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“You are Cursed by the God YHW:” an early Hebrew inscription from Mt. Ebal

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Abstract

In December 2019, an expedition on Mt. Ebal to examine the discarded material from Adam Zertal's 1982–1989 excavation yielded a small, folded lead tablet. The east dump pile, from which the object emerged, contained the discarded matrix from two structures that he interpreted as altars dated to the Late Bronze Age II and Iron Age I. The earlier and smaller round altar lay underneath the geometric center of the later and larger rectangular altar. The tablet could not be opened without damaging it. A team of scientists performed X-ray tomographic measurements with different scanning parameters. The tomographically reconstructed data were subjected to advanced processing to reveal the hidden text. Epigraphic analysis of the tomographic data revealed a formulaic curse written in a proto-alphabetic script likely dating to Late Bronze Age II. The inscription falls within the literary genre of Chiastic Parallelism and predates any previously known Hebrew inscription in Israel by at least 200 years.

Keywords Computed tomography, Defixio, Proto-alphabetic writing, Mt. Ebal, Wet sifting, Late Bronze Age

Introduction

From 1982 to 1989, Adam Zertal excavated what he interpreted as two altars at el-Burnat (A) on Mt. Ebal's second step on the eastern side. The smaller Late Bronze Age II altar lay directly beneath the larger Iron Age I altar. The biblical tradition (Joshua 8:30) records that Joshua, Israel's early leader, built an altar on Mt. Ebal as part of a covenant renewal ceremony soon after the Israelites returned from Egypt to Canaan. Thus, it is possible that Zertal's findings relate to this verse. The folded lead

defixio, the subject of this paper, probably derived from the fill of the altars.

Apotropaic and imprecatory artifacts emerged in the Mediterranean Basin in prehistoric times. Job, whose vorlage may contain very early material, possibly mentions writing on a lead tablet: “Oh, that my words were ... inscribed with an iron tool and lead ...” (19:24; cf. Jer 17:1).¹ Ancient priests mass produced curse tablets, as evidenced by recovered tablets with blanks where names and other specific information could be added. People deposited the defixiones in perceived portals to the supernatural realm, such as graves, wells, and altars. Assmann [1] demonstrates, that imprecatory texts as early as Egypt's Middle Kingdom ensured that the administration of social justice would be adjudicated in the spirit world, even if earthly magistrates failed to punish adversaries.

These tablets reached their apogee in Graeco-Roman times when people sought to curse anyone who interfered with their peace or prosperity. Similarly, Byzantine Christians in Mesopotamia commonly used Aramaic

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¹ The precise function of the lead as writing material in this verse is not entirely clear.

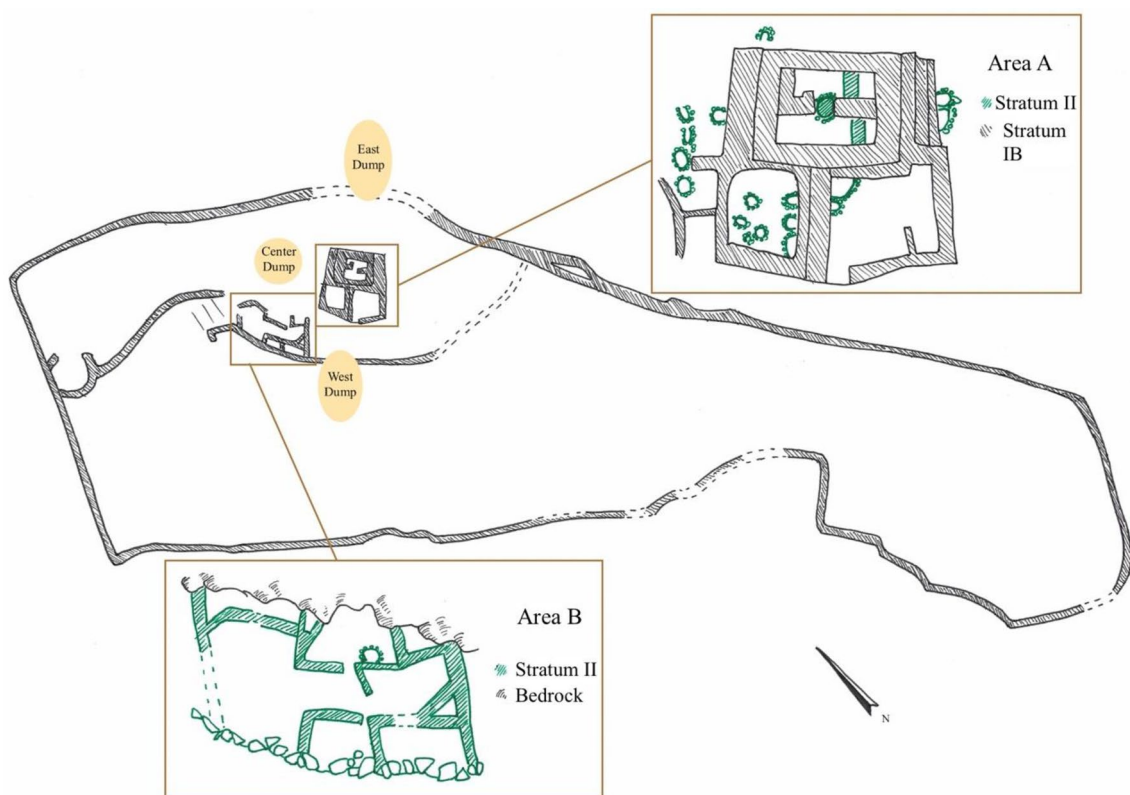


Fig. 1 The foot-shaped enclosures and archaeological remains at el-Burnat (A). Drawing by Abigail Leavitt

incantation bowls to deter evil spirits [2]. Defixiones continued to be popular through the Middle Ages [3]. Ancient people believed that sacred objects possessed apotropaic qualities that could protect them from curses, diseases, relationship problems, and demonic torment. Without the benefit of modern medicine or psychiatry, a huge market existed for magical intervention in human affairs.

Once a religious functionary inscribed the text and sealed the tablet, the incantation became binding. It could not be erased since the tablet would crumble and the curse would disappear, if opened. Neither humans nor supernatural beings could cancel or negate an occult message since they could not see it. However, this has changed in recent decades as scientists have gained the ability to see the interior of lead tablets using X-ray computed tomography and advanced data processing. Such technology enabled us to recover and decipher the concealed text on a small, folded lead tablet from Mt. Ebal. The scribe who wrote the inscription used a stylus to form tiny letters on a small malleable surface. As a result, the font is sometimes sloppy, with overlapping letters, and lacking in uniformity. Thus, the condition of the text added to the challenge of accurately reading the interior slices of the tomographically reconstructed tablet.

The archaeological context

From 1982 to 1989 Adam Zertal, on behalf of the University of Haifa, excavated el-Burnat (A) on Mt. Ebal's second step, northeast of Tel Balata where the ruins of ancient Shechem lie. The excavation occurred under the auspices of the Israel Antiquities Authority as part of Zertal's larger survey of the Manasseh Hill Country (1978–1992).²

He exposed a large rectangular altar constructed in the late thirteenth century BCE (ca. 1225 BCE) which rested atop and protected an earlier round altar [4], which he dated to the mid thirteenth century (ca. 1250 BCE). The altars lie within a 3.8 dunam foot-shaped enclosure, which measures 110 m long and has an average width of 35 m (Fig. 1).

This enclosure is itself encased by a larger foot-shaped enclosure covering 14 dunams [4]. The outer dimensions of the rectangular altar from Stratum 1 measured 8.75–9.00×7.00 m in addition to a ramp on the west side; the round altar from Stratum 2 measured 2 m in diameter. The round altar lies beneath the perfect geometric center of the rectangular altar. Zertal focused his excavation

² License numbers were as follows: L-312/1982-0, L-327/1983-0, L-347/1984-0, L-389/1985-0, L-410/1986-0, L-425/1987-0, L-454/1989-0.

on the inside and outside of the altars (Area A) and on a structure to their north (Area B) which he identified as a four-room house.³

The overwhelming majority (97%) of the pottery dated to Iron Age IA (ca. 1200–1150 BCE), and the rest (3%) dated to the Late Bronze Age IIB (ca. 1250–1200 BCE). However, Leavitt [5] provides three examples of Late Bronze Age pottery from Stratum 2 being older than Zertal proposed. First, the open carinated bowl disappears by the Late Bronze Age IIB [6], yet Zertal published such a bowl. Second, Zertal's [4] cited parallels for two chalice fragments were, in his estimation, contemporary with the open carinated bowl which did not exist in the Late Bronze IIB period. Third, a diagnostic krater sherd for which Zertal recorded no parallel mirrors a sherd from Lachish which dates to the Late Bronze Age IB/IIA horizon [6], pl. 3.3.11.

Zertal's organic samples have disappeared; therefore, no Carbon 14 dates exist by which the ceramic and glyptic dates can be calibrated. The classification of the bones, 96% of which are kosher, is as follows: 65% caprine, 21% bovine, 10% fallow deer, and 4% other (snake, tortoise, etc.). The flint assemblage was typical of the Late Bronze Age and Iron Age I, except for a complete absence of sickle blades, which is consistent with a non-agrarian cultic site.⁴

The glyptic finds consisted of two scarabs and a die or seal. Baruch Brandl [7] assigned Scarab 1 to Ramesses II, but Daphna Ben-Tor and Pieter Gert van der Veen assign it to the reign of Thutmose III or soon after.⁵ Scarab 2 not only bears Thutmose III's cartouche but also displays a seated bowman and a gecko, motifs most common during the 18th Dynasty. Brandl, however, interpreted the scarab as commemorative [7], without providing supporting reasons. His interpretation of Scarab 2 therefore remains uncertain [8].

Like almost all excavations, Zertal left behind discard piles after examining the excavated soil. After Season One (1982) which he devoted to removing a mantle of stones that purposely covered and protected the altars, his team sieved all excavated soil. In December 2019, Stripling wet sifted ca. 30% (ca. 30 cubic meters) of Zertal's discarded material. Approximately 75% of the matrix derived from the east dump, and 25% came from the west dump. The University of Haifa team deposited discarded remains from Areas A and B in the west dump, but they only deposited material from Area A, the location of the

altars, in the east dump. The lead object, the focus of this article, came from the east dump and therefore almost certainly derived from one of the altars. Since Zertal [4] determined that the fill of the Stratum IB altar belonged to Stratum II, the defixio clearly dates to the period of the Stratum II round altar.

In addition to recovering important floral and faunal remains, the project yielded 268 diagnostic pottery sherds (95% Iron Age I, 4.75% Late Bronze Age, and 0.25% Early Roman), 75 diagnostic flints, and 79 small objects. Among the objects was the folded lead tablet, which staff member Frankie Snyder recovered. It measured ca. 2×2 cm and while folded it was 0.3 cm thick, while the thickness of the single lead strip itself merely measures ca. 0.4 mm. Indentations pocked the outside of the tablet, some of which initially appeared to be glyptic.

Initial lab analysis by Orna Cohen revealed that the tablet could not be unfolded without damaging it. Metallurgical analysis of the tablet's lead by Professor Naama Yahalom-Mack at Hebrew University revealed that it derived from a mine in the Aegean (Lavrion, Greece), which was known to be in use in the Late Bronze Age.⁶ The Laboratory of X-ray Tomography at Centre Telč, part of the Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences, performed several tomographic reconstructions of the tablet, revealing that writing exists on the tablet's exterior and interior.⁷ This article focuses on the writing on the tablet's interior, and a subsequent article will present the exterior writing.

Tomographic reading of the interior text

The Institute of Theoretical and Applied Mechanics in Telč obtained information about the tablet's internal structure by using X-ray tomographic measurements (XCT). Thanks to earlier tomographic measurements of a lead amulet from the Czech archaeological site of Dřevíč [3], it was known that it is possible to read the hidden text on a lead object, although reliable tomographic reconstruction of the outer surface of the lead artifact is problematic.

Based on a large set of two-dimensional X-ray images (projections) recorded during the rotation of the object relative to the imaging line "X-ray tube—detector," computed tomography (CT) provides a view of

³ Scholars have long recognized the four-room house as a marker of Israelite ethnicity [9]. The presence of a four-room house, along with kosher faunal remains, supports Zertal's view that this was an Israelite site.

⁴ In 2019, Stripling recovered one sickle blade from the el-Burnat (A) dump.

⁵ Ben-Tor communicated this to Stripling in 2021 and confirmed her conclusion in private emails with van der Veen in 2022. Keel [10] reached a similar conclusion, but he does not completely exclude Brandl's date.

⁶ Professor Yahalom-Mack will separately publish the lead analysis. Mycenaean expert Jorrit Kelder of Leiden University confirmed the Late Bronze Age date of the Lavrion mine (pers. comm. with van der Veen, May 2022).

⁷ Jaroslav Valach developed protocols and performed surface reconstruction based on optical measurements taken at the Department of Monument Diagnostics and Conservation at the Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences. Ivana Kumpova oversaw CT data recording, including setup preparation and measurement of the correction data and programming of support routines. Daniel Vavrik conducted the data processing required to read the scans.

the three-dimensional internal structure of the tomographed object. The CT reconstruction itself is usually performed using the well-known filtered back-projection algorithm. The result of the CT reconstruction is a three-dimensional matrix of voxels (volume pixels). Each voxel represents the calculated density of an object at a given location. The analysis of the reconstructed volume creates a display of its planar slices. When the material density is lower at a given location, that location appears as a darker spot in the slice than when the material density is higher. If the analyzed object is not planar, the search elements may be only partially visible in the selected section; therefore, it is necessary to complete the reconstruction based on several adjacent sections. If the originally planar object is deformed, it can be virtually straightened using specially prepared software.

In general, XCT of lead objects is a challenging task because of the strong scattering of X-ray photons and the high attenuation of X-rays by lead. Based on the XCT analysis of the Dřevíč amulet [3], it was known that the highest possible voltage and power at the X-ray source had to be used, along with significant filtering of the X-ray beam. The filtering result is an X-ray beam with suppressed low-energy photons, which would be completely absorbed by the lead and would only increase the useless signal in areas of the detector that do not contain information about the tomographed object. Filtering also reduces the number of scattered photons that degrade the quality of the tomographic reconstruction. The measurements of the Dřevíč amulet clearly showed that it is necessary to have the longest possible X-ray exposures and that it is desirable to reposition the object during XCT scans to optimally affect the visibility of internal structures.

Methodology

A tomographic scanner, TORATOM, located in Telč was used for the XCT measurements. This scanner has an adjustable geometry, where the object is placed on a rotating stage between the tube and the detector [11]. The projection magnification $11\times$ corresponding to an image pixel size $18\ \mu\text{m}$ was set by the scanner geometry. The detector has an active area of $410\times 410\ \text{mm}$ and a pixel pitch of $0.2\ \text{mm}$. The X-ray tube voltage was set to $235\ \text{kV}$, and the current was set to $0.8\ \text{mA}$. The scattering effect of the X-ray photons was reduced by using a stack of $1.2\ \text{mm}$ tin, $1.5\ \text{mm}$ brass, and $3.0\ \text{mm}$ stainless steel filters in front of the tube and a $3.6\ \text{mm}$ stainless steel filter on the detector. A relatively long exposure of $4\ \text{s}$ per projection was necessary to obtain a reasonable signal behind the lead object. In total, 1,200 projections were recorded during one rotation of the object mounted onto the rotation stage for one XCT measurement. A total of 4 tomographic measurements were performed—a different

detector was also tested, and the lead tablet was scanned in different positions. The quality of the resulting tomographic reconstruction cannot be determined in advance in the case of lead. The quality of the individual projection determines the tomographic reconstruction.

Reconstruction of the tablet

VG Max software (Volume Graphics Ltd.) was used for XCT reconstruction. Figure 2 (left) demonstrates the three-dimensional reconstruction of the lead tablet. The visible halo effect (coloured) obscuring the outer shape of the tablet comes from the scattering of X-ray photons, although this effect was reduced by X-ray beam filtering. Due to the distortion of the tomographic reconstruction by scattered photons, it is difficult to determine the actual location of the letters.

To clarify boundaries of the tablet, an optical digital photogrammetry method [12] was used to reconstruct the tablet's surface. Using an industrial camera with a macro lens and a set of LEDs, 104 optical images were taken from different directions relative to the tablet. The photographs overlapped to a large extent so that identical points on the surface of the object could be identified. Then appropriate algorithms determined the spatial relationships of the letters to each other, which formed the basis for the calculation of a digital model of the object. The software Metashape (Agisoft), using digital photogrammetry, facilitated the process of reconstructing the surfaces. First, the basic set of points on the object's surface was identified, and the optical and spatial parameters of the camera were determined. In the next step, the set of identified points was expanded to form a dense point cloud. This formed the basis for a digital model of the object's surface, which was rendered using triangles. The final step was covering the digital model with the object color texture. Figure 2 (right) depicts the resultant optical reconstruction of the tablet's surface.

Based on the optically reconstructed tablet surface, VGStudio MAX was used to suppress the scattered X-ray photons that degrade the XCT reconstruction of the outer shape. Figure 3 (left) represents an isosurface rendering. Figure 3 (right) depicts the same reconstruction with a volume rendering. As a result, some possible letters become visible in the upper right.

To find the letters in the tablet, a set of planar tomographic slices was generated. Figure 4 (left) illustrates one example. Although the letters may be visible on tomographic planar sections, the physical deformation of the tablet makes it difficult to identify them and determine their spatial relationships. Therefore, virtual suppression of the tablet deformation was performed, like that described by Vavrik et al. [3]. As a result, possible characters became better visible within one straightened slice, as seen in Fig. 4 (right).

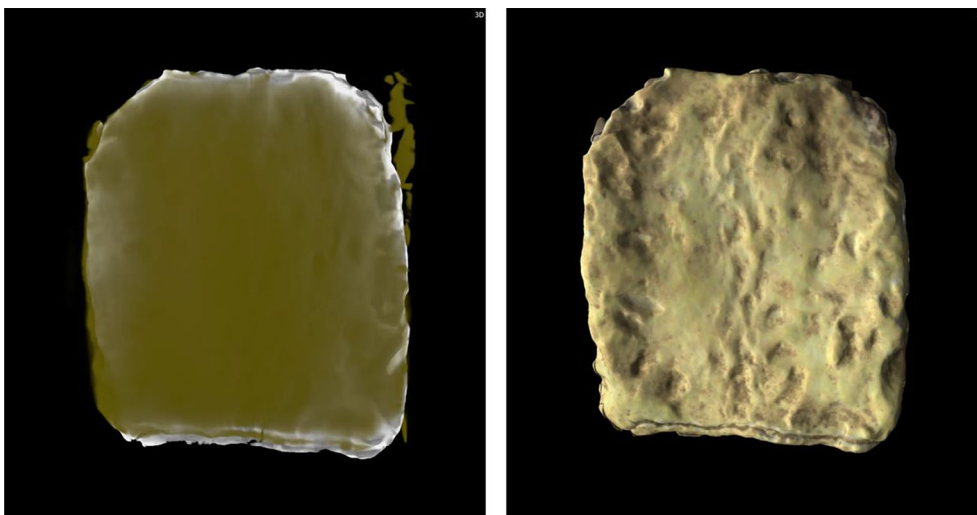


Fig. 2 XCT reconstruction of the tablet (left). Optical reconstruction by digital photogrammetry (right). Credit Daniel Vavrik and Jaroslav Valach

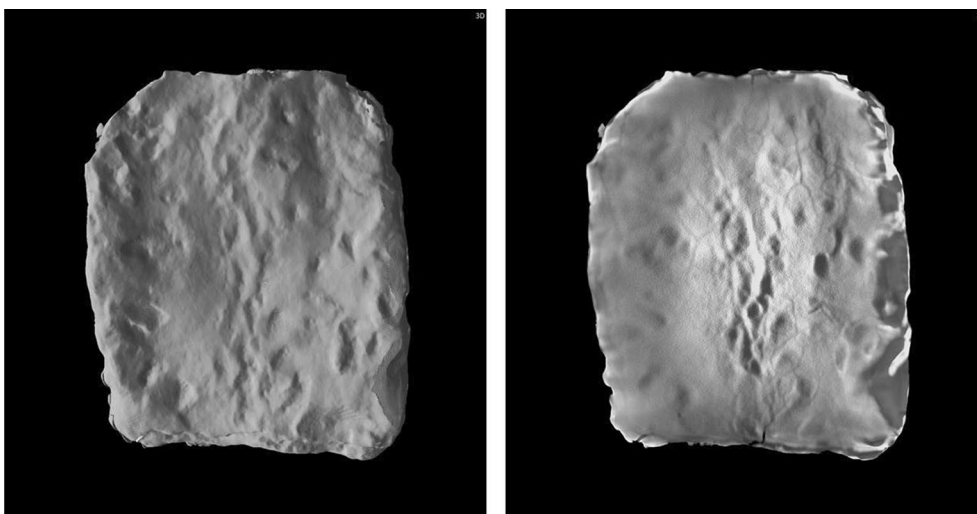


Fig. 3 XCT reconstruction of the tablet's surface (left). Semitransparent visualization of the reconstructed tablet (right). Credit Daniel Vavrik

A similar way of processing tomographic data from artifacts made of highly attenuating materials such as lead or silver has only been published in a few other cases [13–15].

As a final step, a set of 46 slices was generated from the processed XCT reconstructed tablet which were provided for epigraphic analysis. Some operations not listed here were tested to obtain variants of the tomographically reconstructed tablet to provide the best possible results. To view the progression through the tomographically reconstructed tablet see Additional file (Video of the YZ Slice): 1 “giff_video_Ebal_SliceYZ_flattened_mean.giff”.

Paleographic analysis of the “Inner B” inscription⁸

Object structure

The object is a single folded lead strip. When unfolded, the strip would have resembled a tiny two-page booklet. We designated the exterior sides of the object as “Outer A” and “Outer B” and the interior sides as “Inner A” and “Inner B.” If the object were to be unfolded, “Inner B” would be on the right and “Inner A” on the left. The outer “pages” appear in an inverted order: “Outer A” to

⁸ The reading on “Inner B” derives from script recovered from tomographic scans. The letters closely resemble parallels from the proto-alphabetic corpus. Virtually identical letters appear on “Outer A.” Using high-resolution photos, we detected bulges of the letters from “Inner B” on “Outer B” (see *infra* Table 10). A future publication will cover the exterior inscription.

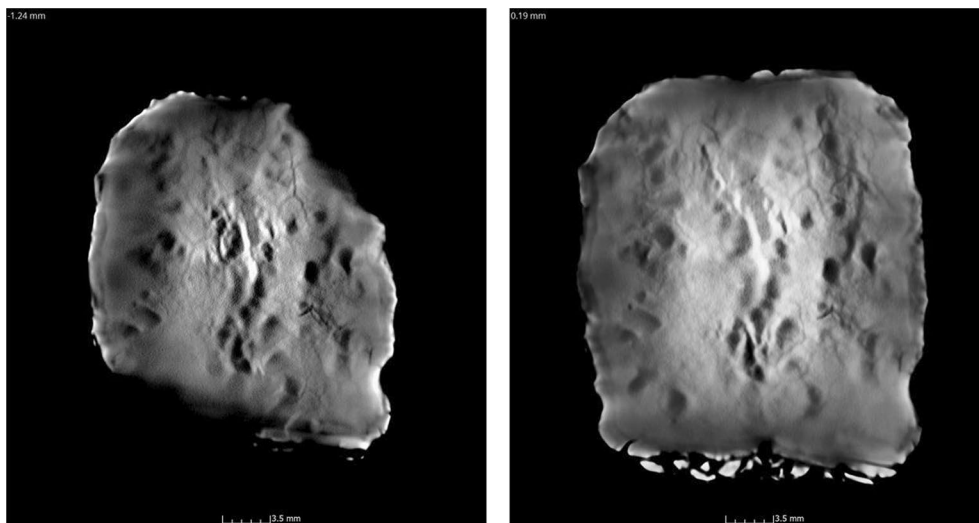


Fig. 4 XCT slice (left) compared with Fig. 3 (right). The slice taken approximately at the same position after tablet straightening right yields several possible letters. Credit Daniel Vavrik



“Inner A”



“Inner B”

Fig. 5 Object structure. Drawings by Gershon Galil

the right and “Outer B” to the left (see Figs. 5 and 6). Figures 3 and 4 present a mirrored picture of the images in Fig. 5.

Transliteration and translation of the “Inner B” inscription
Transliteration of the “Inner B” inscription

'th 'rwr l'lyhw 'rwr
tmt 'rwr—'rwr mt t[mt]

[?]rwr 'th lyhw [?]rwr⁹

אתה ארור לאל יהו ארור
 תמת ארור ארור מת ת[מת]
 [א]רור אתה ליהו [א]רור

⁹ Four letters are faint (the last *mem* and *taw*, of the second *tmt*, and two *'alephs* – see below). Faint letters (whose existence and form could not be established with certainty) appear in square brackets. For the drawings of these letters, see Tables 2, 3, 4, 5, 6, 7, 8.

Table 1 The Paleographic chart of the Mt. Ebal Inscription. Drawings by Gershon Galil

	1	2	3	4	5	6	7	8	9	10	11	12
A א												
H ה												
W ו												
Y י												
L ל												
M מ												
R ר												
T ת												

Translation of the “Inner B” inscription

You are cursed by the god *yhw*, cursed.
You will die, cursed—cursed, you will surely die.
 Cursed you are by *yhw*—cursed.

The inscription consists of 48 letters in 14 word sets, which occur in three formulaic patterns (on the literary structure, see below). The underlined words are implied logically, but the text does not explicitly state them. The term *arur* (“cursed”) appears 6 times on “Inner B” (twice in each pattern) and perhaps 6 times on “Outer A,” in which case the grand total would equal 12 times.¹⁰ We discuss the significance of these numbers below. The scribe wrote in different directions: left to right, right to left, top to bottom, bottom to top, and in boustrophedon order (“as the ox plows”). Figure 7 illustrates this meandering style, beginning in the lower left corner on “Inner B.” Letters 1–17 (Cluster 1=Translation Line 1), highlighted in yellow, appear on the left side, weaving

vertically and horizontally from bottom to top. The Cluster 1 words are as follows: 1–3=ATAH; 4–7=ARWR; 8–10=LAL; 11–13=YHW; and 14–17=ARWR. Letters 18–33 (Cluster 2=Translation Line 2), highlighted in green, primarily occupy the right side on “Inner B” and descend vertically from top to bottom, except for letters 18–20 which begin on the left side and move horizontally to the right. The Cluster 2 words are as follows: 18–20=TMT; 21–24=ARWR; 25–28=ARWR; 29–30=MT; and 31–33=T[MT]. Letters 34–48 (Cluster 3=Translation Line 3), highlighted in white, fill the center. The orientation of these letters is primarily vertical, except for 34–36 which resemble a semi-circle. The Cluster 3 words are as follows: 34–37=[A]RWR; 38–40=ATAH; 41–44=LYHW; and 45–48=[A]RWR.

Importantly, the “Outer A” text is very similar to “Inner B,” with the crucial exception that it lacks the term “EI.” However, it employs the divine name “YHW” (see also “Genre” below).

The script of the “Inner B” inscription

Eight of the 22 letters in the Canaanite/Hebrew alphabet appear in the “Inner B” inscription. All letters represent

¹⁰ It remains uncertain how often the formula occurs on the outside. For the significance of the number of times the “curse” appears, see the “Discussion” below.



“Outer B”

Fig. 6 Object structure. Photographs by Jaroslav Valach

“Outer A”

a variety of forms and stances, as the relevant tables and figures demonstrate. Several of these portray archaic forms, whose appearances preserve distinct pictographic characteristics.¹¹ The interpretation derives from the available tomographic slices. Since the tablet cannot be unfolded, direct study of the inside inscription is impossible. Some letters are not fully visible on all slices, and a few forms lack certainty. Identifying letters near and within the central fold is especially challenging due to cracks and bends in the lead. Likewise, the letters are minuscule in size and vary between ca. 1.5–4 mm. Moreover, the albeit able scribe was constricted by very limited space, while the lead as a writing surface likely hampered the execution of more uniform letters. Even so, as several interior letters can also be detected on “Outer B” of the tablet, where pressure marks of these letters caused by the stylus appear, we can be certain that they are there and that in most cases the incisions are undoubtedly man-made. Table 10 shows some examples.

’Aleph

The letter *’aleph* appears nine times on “Inner B,” always as an initial letter: six times in the term *’arur*, twice

in *’atah* and once as part of the word *’El* (“deity/god”). Three *’alephs* appear in the upper register, while the others occur in the center and in the left bottom corner of the inscription (Fig. 7 and Table 1: A1–9, mirror image). Bulges of many interior letters appear on “Outer B.”

Three *’alephs* that appear in the upper register (Tables 1: A1, 3–4 and 2: 1, 3–4, mirror image) portray a more cursive style and resemble an “inverted” Latin letter A, also known from later Greek classical inscriptions [16], albeit with slightly everting “horns.”¹² A similar *’aleph*, also in the form an inverted Latin letter A, appears on “Outer A” (Table 11:1). Although this type also occurs in later Paleo-Hebrew inscriptions, its form is ancient and occurs earlier in the 2nd millennium BCE, for instance in inscriptions from the Bronze Age Egyptian turquoise mines at Serabit el-Khadim in Southwestern Sinai and at Middle Bronze Age Shechem (Tel Balata). An early Iron Age I parallel appears on the Raddana jar handle inscription.

Twice (Tables 1: A3–4 and 2: 3–4), the horizontal crossbar of *’aleph* transects the V-shaped head, as if to indicate a more figurative representation of the ears, as was the case with the older Proto-Sinaitic bovine predecessor. The “horns” of the bovine-shaped letter can be found in upward and diagonal stances (Tables 1: A1–9 and 2: 1–9, mirror image), sometimes tilting towards the

¹¹ The scribe likely employed different implements, one with a blunt end and a sharp point, and another stylus, likely with a wedge-shaped side, as seems implied by wedges incised on “Outer A” (Fig. 6). While several letters were executed in figurative form, i.e. as full and near pictograms (see especially the archaic forms of *’aleph*, *waw*, *he*, *taw*, and *resh*), not all letters were incised to the same depth. The simpler “stroke letters” may have been engraved deeper (at least in part) by the sharp point of the stylus, while figurative letters may have been engraved shallower with the blunt side of the stylus.

¹² The precise form of the first *’aleph* in the upper right register (Table 2: 1) remains unclear, as it is closely intertwined with other letters in this part of the inscription, i.e. with *he* (Table 3: 1), *mem* (Table 7: 1), *taw* (Table 9: 1), and *’aleph* (Table 2: 2). Why the scribe incised the letters so close to each other is unknown.



“Inner B” Text

“Inner B” Annotations

Fig. 7 Line-drawing of the inscription on “Inner B” (left) and annotated line-drawing (right). Drawing and annotations by Gershon Galil

left and sometimes to the right. These forms undoubtedly preserve elements of more archaic *’alephs*, reminiscent of the Middle Egyptian hieroglyph *k3* (Gardiner F1, “bull”) from which they developed.¹³ A similar *’aleph* can still be found at Iron Age IIA Khirbet Qeiyafa, namely on the Khirbet Qeiyafa ostracon (form/stance “B”) [17].

The most figurative form of *’aleph* appears in the lower left corner of the register (as part of the personal pronoun *’atah*; Fig. 7 “Inner B,” Table 2: 6, mirror image). It has two ears, while the curvature of the horns and the skull suggests a distinctive natural appearance.

The letter below this *’aleph* is very similar (although its precise form escapes us) and belongs to the personal pronoun *’atah*—but contains a more vertical stance (Fig. 5 “Inner B” and Tables 1: A7 and 2: 7, mirror image). Bulges of this letter appear clearly on “Outer B.” The inscription of “Inner B” begins with this letter.

Another *’aleph* like the two previous ones, appears in the lower half of the inscription as the initial letter of *’arur* (Fig. 7 “Inner B” and Tables 1: A9 and 2: 9, mirror image). Bulges of this letter are also detectable on “Outer B.”

Three further *’alephs* appear in the central part of “Inner B.” All of them occur as the initial letter in the verb *’arur* and are bovine-shaped with two horns (Tables 1: A2, 5, 8 and 2: 2, 5, 8, mirror image). The horns of two of them invert, while those of the third evert.

¹³ I.e. an ox’s head with two horns, sometimes shown with one eye and one or two ears [18–21: tables VI–VIII, XIX–XX, XXVII].

He

The letter *he* appears four times on “Inner B,” twice in the divine name *YHW* (on the divine name, see “*Tamut, mot tamut*” below) and twice in the personal pronoun *’atah*. Both times the letter occupies a prominent place within the divine name. It appears once in the upper left register and once in the center to the left of the central fold (Fig. 7 and Tables 1: H1–2 and 3: 1–2, mirror image).¹⁴

The two letters are closely reminiscent of the Middle Egyptian hieroglyph *ḳ3(i)* (Gardiner A28, meaning “to extol”), representing a *standing* figure with raised arms. This form is attested in Proto-Sinaitic inscriptions, where it occurs alongside the more common form for *he*, a *seated* figure with raised arms, which seems to have derived from the Middle Egyptian hieroglyph A1 (frequently used as a denominative for indicating royal officials) or from the hieratic version of A28 [20].

Its proper place within the divine name confirms the identity of the letter *he*. Perhaps the writer increased its appearance (with raised arms as in adoration, cf. Egyptian *ḳ3(i)* “to extol”) to pay special tribute to his deity. Although this suggestion must remain conjectural, its significance for Israelite religious studies merits further investigation. A similar standing *he*—albeit smaller—is found toward the left lower edge of “Inner B” as part of the personal pronoun *’atah* (Tables 1: H4 and 3: 4).

¹⁴ The entire letter is not clearly visible, but its upper half (head and arms) is clear.

A clear letter *he* also appears in the center of “Outer A” of the tablet. It is a cross-shaped figure with two small legs and a disk-shaped head (see Fig. 6: “Outer A”). Strikingly, only the *standing* variant of *he* occurs in Proto-Sinaitic inscriptions, and only the *seated* variant appears in the Proto-Canaanite corpus.¹⁵ Moreover, whereas the standing variant still closely preserves the ancient pictographic form, its Proto-Canaanite “successor” virtually lost its naturalistic elements. The more prevalent form of *he* (that of the seated figure) appears once in the lower left half of “Inner B,” where it occurs in the personal pronoun *'atah* (Fig. 7 and Tables 1: H3 and 3: 3).¹⁶

Waw

The letter *waw* appears eight times on “Inner B:” twice in the divine name *YHW* and six times in the term *'arur*. Two *waws* are in the upper register, while the others lie within the central and lower half of the inscription (Fig. 7 and Table 1: W1–8). Each of the eight occurrences deviates in style and appearance. Even so, they all resemble the Middle Egyptian hieroglyph ḥḏ (Gardiner T3, “mace”) from which the letter developed. This Egyptian letter represents a pear-shaped mace. Precisely this form is represented by the proto-alphabetic letter *waw* in Proto-Sinaitic and Proto-Canaanite inscriptions of the eighteenth–twelfth centuries BCE. It no longer appears during the early Iron Age, when its U- or V-shaped head opens toward the top and becomes reminiscent of the Latin letter “Y” [17, with additional bibliography].

Four out of eight (longer and shorter) stems of *waw* are straight (Fig. 7; Tables 1: W2–4, 6, 8 and 4: 2–4, 6, 8, mirror image). Some orient vertically (Tables 1: W2–4, 6, 8 and 4: 2–4, 8, mirror image) while others are positioned in a more diagonal stance (Tables 1: W1, 5, 7 and 4: 1, 5–6, mirror image). Bulges of some of these also appear on “Outer B” (Table 10: 4). Once *waw* is short and resembles the small Latin letter “e” while its stem curves upwards (Tables 1: W7 and 4: 7, mirror image).

Sometimes *waw* stances in an almost perfect upright position (Tables 1: W2–4, 6, 8 and 4: 2–4, 8, mirror image), while twice it tilts, once toward the left and once toward the right (Tables 1: W1, 5, 7 and 4: 1, 5, mirror image). In some instances, the head has a large circular or rhomboid form (Tables 1: W1–2, 5, 6, 8 and 4: 1–2, 5, 6, 8, mirror image). In many instances, the head is considerably smaller (Tables 1: W4 and 4: 2–4, mirror image) like *waw* on the Gezer sherd. In one instance, the head may

have small protrusions (Tables 1: W3 and 4: 3, mirror image); this letter is also represented by bulges on “Outer B.” This type may relate to hieroglyph T3 at Abydos, where a small vertical stroke likewise protrudes from the mace-head of the letter. In this case, however, the protrusion represents the continuation of the mace’s wooden shaft. The Wadi Hammamat hieroglyphs have a similar T3 style [22].¹⁷

Yod

The letter *yod* appears twice on “Inner B:” Both times it occurs as the initial letter in the divine name *YHW* (See 4.3 below), and both times it resembles the Latin letter “F” (Fig. 7; Tables 1: Y1–2 and 5: 1–2, mirror image). The first *yod* has an inverted stance and is engraved toward the right of the large *he* in the upper left register. Its bulges protrude into “Outer B” (Table 10: 3). The second *yod* is likewise found upside down, but this time it appears in mirror stance.

Yod derives its form from the Middle Egyptian hieroglyphs (Gardiner D36, “arm, hand”) and *drt* (Gardiner D47, “hand”), whose appearance and stance appear in the Proto-Sinaitic inscriptions, including the Wadi el-Ḥol in Upper Egypt and at Serabit el-Khadim in Sinai. The best parallel occurs on the Serabit el-Khadim sphinx S345, kept at the British Museum in London [21: Table LXIX, 344].

Morenz suggests that this form may also be found on green jasper scarabs, for instance from Middle Bronze Age II Tel Jemmeh and Tel es-Sultan (Jericho), whose inscriptions he interprets as Proto-Canaanite [23]. The sturdy F-shaped form seems to have had a long duration and as such can still be found on the Qubur el-Walayda bowl from the late thirteenth century BCE. The early Iron Age epigraphic corpus, where the form of *yod* seems to have further evolved, lacks an exact parallel. Even so, it may occur in the recently discovered early Iron Age “Jerubbaal” inscription from Khirbet el-Ra’i in the Judean Shephelah, but as the letter is only partly preserved, this remains uncertain.¹⁸

Lamed

The letter *lamed* appears three times on “Inner B” and twice on “Outer A.” All three letters are faint, and the first two letters (Table 6: 1–2) intertwine with other letters. Bulges of all three *lameds* occur on “Outer B” in mirror stance, confirming their existence (Table 10: 5–6). The letter always has a form that closely resembles the

¹⁵ See the letter *he* on the Nagila sherd and on the Lachish bowl fragment, [19: Table 5].

¹⁶ The entire letter is not clearly visible, but its upper half (head and arms) is obvious (Table 3: 3).

¹⁷ While the letter *waw* may also have a protrusion in Sinai 376, when scrutinized, the extension there may be no more than a simple scratch on the rock face [21: tables V and VI, 280–281].

¹⁸ For further discussions on the subject see the following: [12, 20, 23].

Table 2 Photos and line drawings of 'aleph as they occur on "Inner B." Drawings by Pieter Gert van der Veen and Scott Stripling





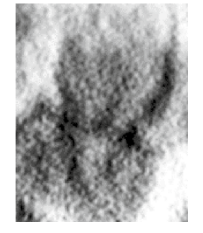



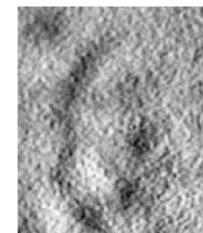

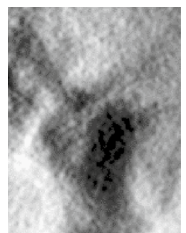

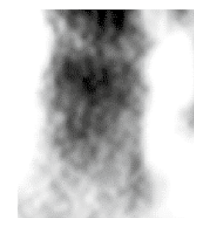

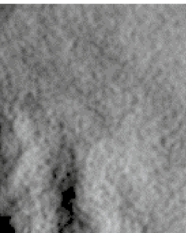

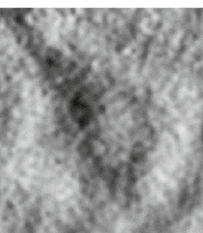

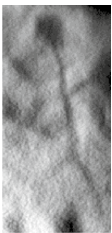





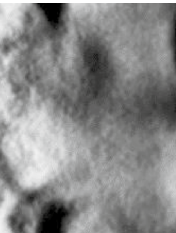

			
1A Scan: Ebal_flattened_YZ_35.tif. 0.35 mm.	1B 'aleph intertwined with <i>waw</i> (1), <i>mam</i> (1), and 'aleph (2).	2A Scan: Ebal_flattened_YZ_35.tif. 0.35 mm.	2B 'aleph beneath 'aleph (1) above.
			
3A Scan: 9.tif. 1.22 mm.	3B 'aleph in upper register (right).	4A Scan: Ebal_flattened_YZ_33.tif. 0.15 mm.	4B 'aleph in upper fold area with <i>resh</i> between the horns.
			
5A Scan: Ebal_YZ_HighPF_23.tif. -85mm.	5B 'aleph in the central fold area.	6A Scan: Ebal_flattened_YZ_34.tif. 0.25 mm.	6B pictographic 'aleph in lower right half.
			
7A Scan: Ebal_side B 0.96.tif. 0.96 mm	7B ['aleph] beneath 'aleph (6).	8A Scan: Ebal_flattened_YZ_32.tif. -0.05 mm.	8B 'aleph in in the central right half.
			
9A Scan: Ebal_YZ_HighPassFilter_34.jpg. 0.25 mm.	9B ['aleph] to the right of the lower fold.		

Table 3 Photos and line drawings of *he* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

			
1A Scan: 9.tif. 1.22 mm.	1B <i>he</i> near <i>waw</i> (1), <i>lamed</i> (2) and <i>taw</i> (2) in upper right register.	2A Scan: Ebal_YZ_HighPassFilter 23.tif. -0.85 mm.	2B <i>he</i> with visible arms, head, and neck in the central right half.
			
3A Scan: Ebal side B 0.02.tif. 0.02 m	3B seated <i>he</i> in lower right half.	4A Scan: Ebal side B 0.56.tif. 0.56 m.	4B <i>he</i> with visible head and arms in the lower right half.

Latin letter “G” (Fig. 7; Tables 1: L1–3 and 6: 1–3, mirror image). On “Inner B” it appears twice in the first register as part of the sentence fragment *l’l-YHW*, “by ‘El/god-YHW.” The first letter (Fig. 7; Tables 1: L1 and 6: 1, mirror image) is located below the *taw* of “tamut” and the second (Tables 1: L2 and 6: 2, mirror image) below and partly behind the head of *he* in *YHW*. These first two letters intertwine with other letters. The third *lamed* appears in the center of “Inner B” near the left leg of *he* in *l-YHW* (“by *YHW*”; Tables 1: L3 and 6: 3 and 3.2.2, mirror image).

The G-shape of the letter developed from the Egyptian hieroglyph *nwh* (Gardiner V1, “rope”), which represents a coiled rope [20], and frequently appears in Proto-Sinaitic inscriptions. The same form/stance also occurs twice on the Qubur el-Walayda bowl and on the Lachish ewer. It is likewise attested in some late inscriptions in Proto-Canaanite (twelfth–tenth century BCE) script, including the Beth-Shemesh ostrakon, the “Jerubbaal” inscription from Khirbet el-Ra’i, the Khirbet Qeiyafa ostrakon and jar inscription, and the Tell es-Safi ostrakon [17].

The coiled rope form did not survive into the later ninth–eighth centuries BCE, except for the Tell Fekheriyeh statue inscription from northern Syria, which preserves archaic letter forms.

Mem

The letter *mem* appears three times on “Inner B,” always in the Hebrew verb *mot* “to die.” It is written in different stances and is represented by a zigzag line with two or even three sharp bends (Fig. 7; Tables 1: M1–3 and 7:

1–3, mirror image), reminiscent of the hieroglyphic sign *nt* (Gardiner N35, “water”). Once the letter orients horizontally, virtually resembling a Latin “M” (Table 6: 3), and twice it has a more diagonal stance (Table 7: 1–2). The horizontal form mainly occurs in Proto-Sinaitic inscriptions, unlike at Wadi el-Hol, where it is lying on its side, and virtually never in Proto-Canaanite inscriptions, except at Shechem (Tel Balata), where *mem* is consistently turned on its side in a more-or-less vertical position.¹⁹ Bulges of *mem* occur on “Outer B” (Table 10: 7).

It may also appear on the Iron Age IIA (late) Kefar Veradim gadrooned bowl, where its stance was more likely determined by the direction from which the engraver incised the inscription, around the edges of the flat bottom on the inside of the bowl [24].

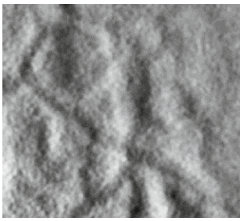

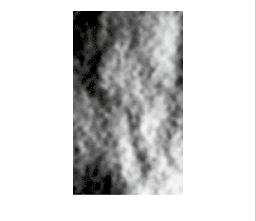

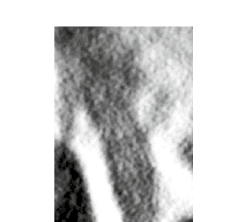

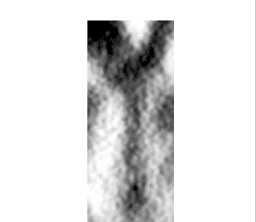

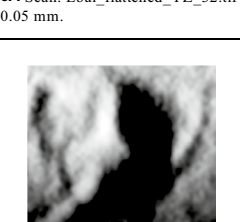
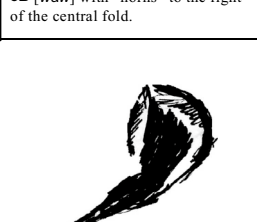
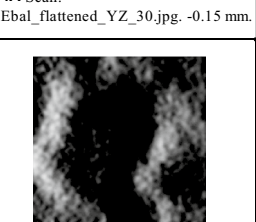
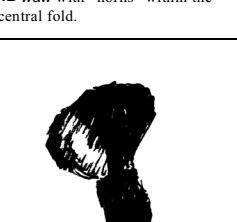
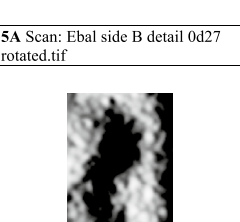
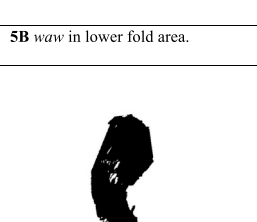
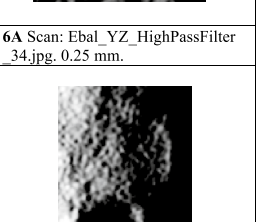
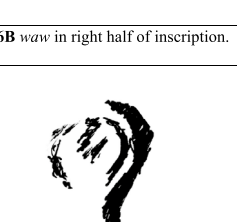
Resh

The letter *resh* appears 12 times on “Inner B,” always in the term *’arur* (“cursed”), which appears six times. The term *’arur* occurs twice in the upper central and right registers, twice in the center, and twice in the lower left half (Fig. 7; Table 1: R1–12). Although most letters are similar in form and stance, the scribe did not follow a stringent pattern. Variations in the following aspects are notable:

- (1) *The head*: It mostly has a rhomboid form. Once it has a triangular head that is not totally closed on

¹⁹ Sometimes it tips to one side, foreshadowing its later Phoenician form.

Table 4 Photos and line drawings of *waw* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

			
1A Scan: Ebal_YZ_HighPassFilter_34.tif. 0.25 mm.	1B <i>waw</i> intertwined with <i>aleph</i> (1) and <i>mem</i> (1) in upper right register.	2A Scan: Ebal_flattened_YZ_33.tif. 0.15 mm	2B <i>waw</i> in the central left register.
			
3A Scan: Ebal_flattened_YZ_32.tif. 0.05 mm.	3B [<i>waw</i>] with “horns” to the right of the central fold.	4A Scan: Ebal_flattened_YZ_30.jpg. -0.15 mm.	4B <i>waw</i> with “horns” within the central fold.
			
5A Scan: Ebal side B detail 0d27 rotated.tif	5B <i>waw</i> in lower fold area.	6A Scan: Ebal_YZ_HighPassFilter_34.jpg. 0.25 mm.	6B <i>waw</i> in right half of inscription.
			
7A Scan: Ebal_flattened_YZ_26.tif. -0.15 mm.	7B <i>waw</i> on left edge of central fold.	8A Scan: Ebal_flattened_YZ_32.tif. -0.05 mm.	8B <i>waw</i> in right half of inscription.

one side (Table 8: 3), and once it seems to have a firmly closed triangular head (Tables 1: R1 and 8: 1, mirror image), a form known from the Sealand inscriptions (ca. 1500 BCE).

- (2) *The neck*: At least twice the letter possesses a “neck” that widens toward the bottom (Fig. 7; Tables 1: R2, 4 and 8: 2, and 9, mirror image), as if the scribe sought to reproduce the archaic letter form of the head, reminiscent of the Egyptian hieroglyph Gardiner D2. The remaining “necks” are represented by

a straight line that varies in thickness and size, while it invariably tilts. Twice the letter is upside down (Tables 1: R 3, 11 and 8: 3 and 11, mirror image).

- (3) *The stance*: Most letters possess an almost vertical stance (Tables 1: R1, 3–4, 6, 8, 10–11 and 8: 1–3, 5–6, 7–9, 11, mirror image), while some tilt somewhat to the side (Tables 1: R2, 5, 7, 9, 12 and 8: 4–6, 10, 12, mirror image).

Table 5 Photos and line drawings of *yod* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

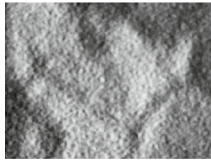

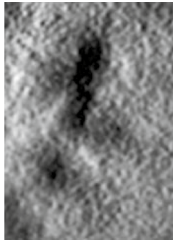

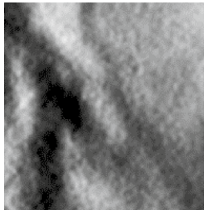

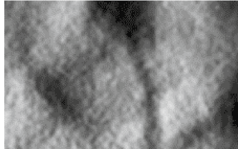

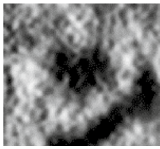

			
1A Scan: Ebal_not_flattened_YZ39.tif. 0.75 mm.	1B <i>yod</i> intertwined with <i>he</i> (1) and <i>taw</i> (2) in upper right register.	2A Scan: Ebal_YZ_HighPassFilter_23.jpg. -0.85 mm	2B <i>yod</i> to the right of the central fold.

Table 6 Photos and line drawings of *lamed* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

			
1A Scan: Ebal_flattened_YZ_37.tif. 0.55mm.	1B <i>lamed</i> intertwined with <i>taw</i> (1) in upper right register.	2A Scan: 9.tif. 1.22 mm.	2B <i>lamed</i> behind head and neck of <i>he</i> (1) in upper right register.
			
3A Scan: Ebal_YZ_HighPassFilter_33.jpg. 0.15 mm.	3B <i>lamed</i> above the arm of the seated <i>he</i> (3).		

Although the form of *resh* varies in detail, the following five categories are notable:

Form/Stance A: At least two letters (Tables 1: R2, 4 and 8: 2 and 7, mirror image) contain a kite- or double rhomboid shape, including a widening neck-like element. This is reminiscent of the Egyptian hieroglyph Gardiner D2: i.e. “head [viewed] from enface” with the meaning “face” or “above” [25]. While this form appears in Proto-Sinaitic, the kite- or rhomboid form is likely unique, but see also Form/Stance B.

Form/Stance B: Seven letters possess a rhomboid head with a straight and narrow “neck” (Tables 1: R5–12 and 8: 4–6, 8–10, 12, mirror image). This too is a peculiar form, which possibly has two parallels, once on Sinai 365b (in Proto-Sinaitic) and once on the Grossman Seal, where the letter has been rotated (see also Stance C).

Form/Stance C: One *resh* (Tables 1: R11 and 8: 11, mirror image) also possesses a rhomboid head with a

straight short “neck,” identical to Form/Stance B, but it is inverted.

Form/Stance D: One *resh* (Tables 1: R3 and 8: 3, mirror image) has a rhomboid or semi-triangular head that is open to the side, while the whole letter inverts and perhaps slightly tilts to the left. Its long vertical “neck” is straight and narrow. In two instances on the Khirbet Qeiyafa ostrakon *resh* also orients in this manner [17].

Form/Stance E: Once the head of *resh* is seemingly triangular, and its “nose” turns to the right (Tables 1: R1 and 8: 1, mirror image). This letter has a short vertical neck. Overall, the letter is similar to the common form of *resh* in later Proto-Canaanite and Phoenician inscriptions, which is also true of later Byblite and Aramaean inscriptions of the ninth–eighth centuries BCE (e.g. the Shepitba’al and Tell Fekheriyeh inscriptions). Even so, this form is by no means a late development, as stated above, as it also appears in the proto-alphabetic Sealand inscriptions from southern Mesopotamia. It derived its

form from the Egyptian hieroglyph D1 (“head in profile”), which also appears in Proto-Sinaitic and Proto-Canaanite inscriptions.

In sum and despite its possible variations, *resh* on “Inner B” is squarely archaic in style and finds good parallels in the Proto-Sinaitic and Babylonian Sealand inscriptions. Bulges of several *reshes* can be seen on “Outer B” (Table 10: 8).

Taw

The letter *taw* appears seven times on “Inner B,” always in the archaic X-form (Fig. 7; Tables 1: T1–7 and 9: 1–7, mirror image). Most letters have small ticks attached to the outer ends of one or more ticks, and as such, this feature is a significant diagnostic peg. One letter (Tables 1: T6 and 9: 6, mirror image) appears to be completely cross-shaped. Bulges of both letters are found in mirror stance on “Outer B” (Table 10: 9). The letter developed from the Middle Egyptian hieroglyphs Z10 and Z11, representing two crossing planks [17, 18, 20]. These forms/stances appear infrequently both in Proto-Sinaitic and Proto-Canaanite inscriptions, but the ticks disappear almost entirely in later scripts from the ninth century BCE onwards, with very few exceptions, such as the Zerahyahu [26]: Table 14 and the Kuntillet ‘Ajrud Pithos B inscriptions [26]: Table 3, 1b.

Terminology and chronology

The inscriptions discussed above fall into six main groups:

Proto-sinaitic inscriptions

Group 1 Proto-Sinaitic inscriptions from Egypt and Sinai dated to the 19th–sixteenth centuries BCE.

Early proto-canaanite inscriptions

Group 2 MBA–LB I Proto-Canaanite inscriptions from Canaan and Babylonia (Sealands Dynasty dated to the seventeenth–fifteenth centuries BCE): (1) the Lachish bronze dagger; (2) the Gezer jars; (3) the Gezer ostrakon; (4) the Megiddo ring; (5) the Shechem plaque; (6) the Raddana handle; (7) the recently found Lachish milk-bowl ostrakon; (8–11) the Babylonian Sealand inscriptions; and (12) the Nagila ostrakon.

Late proto-canaanite inscriptions

Group 3 Proto-Canaanite inscriptions from Canaan dated squarely to the LB II: (1) the Lachish ewer; (2) the Lachish bowl; (3) the Lachish bowl fragment; (4) the Qubur el-Walayda bowl; and (5) the Lachish jar inscription.

Group 4: Iron Age I–IIA Proto-Canaanite and Israelite inscriptions from Canaan and Israel from the twelfth–ninth centuries BCE: (1) the Beth-Shemesh ostraca; (2) the “Jerubbaal” inscription; (3) the Qeiyafa ostrakon; (4) the Qeiyafa ‘Eshbaal jar inscription; (5) the ‘Izbet Sartah inscription; (6) the Ophel inscription; and (7) the Tell es-Safi ostrakon.

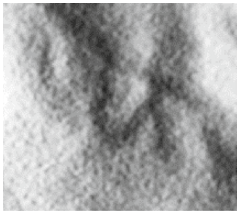

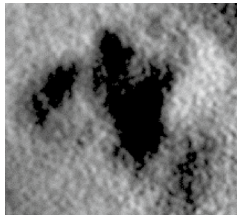
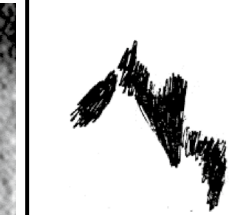
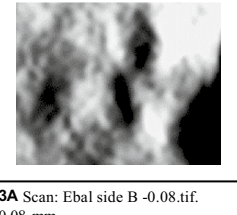
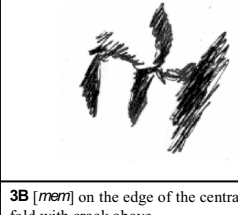
Phoenician inscriptions

Group 5 Early Phoenician inscriptions dated to the tenth–mid ninth centuries BCE, from Byblos, Tel Gezer, and Tel Zayit, etc.

Group 6 Mid-ninth century BCE inscriptions, including the Mesha and Ataroth inscriptions [27].

The precise relationship between these groups is intricate, and the processes involved are by no means linear and clear (for a similar observation, see [23]: esp. 34–45) [29]. Even so, a diachronic development of the letter types as listed in these inscriptions supports the above sequence. This order locates the “Inner B” inscription somewhere between the first two and the last three groups, within Group 3 of Late Bronze Age II. Notably, no letters on “Inner B” first appear *after* the thirteenth century BCE. This date is confirmed by the archaeological context (see above), as well as by the following arguments: (1) The letter *‘aleph* is partly presented as an ox head on “Inner B.” This pictographic form/stance is the common type attested in most inscriptions belonging to Group 1, but not so in the other groups. *‘aleph* also appears in the form of the Latin capital letter “A” with everting or widening “horns.” This form/stance is virtually identical to those found in the other groups; (2) The letter *he* appears on “Inner B” in the divine name *YHW*, twice as a standing figure with raised arms and once in its more common seated position. The small standing form also appears as the last letter of the word *‘atah* (you). This standing form is attested in Proto-Sinaitic inscriptions of Group 1 but (until now) no longer in the other groups; (3) The letter *waw* appears on “Inner B” in different forms/stances, all of which derive their form from the Egyptian hieroglyph Gardiner T3, representing a “mace with pear-shaped head.” This form appears only in inscriptions of Groups 1–3 but is absent from Groups 4–6; (4) the letter *yod* appears on “Inner B” in a form that is closely reminiscent of the Latin letter “F,” once in an inverted (mirror) position and once in an upright stance. These forms appear in Groups 1–4 but are no longer present in the latest groups; (5) The letter *lamed* on “Inner B” is represented by a semi-spiral, resembling the Latin letter “G.” This form appears only in Groups 1–4 and is absent in Groups 5–6; (6) The letter *mem* always appears in the verb “to die” in the “Inner B” inscription. Once it clearly recalls the horizontal Egyptian “water” sign (Gardiner sign N35). Its *horizontal*

Table 7 Photos and line drawings of *mem* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

			
1A Scan: 14.tif. 0.81 mm.	1B <i>mem</i> with leg of <i>waw</i> (1) in upper right register.	2A Scan: Ebal_flattened_YZ_35.jpeg. 0.35 mm.	2B <i>mem</i> in the left register.
			
3A Scan: Ebal side B -0.08.tif. 0.08 mm.	3B [<i>mem</i>] on the edge of the central fold with crack above.		

orientation is common in Group 1, but not so in the other groups with just one possible exception, the Kefar Veradim bowl (for a different interpretation, see above). This form, albeit without a leg, is attested in a *vertical* stance in Groups 3–5; and (7) the letter *resh* appears on “Inner B” in different forms, most of which contain rhomboid heads. Some of these have a neck base that resembles its hieroglyphic forerunner, from which it developed. This form appears only in Group 1. These letters resemble the Egyptian pictographic “head in enface view,” meaning “face” or “above” (Gardiner sign D2).

Once or possibly twice it appears to have a triangular head that is directed towards the top or bottom, depending on its orientation. This developed form already appears in the Babylonian Sealand proto-alphabetic inscriptions (ca. 1500 BCE). Hence, it is by no means a late development; (8) the letter *taw* appears on “Inner B” mainly in the X-form, always with ticks attached to its crossbars. This form appears only in Groups 1–4 but is absent from Groups 5–6, with just one or two exceptions, such as the Zerahyahu inscription and possibly at Kuntillet ‘Ajrud.

In sum, more than half of the letter forms only appear in Proto-Sinaitic and Proto-Canaanite inscriptions before the thirteenth century BCE. Some forms may also be found later, depending on whether their orientation must be considered chronologically significant. In line with the archaeological date of the foundational occupational phase of el-Burnat (A) during Late Bronze Age II and a similar date suggested through the metallurgical analysis of the tablet, we surmise that the earlier/earliest forms were still part of the scribal tradition of the responsible Hebrew scribe, for whom these forms may have played an

important role, either ritually or for adding a more formal ring to the content of the tablet. This would not be without parallels in Ancient Near Eastern royal and religious inscriptions [28, 30, 31, Part IV: § 31].

The vocabulary

‘El

The word *‘El* appears only in the first line of “Inner B,” in the words “*l’l YHW*” (“by [the] god, *YHW*”). Here the term *‘El* is most likely employed as an appellative for “deity,” to qualify the Israelite god. At Ugarit, the term *‘El* is most frequently used as a name for the supreme creator god. The generic sense also denotes other “deities” (*‘ilu*, *‘lm*), for instance “the god Ba‘al-Haddu” [32–34]. This is also true for other West and Northwest Semitic (Canaanite, Phoenician [‘l, ‘lm], Aramaic [‘l], Akkadian [*ilu*, *ilānu*], and Israelite) cultures. In a similar vein, the Middle Bronze Age Amorites of the Balich-Harran region worshiped an *‘El*-type deity whom they qualified as *il Amurri* (literally “the god of the West-Land”). In this sense, the term also appears in ancient Hebrew epigraphy, for instance at Kuntillet ‘Ajrud and Deir ‘Alla [35, 36]. If so, *‘El* on “Inner B” is likely employed as an appellative, qualifying the name *YHW*, Israel’s supreme god.

Yhw

The name of the god of Israel appears twice on “Inner B.” in the first line, in the words “*l’l YHW*” i.e. “by ([‘El or] god, *YHW*)” and once in the center of the inscription. Here, it appears in the shorter form *YHW* and as such is closely reminiscent of spellings found in topographical inscriptions from New Kingdom Egypt, such as in the

phrase “Shasu-land of *YHW*” (𐤔𐤏 𐤏𐤍𐤗 𐤙𐤏𐤗 with variant spellings).²⁰ The form *YHW* also appears twice at Kuntillet ‘Ajrud during the eighth century BCE.²¹

In the Hebrew Bible, the name of Israel’s god appears more than 5000 times, but the short version never appears as a single word. Rather it is found only as a theophoric element in personal names (*YHW* or *YW*). These renderings also appear in the ancient Hebrew onomasticon. For a full list, see [35], as well as in theophoric personal names attested in Neo-Assyrian and Neo-Babylonian documents (*iahu-* or *ia-*).

In the fifth century BCE Elephantine texts, the name of god appears in two short versions: *YHW* and *YHH* [37], while the short version “Iao” also appears in Greek magical papyri of the second century BCE—fifth century CE [38].

The appearance of the name *YHW*—the name of the god of Israel—suggests that the Mt. Ebal inscription was written by early Israelites in ancient Hebrew, in which case it would be the most ancient Hebrew inscription ever found in the Land of Canaan. Consequently, the inscription contributes significantly to the study of Israel’s ethnogenesis.

Tamut, mot tamut

The terms “*tamut*” and “*mot tamut*” appear on “Inner B” twice in the first line and in the inscription on the right side of the object: “You will die (*tamut*) ... you will surely die (*mot tamut*).” The noun *mt* (“death”) and the verb *mwt* (“to die”) also appear in other Semitic languages, but here, it is clearly found in a Hebrew inscription as is established by the reference to the Israelite deity *YHW* in a literary formula reminiscent of related passages in the Hebrew Bible and in ancient Hebrew epigraphy (on this, see below).²²

The phrase “*mot tamut*” occurs 12 times in different contexts in the Hebrew Bible and in passages composed by scribes belonging to different periods. Examples include the following: Gen 2:17 (God to Adam); 20:7 (God to Abimelech); 1 Sam 14:44 (Saul to Jonathan); 1 Kgs 2:37, 42 (Solomon to Shimei); 2 Kgs 1:4, 6, 16 (Elijah to Ahaziah); Jer 26:8 (priests, prophets, and other people to Jeremiah); Ezek 3:18; 33:8, 14 (as referring to the wicked).

A close phrase “he will surely put to death” = מות יומת appears 18 times in the Hebrew Bible, most (14) of which are found in the books of Exodus (8) and Leviticus (6). In 7 of 14 instances, the phrase is explicitly related to the *arur* prohibitions in Deut 27, Ex 21:15, 17, Lev 20:9 (referring to the prohibition in Deut 27:16), Ex 22:18; Lev 20:15 (referring to the prohibition in Deut 27:21), Ex 21:12, and Lev 24:17 (referring to the prohibition in Deut 27:24).

A similar phrase, albeit written in the plural, appears in an Ammonite inscription found at the Amman citadel (line 2), which reads: “... they will surely die ...” = מת ימתן [35].

‘Arur, ‘atah ‘arur, ‘arur ‘atah

The term *‘arur* (cursed) is written in the *plene* spelling as *‘rwr* (ארור), i.e. with a *waw*, and as such it can be found in all 33 biblical occurrences (ארור), including its feminine form, ארורה, and the form ארו as found in Judg 5:23: ... ארו ארו ... ארו. This spelling also appears in the epitaph tomb inscription of [Shebna]yahu from Silwan village, immediately east of the City of David (seventh century BCE): “This is [the grave of Shebna]yahu, the royal steward ... Cursed be the m[an] who op[ens] this”²³ (cf. Isa 22:15–16) [35, 41]. This *plene* spelling probably also appears on one of the inscriptions from Khirbet El-Qom: “... Cursed by *YHWH* ...” [35].²⁴ In other epigraphic inscriptions the spelling is short = *‘rr*, without a *waw*. This spelling occurs in the following inscriptions from the Judean Desert and the Shephelah: (1) the Khirbet El-Qom inscriptions: “... Cursed by *YHWH* ...”²⁵ (2) the Khirbet Beit Lei’ inscriptions (nos. 4–5): “... Cursed ...”²⁶ and (3) in Hebrew graffiti found in a cave near Ein-Gedi, in the Judean Desert: “Cursed (is the man) who will erase ...”²⁷ [35]. The fourth inscription from Khirbet Beit Lei’ is interesting, as it includes in the first line the letters:

’*rr* (ארר), which could be a scribal misspelling of ארר or ארו.

In the Hebrew Bible the term *‘arur/‘arurah* appears mainly in the book of Deuteronomy (16 times), specifically in Deut 27 (12 times) and Deut 28 (4 times), Genesis (5 times), Jeremiah (5 times), etc. Different scribes composed or edited these biblical texts in different periods.²⁸ Biblically, Joshua relates explicitly to the term *‘arur* in

²⁰ I.e. in the lists of Amenhotep III at Soleb (ca. 1391–1353 BCE), of Rameses II at Amarah-West (1279–1213 BCE), and of Rameses III at Medinet Habu (1187–1156 BCE). For these renderings, see the following: [39, 40].

²¹ I.e. No. 1.2: “... blessed by *Yhw*” = הא ליהו ברך No. 3.9: “[blessed] by *Yhw* ... and *Yhw* gave him ...” = ... ונתן לה יהו [ברכתו] ליהוה [35, 36]. In the second inscription (No. 3.9), the name of God occurs in two different versions: the short version (*Yhw*) and the long one (*Yhwh*).

²² Cf. Aqhat II vi 38: “[And] I’ll die the death of every man, I also must surely die” = [...] *mt. kl.mt. w’an. mtm’amt* [38, 42].

²³ זאת [קבורת שבנ] יהו, אשר על הבית ... ארוור הא [דם] אשר יפ[תח] את זאת.

²⁴ ארוור עפיבן נתנ [יהו] ליהוה.

²⁵ ארוור חגיבן חגיב ליהוה צבאת.

²⁶ ארוור ... ; “Cursed ...” = ארוור / רפך.

²⁷ I.e. ... אשר ימחה. The spelling ארוור in this graffiti is not clear.

²⁸ Also see [45]: esp. chapter 2; [33: chapter 1: 1.2.3]; and [46: with additional bibliography].

Table 8 Photos and line-drawings of *resh* as it occurs on "Inner B." Drawings by Pieter Gert van der Veen and Scott Stripling

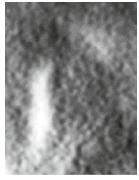

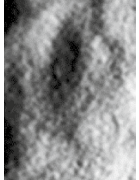

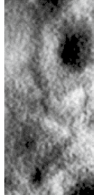

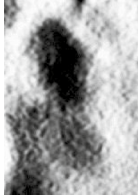



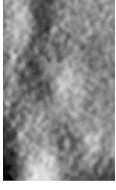

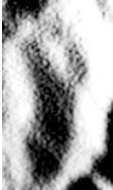

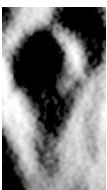

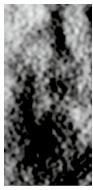



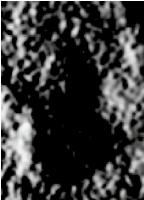

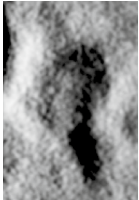

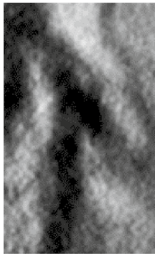

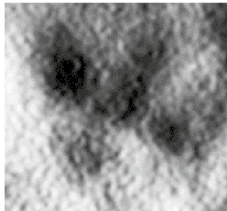

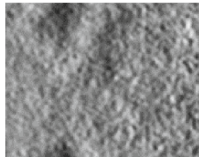

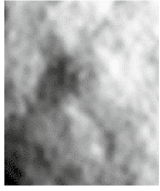

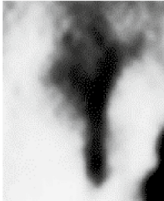

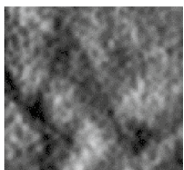

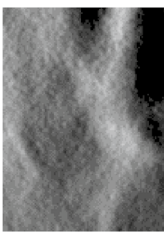

			
1A Scan: Ebal_flattened_YZ_35.jpeg. 0.35 mm.	1B <i>resh</i> between the horns of 'aleph (4) in upper left register.	2A Scan: Ebal_flattened_YZ_35.jpeg. 0.35 mm.	2B <i>resh</i> in upper left register.
			
3A Scan: Ebal_flattened_YZ_35.jpeg. 0.35 mm.	3B Inverted <i>resh</i> with opening head in left register.	4A Scan: Ebal_flattened_YZ_35.jpeg. 0.35 mm.	4B <i>resh</i> in central fold area.
			
5A Scan: Ebal_flattened_YZ_30.jpeg. -0.15 mm.	5B <i>resh</i> in lower right half below <i>lamed</i> (3).	6A Scan: Ebal_YZ_HighPassFilter_33.jpg. 0.15 mm.	6B <i>resh</i> in the right half.
			
7A Scan: Ebal_flattened_YZ_30.jpeg. -0.15 mm.	7B <i>resh</i> in right half.	8A Scan: Ebal_flattened_YZ_30.jpeg. -0.15 mm.	8B [<i>resh</i>] in right half.
			
9A Scan: Ebal_flattened_YZ_35.tif. 0.35 mm.	9B [<i>resh</i>] to the left of the inverted <i>resh</i> (3) in the left register.	10A Scan: Ebal_flattened_YZ_34.tif. 0.25 mm.	10B <i>resh</i> in right half.
			
11A Scan: Ebal_flattened_YZ_30.jpeg. -0.15 mm.	11B Inverted <i>resh</i> beneath the legs of <i>he</i> (1) in the upper register.	12A Scan: Ebal_flattened_YZ_30.jpeg. -0.15 mm.	12B <i>resh</i> in the right half.

Table 9 Photos and line drawings of *taw* as it occurs on “Inner B.” Drawings by Pieter Gert van der Veen and Scott Stripling

			
1A Scan: Ebal_flattened_YZ_35i.jpeg. 0.35 mm.	1B <i>taw</i> intertwined with <i>lamed</i> (1) and <i>mem</i> (1) in upper right register.	2A Scan: Ebal_flattened_YZ_35i.jpeg. 0.35 mm.	2B <i>taw</i> intertwined with <i>yod</i> (1) and <i>he</i> (1) in upper right register.
			
3A Scan: Ebal_flattened_YZ_35i.jpeg. 0.35 mm.	3B <i>taw</i> beneath <i>mem</i> (2) in the left register.	4A Scan: Ebal side B -0.23.tif. - 0.23 mm.	4B <i>taw</i> near the left edge of the lower central fold.
			
5A Scan: Ebal side B -0.08.tif. -0.08 mm.	5B <i>taw</i> with rhomboid-shaped head (overwriting a <i>resh?</i>).	6A Scan: Ebal_flattened_YZ_35i.jpeg. 0.35 mm.	6B <i>taw</i> to the right of seated <i>he</i> (3).
			
7A Scan: 21_02_10_SL: 10.tif. 1.02 mm.	7B [<i>taw</i>] to the left edge of the lower central fold.		

Josh 6:26 (cf. 1 Kgs 16:34) and to the altar on Mt. Ebal (Josh 8:30–35), the location of the *’arur* ceremony mentioned in Deut 27.

In the Mt. Ebal inscription the verb *’arur* was written in Hebrew, as demonstrated above. Even so, the term also appears in Akkadian (*arāru*, *arratu* = “curse, to curse,” CAD A/2: 234, 304, etc.), so it seems reasonable that it was a Proto-Semitic term that was probably also used in other languages, such as Canaanite.

The Mt. Ebal inscription also sheds light on the ancient use of the *plene* spelling, especially in curses. The use of *mater lectionis* in ancient inscriptions was not uniform as evidenced by the following Ugaritic texts: KTU 4.171: 4: *ṭmnyṃ. šmn*; KTU 1.6 VI: 10, 14: *’ahym . ytn . B’l*; KTU 1.19: IV 24, 30: *b . šmym*; and more.²⁹

²⁹ We thank Prof. Daniel Sivan for the information about the Ugaritic texts.

Table 10 Bulges of some letters of “Inner B” on “Outer B” caused by the incisions of the stylus into the thin lead strip. Examples by Pieter Gert van der Veen





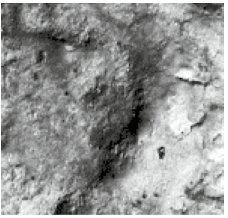

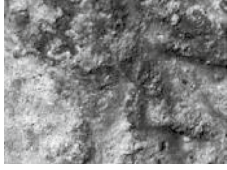
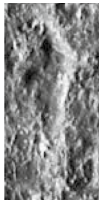


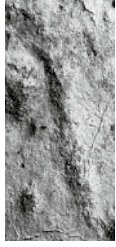





			
1 <i>aleph</i> in 'arur (upper right half).	2 <i>he</i> in 'atah (lower right half).	3 <i>yod</i> in YHW(upper right half).	4 <i>waw</i> in YHW(upper right half).
			
5 <i>lamed</i> in 'El (upper right half).	6 <i>lamed</i> around head of <i>he</i> (1).	7 <i>mem</i> in tamut (upper right half).	8 <i>resh</i> in 'arur (upper left half).

Table 11 Representative letters on “Outer A” that closely resemble the form and stance of letters on “Inner B.” Credit: Pieter Gert van der Veen

			
1 <i>aleph</i> in 'arur (lower right half).	2 <i>he</i> in YHW(center).	3 <i>waw</i> in 'arur (upper right half).	4 <i>yod</i> in YHW(center).
			
5 <i>lamed</i> in le YHW (center).	6 <i>mem</i> in tamut (lower center).	7 <i>resh</i> in 'arur (upper right half).	8 <i>taw</i> in tamut (lower center).

Literary structure of the “Inner B” inscription

The “Inner B” inscription follows a sophisticated literary structure, as follows:

- A. You are cursed by the god *yhw*—cursed.
- B. You will die,
- C. Cursed –
- C'. Cursed,
- B'. you will surely die.
- A'.Cursed you are by *yhw*—cursed.

The central pattern of the text is a chiasmic parallel:

*“You will die—cursed,
Cursed—you will surely die.”*

Similar chiasmic parallels appear in the Hebrew Bible:

Gen 9:6: “Whoever *sheds* human blood, by humans shall their blood *be shed*.”

Likewise, chiasmic parallels occur in the Ugaritic literature:

Aqhat II vi 35–36: “What after(life) can one obtain? what can a man obtain hereafter?” [43, 44].

Lead defixiones

Scribes in the Southern Levant began inscribing on metal in the Bronze Ages, and the practice continues to modern times. This can be seen on inscribed bronze arrowheads, mainly from the early Iron Age (IA IB–IIA).³⁰ Due to their relative scarcity, it is likely that these were prestige objects that may have served some magical or political purpose [48]. However, Elayi [49] disputes this view. Tin bars from the thirteenth–twelfth centuries BCE, smelted at distant places including Britain and Sardinia, inscribed with Cypro-Minoan characters, have surfaced at various sites in the Eastern Mediterranean, including modern Israel [50]. Until now, lead inscriptions (let alone *defixiones*) from the Late Bronze and Iron Ages have not been recorded in Israel, although excavations in modern Turkey yielded lead strips from the eighth century BCE (Iron Age II), containing hieroglyphic Hittite/Luwian inscriptions [51, 52]. These include the so-called Kululu lead strips with lists of personal names and towns, commodities, and a census list and the Kirşehir Letter from Yassihöyük [53, 54], which a certain Muwatalli wrote to his overlord, Tuwatti. The height of these apparently rolled strips resembles that of the Mt. Ebal tablet, measuring less than 3 cm. Correspondence recorded on lead strips also exists from Assur; these letters likely arrived there from Karchemish [55, 56] and date to the late eighth–seventh centuries BCE. The oldest known inscribed lead

strip, however, was discovered in 1936 at Late Bronze Age Büyükkale, the acropolis of the Hittite capital of Hattusas [53, 57]: Figs. 5, 6 and 7. Unfortunately, the inscription is poorly preserved and consequently it has not been fully deciphered. However, its fourteenth–thirteenth century BCE date coincides with that of the Mt. Ebal inscription and therefore confirms the use of lead strips for writing at that time.

None of the above lead inscriptions, however, contain curses like the Mt. Ebal inscription. However, curse or so-called execration texts written on pottery sherds or figurines from the Bronze Ages are known from the Old, Middle, and New Kingdom periods in Egypt, as well as from other regions. While most of these date to the Middle Kingdom and include references to enemy cities and tribes in Syria and Canaan [58, 59], specimens from the Egyptian New Kingdom also exist [60, 61] which coincide chronologically with the Mt. Ebal inscription. A curse inscription has also been found on a sherd from Late Bronze Age Stratum VII at Beth-Shean, likely reading “enemy/rebel in/of the house of the red ones,” but its precise meaning remains in dispute [62, 63]. It could also relate to the magical ritual of breaking “red pots,” a common Egyptian practice [64, 65].

Although the Mt. Ebal defixio is the earliest known inscription of its kind from Canaan, the listed examples above confirm that writing on lead existed in the Eastern Mediterranean (especially in Turkey and Northern Syria) and that curse inscriptions were common, especially in Egypt. As the metallurgical analysis has shown, the lead on which the Mt. Ebal inscription was written, originated in the Aegean, probably in the region of Lavrion in mainland Greece.

Genre and “Sitz im Leben”

Genre

As previously mentioned, the text of “Inner B” is like that of “Outer A.” Moreover, as the lead strip was folded, its inner text became invisible to human eyes and as such it became practically “sealed.” These observations imply the legal genre of the lead strip and as such it may be comparable to Hittite, Assyrian, and other “legal-economic texts.” As is the case with these documents, the main text was written on the inside, while a version of it was copied on “the envelope.”³¹ If correctly interpreted, the Mt. Ebal inscription would not only be a curse document but also possibly a sort of judicial text, whose warning codified an “agreement” between YHWH and his people Israel.

³⁰ Only the Ruweish arrowhead came from a controlled excavation; for the others the provenance was uncertain [47].

³¹ See Galil [66] for additional bibliography.

“Sitz im Leben”

As mentioned above, the lead inscription derived from the east dump at el-Burnat (A) and therefore it almost certainly came from one of the altars rather than from the “four-room house” in Area B. The palaeographic analysis suggests that the inscription belongs to the earliest possible stratum at the site, that of Late Bronze Age II. This would mean that the lead strip pertains to the more primitive (round) altar rather than to the larger later structure with the ramp that dates to early Iron Age I. It is possible that the tablet was purposely left at the site, and if so, this would certainly be significant. It may have originally been utilized near the altar during a curse ceremony (cf. Deut 27 and Josh 8) and later deposited on the altar by priests. The observation that the tablet possibly mentions the term *’arur* 12 times (like Deut 27) may suggest that the object could indeed have been related to a curse ceremony as mentioned in Deut 27. The possibility also exists that the tablet reflects a verdict against an individual sinner under a divine curse (see Deut. 21:22–23) [67].³² The pilgrims that frequented the site would not have touched the tablet, let alone taken it with them, as they considered the object to be sacred. Like the Ark of the covenant, ritual relics (*mana*) were often considered too holy to touch (2 Sam 6:6–7) or even view (1 Sam 6:19). Of course, it could also have been simply buried in the ground or deposited within the altar temenos with other cultic objects as a kind of *favissa*, a practice which occurred at other sites, including Iron Age Yavneh [68, 69], near the coast, and Horvat Qitmit in the northern Negev Desert. Excavation there yielded ritual objects, once part of the inventory of the local shrine [70]. Indeed, a *favissa* was found at el-Burnat (A), containing pottery and a pumice chalice with Semitic parallels [71], apparently belonging to the earlier phase at the site. Moreover, according to Zertal [4], the shrine and the altar had indeed been ritually “buried” with innumerable stones in Stratum IA before it was abandoned, likely “to protect it because it was still considered sacred.”

Conclusion

An expedition to wet sift Adam Zertal’s dump piles from the 1980s at el-Burnat (A) yielded a small, folded lead object. Enhanced photogrammetry and tomographic reconstructions revealed letters written in a proto-alphabetic (=Proto-Hebrew) script, likely dating to the Late Bronze Age II (ca. 1400–1200 BCE), but no later than ca. 1250 BCE. The original archaeological context and analysis of the lead reinforce this date. The text contains repeated use of the word *’arur* (=curse) and is the oldest Hebrew text found within the borders of ancient Israel, predating

the Khirbet Qeiyafa ostrakon by at least two centuries. The use of the divine name *YHW* leaves no doubt that the text is Hebrew and not Canaanite. The recovery of this formulaic curse from an altar on Mt. Ebal synchronizes with Joshua 8, which mentions the construction of an altar (vss. 30–31), writing (vs. 32), and pronouncement of curses (vss. 33–34). This text requires adjustments to certain anthropological and biblical paradigms.

Note³³

Galil believes that all 48 letters are clear on the scans (Fig. 7 and Table 1) and that no brackets are needed to designate any uncertain letters. He clearly sees the letter *he* in Table 1: H3 and Fig. 7 and the form and stance of the first *’aleph* in the upper left register (Fig. 7; Table 1: A1) although it appears partly below the letters *mem*, *taw*, and *waw*. Also, he is certain that the term *’arur* appears 12 times on the defixio, 6 times on “Inner B” and 6 times on “Outer A” and that the inner and outer texts are almost identical. In Galil’s opinion the inscription dates to the end of the thirteenth century BCE—close to the date of the Mernephtah Stele (ca. 1208 BCE), but the other authors believe it could be older.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40494-023-00920-9>.

Additional file 1: (Video of the YZ Slice).

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Author contributions

SS wrote the Archaeological Context, Abstract, Introduction, Conclusion, and Bibliography. Furthermore, he served as the corresponding author and primary editor and helped PV create the drawings for Tables 2, 3, 4, 5, 6, 7, 8, 9. GG deciphered most of the letters in the inscription and composed Figs. 5, 7, and Table 1. Additionally, he and PV wrote the “Tomographic reading of the interior text” section, and the “Paleographic analysis of the “Inner B” inscription”

³² The authors recognize this possibility but believe it more likely relates to a corporate or national curse.

³³ Galil deciphered most of the interior letters, and van der Veen first recognized that there were bulges on the outer surface from portions of the interior text. Urbanova assisted with the detection of the first three letters.

section, “The Vocabulary” section, and the “Literary structure of the “Inner B” inscription” section, “Lead defixiones” section, and the “Genre and “Sitz im Leben”” section. IK assisted DV with writing the “Tomographic reading of the interior text” Section. She also oversaw CT data recording, including setup preparation and measurement of the correction data. JV assisted DV with writing the “Tomographic reading of the interior text” section. He also developed protocols and performed surface reconstructions of the lead tablet. PV deciphered portions of the inscription, first recognized the exterior bulges, and composed the drawings for Tables 2, 3, 4, 5, 6, 7, 8 and 9. He also created Tables 10 and 11. Furthermore, he and GG wrote the “Tomographic reading of the interior text” section, “Paleographic analysis of the “Inner B” inscription” section, “The Vocabulary” section “Literary structure of the “Inner B” inscription” section, the “Lead defixiones” section, and “Genre and “Sitz im Leben”” section. He also helped SS format the manuscript. DV conducted the extensive data processing needed to read the scans, and he wrote “Tomographic reading of the interior text” section. Additionally, he created Figs. 2, 3, and 4. JV performed surface reconstructions of the defixio. All authors reviewed the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The underlying data are available upon request. One example is as follows: “giff_video_Ebal_SliceYZ_flattened_mean.giff”.

Code availability

Not applicable.

Declarations

Ethics approval and consent to participate

The authors have permission to use all images in the article and have properly credited all sources and acknowledged all contributors. No portion of this article has been published or is pending publication with another journal in any form or language.

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