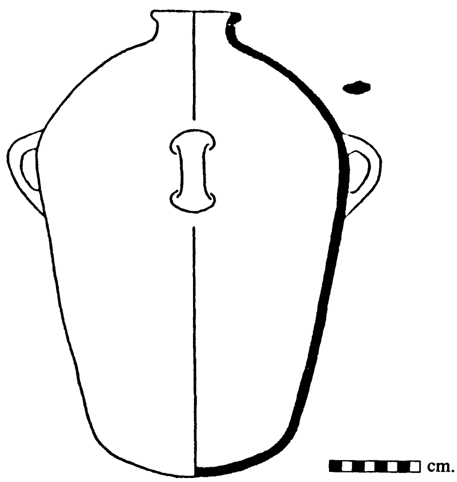


Fig. 2. Wampler's jar type 240 (Table 1, MS 24, from Tell en-Naṣbeh).

31 Personal communication: D. Ariel. This material will be discussed in Volume VI of the City of David publications in *Qedem*.

32 This was discovered only by going through all the Tell en-Naṣbeh records in Berkeley.

33 Wampler (above, n. 19), p. 9, paragraph 40; p. 10, paragraph 49; p. 11, paragraph 55; p. 136, Pl. 14:240.

the fact that the base approaches the sack shape of the Persian and later periods.[34] It would be of great significance were a *m(w)ṣh* impression indeed found on a jar of a type dating from the transition between the Iron Age and Persian period, but since the impression under discussion was found on a fragment of a jar wall (the rim was not preserved), its assignment to a vessel of this type remains only a possibility. The handles on which the impressions are stamped are of the single-ridge variety.

PALAEOGRAPHY

There are three related questions: 1) whether there is a classification scheme that can divide the impressions into coherent sub-groupings; 2) whether the number of stamps used to produce the impressions can be determined; and 3) whether palaeography, or palaeography in conjunction with other criteria, can provide a relative or absolute chronology of the impressions.

Classification

Several attempts have been made to classify the *m(w)ṣh* impressions, of which Naveh's is the best known; he used palaeography and external characteristics to sub-group and date the impressions:[35]

1) *mṣh*, with an archaic *mem*, a peculiar *ṣade* and a *he* with an oblique upper stroke; generally appears on the handle;
2) *mṣh*, with an archaic *ṣade* and a *he* with a horizontal stroke; found only on the handle;
3) *mw/ṣh*, in two lines, the *he* with a horizontal bar and the *ṣade* archaic as in No. 2; stamped on the body.

On the basis of external characteristics, the impressions may be categorized according to four variables:

1) Position of impression: on handle or wall;
2) Shape of field: oval or circular;
3) Number of lines of text: one or two;
4) Total number of characters: three or four.

Although theoretically there could be 16 types, based on this classification, in practice only three types occur (see Table 2, Position, Field, Line and Character Columns):

Type A: handle; oval; one line; three characters (e.g. MS 30, Fig. 3; MS 27, Fig. 4; MS 8, Fig. 5);

34 Stern (above, n. 2), p. 103.

35 J. Naveh: *The Development of the Aramaic Script* (*Israel Academy of Sciences and Humanities Proceedings* 5.1), Jerusalem, 1970, pp. 58–59.

Type B: wall; circular; two lines; four characters (e.g. MS 12, Fig. 6);

Type C: wall; circular; one line; three characters (e.g. MS 37, Fig. 7).

Types B and C, with circular fields and at least one inverted character, appear on the walls, and not the handle, of the vessel. It is unclear whether this is a functional and/or temporal distinction.

In the Type A impressions, each of the three letters appears in two slightly different forms (Figs. 3–5):

mem$_1$. The middle stroke of the *mem* crosses below the main stroke. The final stroke begins at the main one and drops down.

mem$_2$. The middle stroke ends at the main stroke. The final stroke begins at the main one and extends from above the main one to below it.

ṣade$_1$. The middle stroke proceeds off the base stroke, drops down and turns right. The middle leg is thus part of this one stroke.

ṣade$_2$. The middle stroke does not bend, and the middle bar is formed by a short vertical stroke branching up.

he$_1$. The top is roughly parallel with the line of writing, producing two legs of roughly equal size.

he$_2$. The left stroke slants from the top down, left to bottom, producing a middle leg shorter than the right hand-leg.

Although six classes are theoretically possible, only two actually occur (see Table 2, *mem, ṣade, he* and Type Columns):

Type A1: *mem*$_1$, *ṣade*$_1$, *he*$_1$ (e.g. MS 30, Fig. 3);

Type A2: *mem*$_2$, *ṣade*$_2$, *he*$_2$ (e.g. MS 27, Fig. 4; MS 8, Fig. 5).

Number of Stamps

It is important to estimate the number of stamps used to make the impressions, since the use of only a few stamps would indicate a small bureaucracy and/or a limited period of use, while the use of many may mean a complex bureaucratic scenario and/or a lengthy period of use.

Only one impression of Type C is preserved. McCown believed the two Type B impressions were 'probably from the same stamp',[36] but there is no clear evidence to determine this since both impressions are heavily worn. If the Type B impressions are indeed from the same stamp, we have a single exemplar from Types B and C.

36 McCown (above, n. 2), p. 164.

Table 2. *m(w)ṣh* palaeographic analysis.

MS No.	Position	Field	Lines	Characters	Orientation	*mem*	*ṣade*	*he*	Type	MS No.	Position	Field	Lines	Characters	Orientation	*mem*	*ṣade*	*he*	Type
1	H	O	1	3	U	1	1	1	A1	23	H	O	1	3	J	2u	2u	2	A2
2	H	O	1	3	J	2s	2c	2	A2	24	H	O	1	3	J	1	1	1	A1
3	H	O	1	3	H	2s	2c	2	A2	25	H	O	1	3	J	2s	2c	2	A2
4	H	O	1	3	J	1	1	1	A1	26	H	O	1	3	J	2b	2o	2	A2
5	H	O	1	3	S	2s	2c	2	A2	27	H	O	1	3	H	2u	2c	2	A2
6	H	O	1	3	H	2b	2o	2	A2	28	W	C	2	4	—	*mem* Invert			B
7	H	O	1	3	J	2b	2o	2	A2	29	H	O	1	3	J	2u	2u	2	A2
8	H	O	1	3	H	2b	2o	2	A2	30	H	O	1	3	H	1	1	1	A1
9	H	O	1	3	H	2u	2c	2	A2	31	H	O	1	3	J	2s	2c	2	A2
10	H	O	1	3	H	2u	2u	2	A2	32	H	O	1	3	S	2u	2u	2	A2
11	H	O	1	3	H	2s	2c	2	A2	33	H	O	1	3	U	2b	2o	2	A2
12	W	C	2	4	—	*mem* Invert			B	34	H	O	1	3	H	2b	2o	2	A2
13	H	O	1	3	J	2u	2u	2	A2	35	H	O	1	3	H	2s	2o	2	A2
14	H	O	1	3	H	2b	2o	2	A2	36	H	O	1	3	U	2b	2u	2	A2
15	H	O	1	3	H	2u	2o	2	A2	37	W	C	1	3	—	All Invert			C
16	H	O	1	3	J	2b	2o	2	A2	38	H	O	1	3	J	2s	2c	2	A2
17	H	O	1	3	J	2s	2c	2	A2	39	H	O	1	3	J	2u	2u	2	A2
18	H	O	1	3	J	2s	2c	2	A2	40	H	O	1	3	J	2s	2c	2	A2
19	H	O	1	3	J	2s	2c	2	A2	41	H	O	1	3	H	2s	2c	2	A2
20	H	O	1	3	J	2b	2u	2	A2	42	H	O	1	3	J	2s	2c	2	A2
21	H	O	1	3	J	2b	2o	2	A2	43	H	O	1	3	H	2b	2o	2	A2
22	H	O	1	3	H	2s	2c	2	A2										

Totals:

Position	Field:	Lines:	Characters:	Orientation:
H:40	O:40	1:41	3:41	J:20
W:3	C:3	2:2	4:2	H:15
				S:2
				U:3
				-:3

Totals:

mem	+ *ṣade*	+ *he*	*Type*
1	+ *2c*	+ *2*=14	A1=4
2s	+ *2o*	+ 2= 4	
2b	+ *2c*	+ 2= 0	
2b	+ *2o*	+ 2=10	
2u	+ *2u*	+ 2= 6	
2u	+ *2c*	+ 2= 2	
2u	+ *2o*	+ 2= 1	
2b	+ *2u*	+ 2= 2	A2=36
			B = 2
			C = 1
			Total All Types = 43

Position: H=handle, W=wall
Field: O=oval, C=circular
Orientation: J=to jar, H=to handle, S=sideways, U=uncertain
1 = mem_1, or $ṣade_1$, or he_1
2s = straight-mem_2 2c = compact-$ṣade_2$ 2u = uncertain-mem_2 or $ṣade_2$
2b = bent-mem_2 2o = open-$ṣade_2$ 2 = he_2

The dimensions of the Type A impressions vary widely. This, however, cannot be used as an argument to determine whether one or multiple stamps were used, since a certain variation in size might be due to contraction during firing.

The letter forms show that two kinds of Type A stamps were in use: A1 and A2. A closer inspection reveals that within Type A2 two styles of *mem* and *ṣade* occur (correlated in Table 2). In some of the *mem*$_2$s, the final stroke is essentially a straight line (2s); in others, the part above the horizontal stroke is slightly bent to the right (2b); a few are uncertain (Table 2, column *mem*; MS 27 is, in fact, problematic,

Fig. 3. Seal type A1 (Table 1, MS 30, from Tell en-Naṣbeh).

Fig. 4. Seal type A2, straight-*mem*$_2$, compact-*ṣade*$_2$ (Table 1, MS 27, from Tell en-Naṣbeh).

Fig. 5. Seal type A2, bent-*mem*$_2$, open-*ṣade*$_2$ (Table 1, MS 8, from Tell en-Naṣbeh).

Fig. 6. Seal type B (Table 1, MS 12, from Tell en-Naṣbeh).

Fig. 7. Seal type C (Table 1, MS 37, from Ramat Raḥel).

and may lean slightly to the left). Similarly, the *ṣade*$_2$ has two different forms: in some it is relatively compact (2c); in others it is more open (2o); a few are uncertain (Table 2, column *ṣade*). No examples of the bent-*mem*, compact-*ṣade* occur. At least three stamps of A2 were employed; thus, at least six *m(w)ṣh* stamps were in use.

Palaeographic Considerations

The difficulty in classifying the impressions on the basis of palaeography and in the use of palaeography for chronology is clear from Bartlett's description of MS 2 from Jericho: 'an archaizing palaeo-Hebrew *mem*, a somewhat stylized *ṣade* ... an Aramaic *he*'.[37] One impression of three letters represents three different script types! The difficulty becomes salient from a perusal of the views of the various scholars. Sellin and Watzinger placed their example in the fifth century B.C.E. Cross dated the corpus to the late sixth and early fifth centuries B.C.E. Avigad dated it to the Persian period. Diringer noted that the variety of letter forms might be scribal confusions from the transition from the 'Early Hebrew characters to Aramaic-Square Hebrew Script'.[38] Naveh asserted that the plene spellings were the earliest, followed by the one from Jericho and three from Tell en-Naṣbeh, and that the others were all later; he dated the entire corpus to the fourth century B.C.E.[39] Stern preferred Cross's approach, accepting an even earlier dating in the Babylonian period, as suggested by McCown.[40]

In the study of seal/stamp impressions, several problems emerge. First, we rarely have absolute dates for any impression or group of impressions. This may lead to a relative dating based on circular reasoning. Second, archaic letter forms may continue in use long after other varieties of script have changed. Change in letter forms typically takes place in cursive script and then spreads to monumental or lapidary script, but there is always a time-lag for the spread and there are no general rules to estimate the length of such a gap. Third, archaizing forms may be employed to add a certain cachet to the impressions. The presence of archaic and archaizing letter forms makes it very difficult to determine a *terminus ante quem* for the usage of seals/stamps. On the other hand, a *terminus post quem* can sometimes be determined by the appearance of an innovative feature, but we are usually unable to date the first appearance of such a feature.

These are the problems that have led to the above disagreement regarding the dating of the impressions and even to confusion about their language: they have been referred to both as Hebrew and as Aramaic. This confusion is also partially due

37 Bartlett (above, n. 8), p. 541.

38 D. Diringer: Mizpah, in D.W. Thomas (ed.): *Archaeology and Old Testament Study*, Oxford, 1967, pp. 338–339.

39 Naveh (above, n. 35), pp. 61–62.

40 Stern (above, n. 2), pp. 207–209; McCown (above, n. 2), p. 202.

to a mix-up between the language reflected by the impressions and the script used. It is almost impossible to determine the language, although it is usually assumed to be Hebrew; it is clear, however, that they were written in an Aramaic lapidary script. The archaeological evidence may point towards a Neo-Babylonian dating (see above). Is it possible to provide an absolute dating for these impressions, based solely on the palaeography?

The different types of *mem* in these impressions are sometimes referred to as 'archaic' or 'archaizing'. Examining Naveh's Fig. 2, one sees types similar to our mem_1 and mem_2 appearing as early the mid-seventh century B.C.E. (the Assyrian clay letters).[41] Similarly, it is difficult to provide a date for our *ṣade*. The *ṣade* of Naveh's Type 1 is labelled as 'peculiar' and the *ṣade* of his Types 2 and 3 as 'archaic'; moreover, *ṣade* is not a frequently occurring letter. Our *ṣade* is similar to the cursive found in the Hamath bronzes of the mid-eighth century B.C.E.[42] Naveh's primary palaeographical criterion is the shape of the letter *he*, but even here he argues for archaization. The conclusion is that no dating, relative or absolute, is possible, based solely on the palaeography of these impressions. There is no evidence to contradict a dating to the Babylonian period; nor is there, however, a terminal date that can be assigned because archaic forms may be used long after they fell out of general use. It is also impossible to derive an internal chronology for the impressions.

NEUTRON ACTIVATION ANALYSIS

Neutron Activation Analysis (NAA) is a means of determining the chemical composition of an object by measuring the relative abundance of a large number of elements from a small sample of the object. The system used in this study is an adaptation of the one employed by Perlman and Asaro.[43] Since there are three major stamp types with at least six actual stamps in use, from six different sites, it was hoped that NAA would determine whether the stamped jars were all produced in the same place or in several locations and where that site (or sites) might be. If the jars were produced in different areas, it was hoped that NAA could establish some pattern in the distribution of stamp types. Samples were secured from all sites except Jericho (Tell es-Sultan).

The results of the analysis of 33 of the 43 known samples (77%) are presented in Table 3, which gives the values for every sample for each of the 14 elements used. We present the mean value for each element and the standard deviation (Std.), as well as the percentage standard deviation (%Std.). The latter is simply Std. divided by

41 Naveh (above, n. 35).

42 Naveh (above, n. 35).

43 I. Perlman and F. Asaro: Pottery Analysis by Neutron Activation Analysis, *Archaeometry* 11 (1969), pp. 21–52. For a general discussion of NAA used in a similar study, see H. Mommsen, I. Perlman and J. Yellin: The Provenience of the *lmlk* Jars, *IEJ* 34 (1984), pp. 92–93, 101–102.

Table 3. *m(w)ṣh* stamp impressions: NAA results.

EL	19/391H	14/391I	6/391J	4/391K	5/391L	8/391M	29/391N	24/391O	31/391P	10/391Q
Ce	47	54	44	41	53	47	41	42	50	65
Co	11.3	11.7	10.0	9.4	13.8	10.8	10.2	8.6	11.9	15.3
Cr	105	124	91	112	125	97	92	101	114	136
Eu	1.11	1.26	1.02	0.97	1.25	1.09	1.01	0.92	1.16	1.49
Fe%	3.53	3.99	3.14	3.70	4.05	3.27	3.10	3.61	3.83	4.96
Hf	4.36	5.07	4.06	3.34	5.67	4.12	3.74	2.98	4.38	5.54
La	22.6	24.6	20.7	19.2	23.7	22.2	20.7	18.4	23.6	30.6
Lu	0.32	0.38	0.32	0.29	0.35	0.30	0.30	0.27	0.38	0.38
Nd	24	23	20	20	20	23	20	17	25	31
Sc	17.19	19.19	15.34	18.96	18.40	16.24	14.98	17.96	18.56	23.25
Sm	4.40	5.04	4.20	4.01	4.98	4.67	3.99	3.76	4.73	6.01
Ta	0.696	0.917	0.669	0.613	1.013	0.724	0.665	0.609	0.833	0.991
Th	6.65	8.11	6.32	6.44	8.63	6.84	6.16	5.97	7.37	8.72
Yb	2.12	2.53	2.01	1.87	2.54	2.17	2.01	1.69	2.39	2.79
EL	**27/391R**	**15/391S**	**16/391T**	**12/391U**	**32/391V**	**18/391W**	**25/391Y**	**9/391Z**	**11/391#**	**22/391^**
Ce	41	62	50	46	60	42	51	52	38	57
Co	9.5	14.2	11.0	11.2	14.0	14.6	10.6	12.5	9.0	13.5
Cr	85	123	102	95	129	121	108	110	82	116
Eu	0.90	1.41	1.09	1.07	1.35	0.98	1.16	1.15	0.87	1.32
Fe%	2.87	4.15	3.53	3.21	4.41	4.41	3.47	3.73	2.68	4.05
Hf	3.36	4.82	4.46	3.90	4.82	4.65	4.35	4.56	3.31	5.02
La	18.7	28.2	23.3	21.8	28.1	27.3	23.2	24.2	17.8	27.2
Lu	0.28	0.44	0.33	0.29	0.42	0.27	0.34	0.35	0.23	0.40
Nu	20	27	22	24	28	22	25	24	18	28
Sc	14.35	21.36	17.29	16.37	21.85	21.29	17.44	18.09	13.53	19.87
Sm	3.83	5.82	4.60	4.49	5.53	4.08	4.82	4.86	3.65	5.57
Ta	0.588	0.863	0.770	0.687	0.915	0.639	0.810	0.809	0.587	0.899
Th	5.58	8.16	7.07	6.62	8.32	8.03	7.12	7.69	5.45	7.86
Yb	1.87	2.65	2.15	2.21	2.65	1.97	2.25	2.33	1.76	2.56

Table 3. *m(w)ṣh* stamp impressions: NAA results (cont'd.)

EL	21/391–	20/392H	23/392I	13/392J	7/392L	34/392M	35/392N	40/392O	42/392P	39/392Q
Ce	52	58	48	40	48	47	47	51	41	52
Co	11.7	13.7	10.5	10.0	11.1	13.7	11.1	12.3	10.2	13.2
Cr	109	122	95	83	99	96	91	103	93	111
Eu	1.16	1.33	1.06	0.90	1.09	1.10	0.98	1.10	0.83	1.13
Fe%	3.63	4.27	3.30	2.91	3.42	3.38	3.07	3.69	3.48	3.77
Hf	4.22	5.19	3.96	3.29	4.03	4.35	3.83	4.57	2.94	4.92
La	24.2	28.6	22.0	19.2	23.4	22.7	21.2	24.3	18.7	25.3
Lu	0.36	0.47	0.34	0.30	0.35	0.38	0.34	0.35	0.27	0.37
Nd	24	25	21	18	21	19	19	22	17	24
Sc	18.45	21.39	16.77	14.01	17.32	16.56	15.28	17.35	15.94	18.39
Sm	4.95	5.49	4.34	3.74	4.69	4.64	4.28	4.81	3.74	4.97
Ta	0.799	0.744	0.611	0.526	0.634	0.702	0.606	0.725	0.576	0.728
Th	7.21	8.10	6.51	5.56	6.79	6.94	6.62	7.09	6.73	7.28
Yb	2.41	2.28	1.87	1.52	1.89	1.90	1.74	1.95	1.50	2.09

EL	43/392R	17/392S	37/392T	Mean	Std.	%Std.
Ce	51	54	58	50	±7	14.0%
Co	10.9	12.3	12.5	11.7	±1.7	14.4%
Cr	103	115	114	106	±14	13.2%
Eu	1.08	1.17	1.26	1.12	±0.16	14.3%
Fe%	3.47	3.76	3.80	3.62	±0.49	13.5%
Hf	4.22	5.02	5.55	4.32	±0.73	16.9%
La	23.4	25.0	26.8	23.4	±3.2	13.7%
Lu	0.39	0.39	0.44	0.34	±0.06	17.6%
Nd	20	22	23	22	±3	13.6%
Sc	17.32	18.22	19.45	17.82	±2.33	13.1%
Sm	4.68	4.80	5.51	4.66	±0.63	13.5%
Ta	0.683	0.721	0.800	0.732	±0.124	17.0%
Th	7.48	7.20	8.05	7.11	±0.87	12.2%
Yb	1.87	2.04	2.32	2.12	±0.33	15.6%

Note: Pills are listed by MS No., followed by lab pill number.

Abbreviations for elements:

Ce = Cerium	Lu = Lutecium
Co = Cobalt	Nd = Neodymium
Cr = Chromium	Sc = Scandium
Eu = Europium	Sm = Samarium
Fe = Iron	Ta = Tantalum
Hf = Hafnium	Th = Thorium
La = Lanthanum	Yb = Ytterbium

the mean value and multiplied by 100%, and is a more convenient measure of the homogeneity of the group. In a homogeneous group most of these readings should be 10% or less. Table 3 shows that the standard deviations for each element are large and that the %Std. is well above 10%. This led to the initial conclusion that the impressions do not form one homogeneous group.

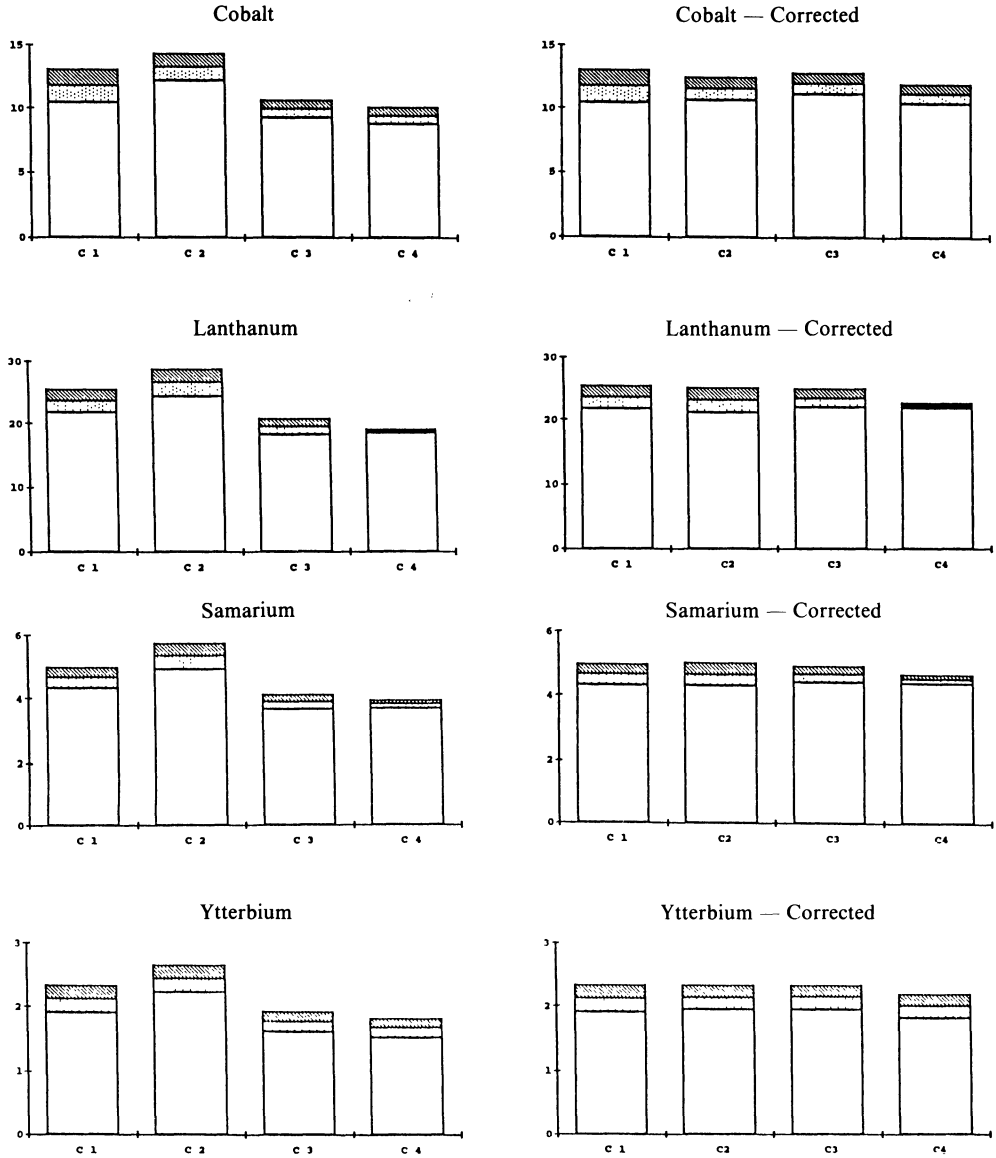
It was then decided to analyse the results statistically, using centroid hierarchical clustering. The centroid cluster analysis performed on the 33 *m(w)ṣh* impressions resulted in four clusters: one of 16 samples, another of nine, a third of five and a final cluster of three. Table 4, which provides a list of the pills that fell within each cluster, the group means, Std. and %Std. for each of the clusters, shows the homogeneity of each of the four clusters. The left-hand column of Chart 1 provides the same information in graph form for a sample of the elements measured.

Table 4. Centroid clustering of *m(w)ṣh* impressions (above) and corrected values (below).

	Cluster 1: 6, 7, 8, 12, 16 18, 19, 21, 23, 25 31, 32, 34, 39, 40, 43			Cluster 2: 5, 9, 10, 14, 15 17, 20, 22, 37			Cluster 3: 11, 13, 27, 29, 35			Cluster 4: 4, 24, 42		
El	Mean	Std.	%Std.	Mean	Std.	%Std.	Mean	Std.	%Std.	Mean	Std.	%Std.
Ce	49	±4	8.2%	57	±4	7.0%	42	±3	7.1%	42	±0	0.0%
Co	11.8	±1.3	11.0%	13.3	±1.1	8.3%	10.0	±0.7	7.0%	9.4	±0.7	7.2%
Cr	105	±10	9.5%	121	±7	5.8%	86	±4	4.7%	102	±8	7.8%
Eu	1.11	±0.08	7.2%	1.29	±0.10	7.8%	0.93	±0.05	5.4%	0.91	±0.06	6.6%
Fe%	3.59	±0.36	10.0%	4.08	±0.36	8.8%	2.92	±0.15	5.1%	3.60	±0.09	2.5%
Hf	4.33	±0.29	6.7%	5.16	±0.35	6.8%	3.51	±0.23	6.6%	3.09	±0.18	5.8%
La	23.7	±1.9	8.0%	26.5	±2.2	8.3%	19.5	±1.2	6.2%	18.8	±0.33	1.7%
Lu	0.34	±0.04	11.8%	0.40	±0.04	10.0%	0.29	±0.04	13.8%	0.28	±0.01	3.6%
Nd	23	±2	8.7%	25	±3	12.0%	19	±1	5.3%	18	±2	11.1%
Sc	17.73	±1.67	9.4%	19.91	±1.66	8.3%	14.43	±0.64	4.4%	17.62	±1.26	7.2%
Sm	4.66	0.33	7.1%	5.34	±0.41	7.7%	3.90	±0.22	5.6%	3.83	±0.12	3.1%
Ta	0.727	±0.079	10.9%	0.862	±0.097	11.3%	0.594	±0.044	7.4%	0.559	±0.017	2.8%
Th	7.10	±0.51	7.2%	8.06	±0.43	5.3%	5.87	±0.45	7.7%	6.38	±0.31	4.9%
Yb	2.12	±0.22	10.4%	2.45	±0.21	8.6%	1.78	±0.16	9.0%	1.69	±0.15	8.9%

Correction values based on Cluster 1:		Cluster 2: Corrected			Cluster 3: Corrected			Cluster 4: Corrected		
	El	Mean	Std.	%Std.	Mean	Std.	%Std.	Mean	Std.	%Std.
	Ce	50	±4	8.0%	50	±4	8.0%	50	±1	2.0%
	Co	11.6	±0.9	7.8%	12.0	±0.8	6.7%	11.2	±0.8	7.1%
Cluster 2: 0.874	Cr	105	±7	6.7%	104	±5	4.8%	121	±9	7.4%
Cluster 3: 1.205	Eu	1.13	±0.09	8.0%	1.12	±0.06	5.4%	1.08	±0.07	6.5%
Cluster 4: 1.189	Fe%	3.57	±0.31	8.7%	3.52	±0.18	5.1%	4.28	±0.11	2.6%
	Hf	4.51	±0.30	6.7%	4.23	±0.28	6.7%	3.67	±0.21	5.7%
	La	23.2	±1.9	8.2%	23.5	±1.5	6.4%	22.4	±0.4	1.8%
	Lu	0.35	±0.03	0.03%	0.35	±0.04	11.4%	0.33	±0.01	3.0%
	Nd	21	±3	14.2%	23	±1	4.3%	22	±2	9.1%
	Sc	17.40	±1.45	8.3%	17.39	±0.77	4.4%	20.95	±1.50	7.2%
	Sm	4.67	±0.36	7.7%	4.70	±0.27	5.7%	4.56	±0.15	3.3%
	Ta	0.753	±0.085	11.3%	0.716	±0.054	7.5%	0.713	±0.020	2.8%
	Th	7.04	±0.38	5.4%	7.08	±0.54	7.6%	7.59	±0.37	4.9%
	Yb	2.14	±0.19	8.9%	2.14	±0.19	8.9%	2.01	±0.18	9.0%

Chart 1. Composition of the four clusters of *m(w)ṣh* stamped impressions; selected elements from Table 4.*



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* All values along the Y-axis for each element are in parts per million. The dotted section of each column represents one standard deviation below the mean, the diagonally hatched area indicates one standard deviation above the mean. The pattern represented in our sample was repeated in the other elements as well.

A comparison of the NAA readings of clusters 2 and 3 with cluster 1 shows that the values of these two clusters deviate uniformly from those of cluster 1. This consistent deviation suggests that the readings of the elements in the samples in the second and third clusters were being diluted. By comparing the means of cluster 1 with the means of cluster 2 it was determined that the readings in cluster 2 were uniformly 0.874 of the values in cluster 1. In the same way it was determined that the mean values for cluster 3 were 1.205 of the values of cluster 1. The values for each reading in cluster 2 were then decreased by 0.874, and those in cluster 3 increased by 1.205. Cluster 4 also appeared to be diluted in relation to cluster 1, but not as uniformly. It had a correction factor of 1.189. The 'corrected' combined values for clusters 1–3 are given in the second column of Table 5, and the 'corrected' combined values for clusters 1–4 in the third column. These can be compared with the mean values for cluster 1 in the first column. Once the dilution is accounted for, the 30 samples of clusters 1–3 form a reasonably homogeneous group or a single cluster. The right-hand column of Chart 1 shows the values for clusters 2–4 after correction. The uniformity among clusters 1–3 is striking when compared with the uncorrected values for each element in the left-hand column. This is a strong indication that the stamped jars come from the same source.

After it had been determined that the *m(w)ṣh* impressions came from the same source it was decided to compare these samples with results from earlier studies to see whether the source of these stamped jars could be established. Reference groups were selected from Shechem, Samaria, Hazor, Timna, Lachish, Jerusalem, Tell en-Naṣbeh, the Moza clay formation and a small sample of *lmlk* stamped handles analysed in an earlier study.[44] This material was then compared with a selection of about half the *m(w)ṣh* impressions, which showed that the *m(w)ṣh* jars resemble the Jerusalem and Moza clay formation more than any of the others (see Table 6). Centroid hierarchical clustering was again used to check the initial interpretation. The results were as follows:

1 The *lmlk* handles, Lachish and Timna reference groups clustered together.
2. The Jerusalem reference group and the *m(w)ṣh* impressions clustered together with clay from the Moza formation.
3. The material from Shechem, Samaria and Hazor formed small clusters on their own. A 'north' cluster represents one bowl each from Samaria and Hazor which did not match any of the southern groups.
4. The comparative material from Tell en-Naṣbeh did not form a homogeneous group. It had affinities with the Shechem group (two pieces), the *lmlk* group (two pieces) and the Jerusalem group (one piece).

44 Mommsen et *al.* ([above, n. 43], pp. 107–109) believe that the two Beersheba pithoi originated in the Jerusalem area. Both are similar to another Beersheba pithos bearing a *lmlk* impression, which also tested as coming from the Moza clay formation.

Table 5. *m(w)ṣh* NAA summary after correction.

	Cluster 1:	Clusters 1–3:			Clusters 1–4:				Cluster 1:	Clusters 1–3:			Clusters 1–4:		
El	Mean	Mean	Std.	%Std.	Mean	Std.	%Std.	El	Mean	Mean	Std.	%Std.	Mean	Std.	%Std.
Ce	49	50	±4	8.0%	50	±4	8.0%	Lu	0.34	0.35	±0.04	11.4%	0.35	±0.04	11.4%
Co	11.8	11.8	±1.2	10.2%	11.7	±1.1	9.4%	Nd	23	23	±2	8.7%	23	±2	8.7%
Cr	105	106	±9	8.5%	107	±10	9.3%	Sc	17.73	18.07	±1.66	9.2%	18.33	±1.84	10.0%
Eu	1.11	1.12	±0.08	7.1%	1.12	±0.08	7.0%	Sm	4.66	4.73	±0.34	7.2%	4.71	±0.33	7.0%
Fe%	3.59	3.57	±0.32	9.0%	3.63	±0.37	10.2%	Ta	0.727	0.737	±0.080	10.8%	0.734	±0.076	10.4%
Hf	4.33	4.41	±0.31	7.0%	4.34	±0.37	8.5%	Th	7.10	7.08	±0.50	7.1%	7.13	±0.51	7.1%
La	23.7	23.4	±1.9	8.1%	23.3	±1.9	8.2%	Yb	2.12	2.14	±0.21	9.8%	2.13	±0.21	9.9%

Table 6: NAA comparisons with other sites.

	Moza	Jerusalem		*m(w)ṣh*		*lmlk*		Timna		Lachish		Shechem	
El	Mean	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
Co	13.1	14.0	±1.9	11.9	±1.3	22.4	±1.9	19.7	±1.1	17.8	±1.14	9.5	±0.1
Cr	107	115	±6	105	±9	147	±7	127	±16	114	±8	164	±2
Eu	1.16	1.20	±0.05	1.10	±0.08	1.66	±0.13	1.60	±0.13	1.42	±0.08	1.19	±0.03
Hf	3.77	3.83	±0.19	4.33	±0.42	14.00	±0.62	9.86	±1.75	11.07	±0.78	4.33	±0.42
La	24.5	23.8	±0.7	23.5	±1.8	34.8	±3.0	33.5	±3.9	29.7	±1.4	29.9	±0.8
Lu	0.33	0.33	±0.02	0.35	±0.04	0.55	±0.03	0.50	±0.04	0.46	±0.03	0.35	±0.04
Sc	17.8	18.6	±0.9	18.3	±1.8	16.2	±0.7	14.7	±1.0	13.3	±0.8	18.3	±1.8
Sm	4.69	4.88	±0.19	4.70	±0.35	6.69	±0.48	6.32	±0.57	5.72	±0.28	4.70	±0.35
Ta	0.740	0.711	±0.03	0.719	±0.06	1.57	±0.08	1.34	±0.08	1.49	±0.57	0.54	±0.11
Th	7.34	7.18	±0.25	7.14	±0.56	9.36	±0.35	8.41	±0.72	7.54	±0.39	4.43	±0.12

Number of samples in each group:
Moza: 2; from I. Perlman, J. Gunneweg and J. Yellin: Pseudo-Nabataean Ware and pottery of Jerusalem, *BASOR* 262 (1986), Table 3. Jerusalem: 20; *ibid. m(w)ṣh:* 17. *lmlk*: 15; sample from NAA data set in archaeometry lab of the Hebrew University of Jerusalem. Cf. Mommsen *et al.* (above, n. 43), Table 3. Timna: 7; sample from NAA data set in the archaeometry lab of the Hebrew University of Jerusalem. Lachish: 8; *ibid.* Shechem: 2; *ibid.*

This demonstrates that the *m(w)ṣh* jars were manufactured in the greater Jerusalem area, and not in the Shephelah or the northern hill country. It is interesting that the Tell en-Naṣbeh reference material does not form a single group, but shows connections with the other groups analysed. The reasons for this, given the small number of pieces sampled from Tell en-Naṣbeh, are not certain. A separate analysis of the Iron Age material from Tell en-Naṣbeh seems warranted, with particular attention to changes in the composition of the clays used over time.

One sample each from clusters 1–3 (MS 19, 29, 10) was examined petrographically to try to identify the diluting agent. The study showed that samples 19 and 10, which overall had higher NAA results on an element-by-element basis than sample 29, contained somewhat greater quantities of *terra rosa* soil than the latter. This higher concentration of *terra rosa* soil may have caused the higher readings in the samples in clusters 1 and 2 in comparison to cluster 3.

The petrographic analysis confirmed that the clay came from the upper member of the Moza clay formation, which stretches from 19 km. west of Jerusalem to the Hebron area in the south, then to the north for an uncertain distance beyond Tell en-Naṣbeh (see Fig. 1). The Moza formation does not appear within 6 km. of Jerusalem or to the immediate east of Jerusalem.[45] With the exceptions of Jerusalem and Jericho, all the sites which produced impressions are within a kilometre of outcrops of the Moza formation. The analysis also showed that the pieces were fired at a temperature of approximately 900° C, and not more than 1,000° C.

To summarize the results of the NAA analysis, the *m(w)ṣh* stamped impressions formed four clusters. It was determined that these clusters suffered dilution in comparison to the major cluster, and that once the results for the minor ones were adjusted, their values matched those of the main group. This means that no correlation could be drawn between the type of impression and the place of manufacture. It was determined that the *m(w)ṣh* impressions clustered with samples from Jerusalem, and not with groups from the Shephelah or from the northern hill country.

SUMMARY AND CONCLUSIONS

The following points concerning the *m(w)ṣh* impressions should be noted. All known excavated examples come from the area between Tell en-Naṣbeh on the north to Ramat Raḥel on the south, and from Jericho on the east to Belmont Castle on the west. The clay out of which the stamped jars were fashioned comes from the area of the Moza clay formation which stretches for a limited distance from Jerusalem to the north, south and west. Thirty of these 42 examples (excluding the piece from the Bible Lands Museum, whose find-spot is unknown) are from Tell en-Naṣbeh. The earliest stratigraphic position of the best stratified pieces is the very end of the Iron Age and the beginning of the Persian period. The palaeography of the

45 Geological Survey of Israel: *Jerusalem and Vicinity Geological Map*, 1:50,000, 1976.

impressions does not oppose a date within the seventh to sixth centuries B.C.E. It cannot be determined when the jars went out of production or out of use.

It is of particular importance that so many of the examples come from Tell en-Naṣbeh. At some time in its history Tell en-Naṣbeh was sufficiently important to have been a depot for more storage jars of a particular class than Jerusalem. If one accepts the commonly agreed identification of Tell en-Naṣbeh with biblical Mizpah, one must ask when, in the course of its history, did it have such special significance. This should be the Neo-Babylonian period, when the Babylonian-appointed governor Gedaliah made Mizpah the seat of his administration. It may be that the distribution of these impressions marks the approximate limits of the territory administered by Gedaliah and his successor(s). Note that the *lmlk* and *yh(wd)* impressions have a much wider distribution and reflect a larger administrative area.[46] The more limited zone of distribution of the *m(w)ṣh* impressions corresponds roughly with the area of the tribe of Benjamin. This theory is compatible with the suggestion that the Babylonians did not devastate the Benjaminite area.[47]

It may be, as Avigad and Stern have suggested, that these jars contained produce from a governmental estate at Mozah.[48] The wine produced at this estate would have been shipped to the capital at Mizpah/Tell en-Naṣbeh for court use. The inscribed jar handles from Gibeon/el-Jib and another from Mozah itself, which date from the sixth century B.C.E., are another indication of the importance of this area for the logistic system of the Babylonian province.[49]

It cannot be determined how long individual jars continued to be used after having been stamped. The fact that some impressions were found at various sites in later or mixed contexts may reflect continued use of these jars after the capital was switched back to Jerusalem. Once the court was no longer at Mizpah the jars could have been re-shipped to any place where they could be put to use. It is also possible that these other sites (Jericho, Ramat Raḥel, el-Jib, Belmont Castle and Jerusalem) were sub-centres of the Babylonian administration and received some shipments for use by governmental personnel.

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46 The *yh(wd)* impressions are from an area bounded by Tell en-Naṣbeh in the north, 'En-gedi in the south, Gezer in the west and Jericho in the east; see summary in Stern (above, n. 2), pp. 202–206. The bulk of the *lmlk* impressions are from an area bounded by Tell en-Naṣbeh in the north, Arad in the south, Gezer in the west and Jericho in the east; see summaries in P. Welten: *Die Königs-stempel*, Wiesbaden, 1969, pp. 175–188; and Y. Garfinkel: 2 Chr 11:5–10 Fortified Cities List and the *lmlk* Stamps — Reply to Nadav Na'aman, *BASOR* 271 (1988), p. 70.

47 A. Malamat: The Last Wars of the Kingdom of Judah, *JNES* 9 (1950), p. 227. More recently, see *idem, The Last Years of the Kingdom of Judah*, in L. Perdues *et al.* (eds.): *Archaeology and Biblical Interpretation*, Atlanta, 1987, pp. 299–300; and Y. Aharoni: *The Land of the Bible, A Historical Geography* (rev. ed.), Philadelphia, 1979, pp. 410–411.

48 Avigad (above, n. 6), p. 119; Stern (above, n. 2), p. 209.

49 N. Avigad: Two Hebrew Inscriptions on Wine Jars, *IEJ* 22 (1972), pp. 5–9.