

A Brand New Old Inscription: Arad Ostrakon 16 Rediscovered via Multispectral Imaging

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Arad Ostrakon 16 is part of the Elyashiv Archive, dated to ca. 600 B.C. It was published as bearing an inscription on the recto only. New multispectral images of the ostrakon have enabled us to reveal a hitherto invisible inscription on the verso, as well as additional letters, words, and complete lines on the recto. We present here the new images and offer our new reading and reinterpretation of the ostrakon.

Keywords: Arad; Elyashiv Archive; Judah; literacy; seventh century B.C.; multispectral imaging; epistolography; Northwest Semitic epigraphy

Arad Ostrakon 16 is part of the Elyashiv Archive¹ discovered at the site in the 1960s. It was first published in the Israel Museum's catalog, *Inscriptions Reveal: Documents from the Time of the Bible, the Mishna and the Talmud* (Hestrin et al. 1972: 64, no. 51, without a photo; see also Weippert 1975: 204, 211–12; and Lemaire 1977: 172–74) and then included, together with the entire epigraphic corpus from the site, in the *editio princeps*, *Arad Inscriptions* by Yohanan Aharoni (1975; republished in English in Aharoni 1981: 30–31).²

¹ For further bibliography, see Renz and Röllig 1995: 347–403; Dobbs-Allsopp et al. 2005: 5–7; and Ahituv 2012: 87–88, 149.

² For the history of the publication of the Arad inscriptions, see Na'aman 2011: 83.

The ink of the ostrakon has faded “to the extent of disappearing in the color of the grey sherd” (Aharoni 1981: 30). On the recto, 14 lines of written text can be discerned. Aharoni transcribed ten lines, while other scholars noted the existence of additional lines but were unable to decipher them. At any rate, it has been generally agreed that only ten lines have decipherable words, and only the first five can be read as a continuous text (Lemaire 1977: 172–74; Pardee 1978: 310; Pardee et al. 1982: 49; Davies 1991–2004: 16; Renz and Röllig 1995: 379–80; Ahituv 2012: 110–12; Dobbs-Allsopp et al.

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2005: 31–34). Having harnessed the new technology of multispectral imaging for use in the field of Northwest Semitic epigraphy (with some examples in Faigenbaum et al. 2012; 2014; 2015; Faigenbaum-Golovin et al. 2015; Sober et al. 2014), we are now able to state that there is writing on the entire surface of the recto. Consequently, we are today able to offer a new reading for the recto of Arad 16. Furthermore, over 40 years after its first publication, we have also found, to our surprise, that the sherd was in fact written on both sides, recto *and* verso. Our imaging method makes it possible to identify three legible lines on the verso.

In this article, we offer a reading of the newly discovered text on the verso and an updated reading of the recto. In light of the new data, we then propose a complete interpretation of the ostrakon, putting it in context with the entire assemblage of the Arad inscriptions—the largest corpus of ostraca from a single site in Iron Age Judah.

Method: Multispectral Imaging

An experimental study (Faigenbaum et al. 2012) demonstrated that (a) the optimal imaging wavelength for ostraca lies between 550 nm and 950 nm; and (b) ten different bandpass filters are sufficient for capturing the most favorable image. Accordingly, we used a standard digital camera that is sensitive to the visual spectrum (i.e., 400–700 nm), with its internal infrared (IR) cut filter removed and replaced with transparent glass in order to enhance the camera sensitivity in IR wavelengths (i.e., up to 1,000 nm). Thereafter, the spectrum was sliced into ten channels utilizing commercial external bandpass filters. Using this system, we produced spectral cubes of ten images for each side of the ostrakon. We selected the best images (taken at 830 nm for the recto and 890 nm for the verso), based on an algorithm that we developed (described in Faigenbaum et al. 2012 and Shaus et al. 2017). In order to improve the legibility of the images, we performed contrast and brightness manipulations via the freely available ImageJ 1.48V and IrfanView 4.38 software applications. The facsimiles of the inscription were created by us manually, aided by computer software. For further technical details, see Faigenbaum-Golovin et al. 2017.

Figure 1 depicts the recto, comparing an image taken shortly after the excavations with a current color image and with an 830 nm image taken via our multispectral imaging system. **Figure 2 (a–c)** depicts the verso, comparing a current color image to an 890 nm image taken via our multispectral imaging system (see below). The facsimiles represent our new reading of the ostrakon.

Recto

Aharoni read the inscription as follows:

1. אחד. חנניהו. שלח לשל-
2. ס. אלישב. ולשלם ביתך. בר-
3. כתך ליהוה. ועת כצאתי
4. מביתך ושלחתי את
5. ה[כ]סף 8 ש[קלים] לבני גאליהו [ב]
6. י[ד ע] זריהו, ואת
7. אתך והש
8. את כסף. ואמ
9. צבכ שלח
10. את נחם ולא תשלח ל

This reading was translated and interpreted as follows:³ “Your brother Ḥananyahu (hereby) sends greetings to (you), Elyashiv, and to your household. I bless you by Yahweh. And now, when I left your house I sent the [mo]ney, 8 s[hekels], to the sons of Ge’alyahu by the intermediary of Azaryahu as well as the [...] money [...]. And if [...] send Nahum and you shall not send [...].”

Below is the new reading, based on our optimal image, followed by philological comments and a discussion (in red: our alterations and additions with respect to older readings):

1. אהבך חנניהו. שלח לשל-
2. ס אלישב. ולשלם ביתך בר-
3. כת <ד>. ליהוה. ועת כצאתי
4. מביתך. ושלחתי את
5. ספ[ר] זכה. לפני גאליהו. ב
6. י[ד ע] זריהו. ואת הצרוך
7. שא אתך. והשבת[ם?]. כ[לו]
8. אם כסף. 5 {חאר} ואם י[ש ב]
9. מ[צבך]. שמון שלח []
10. [הנח ואל תשלח |
11. או קהתן 5(?)
12. הא'
13. א/א' לא/א'
14. צח

Commentary

Line 1 (Fig. 3): אהבך: Aharoni, followed by many others (Lemaire 1977: 172–74; Pardee 1978: 310; Renz and Röllig 1995: 379–80; Dobbs-Allsopp et al. 2005: 31–34; Aḥituv 2012: 110–12), read אחד, “your brother.” Pardee (1978: 310; cf. Pardee et al. 1982: 48–50, 157–59)

³ We have incorporated Aharoni’s (1981: 30–31) translation with that of Dennis Pardee (1978: 310–12) and of F. W. Dobbs-Allsopp and colleagues (2005: 31–34) (cf. also Lemaire 1977: 172–74 and Renz and Röllig 1995: 379–80).

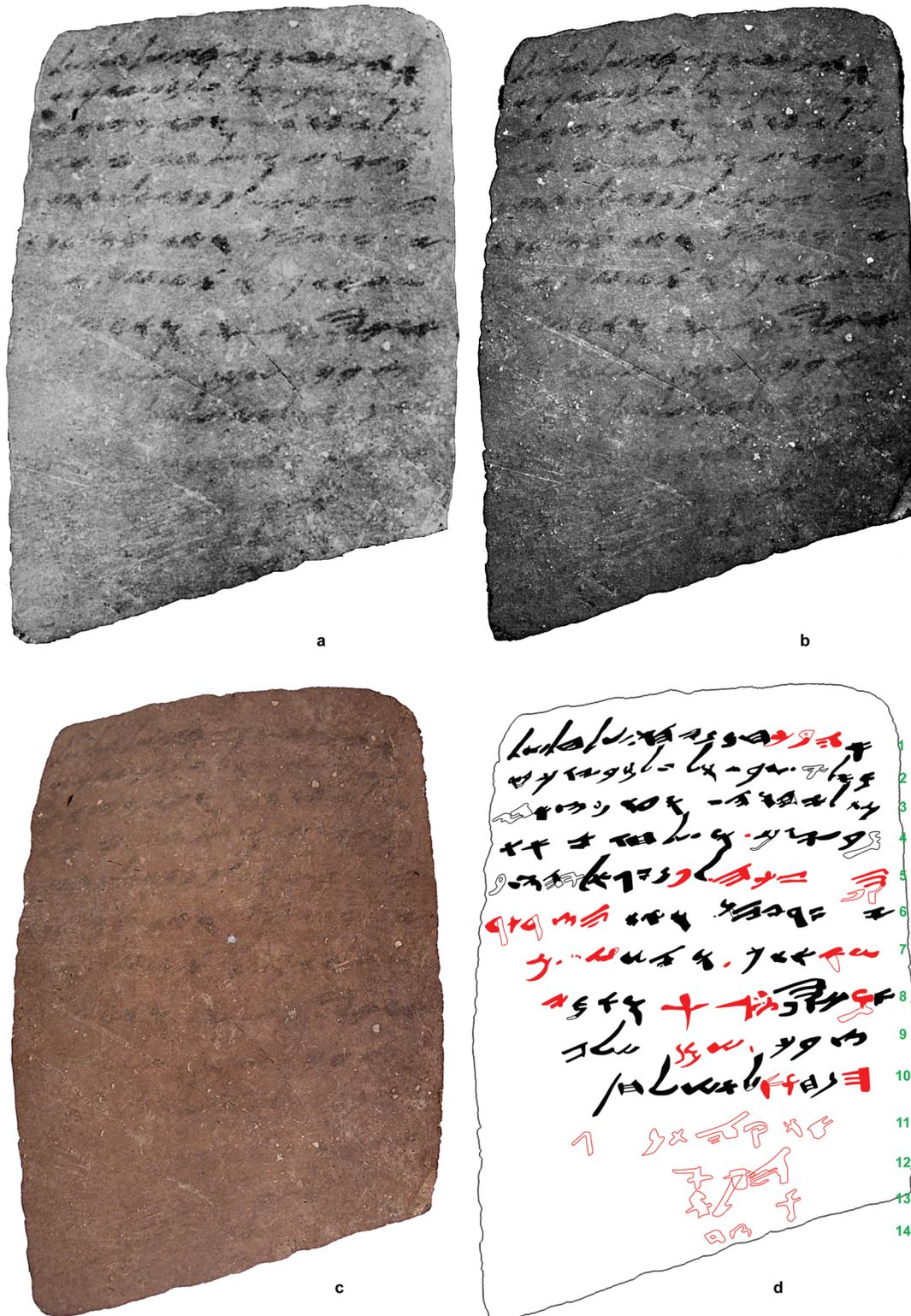


Fig. 1. Recto of Arad Ostrakon 16: (a) An image taken shortly after the excavations (courtesy of the Israel Antiquities Authority); (b) 830 nm image taken via our multispectral imaging system; (c) current color image; and (d) our facsimile (in red: our new readings, as opposed to older readings by Aharoni and others in black; hollow shapes represent reconstructed letters and characters). (Photos b–d by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

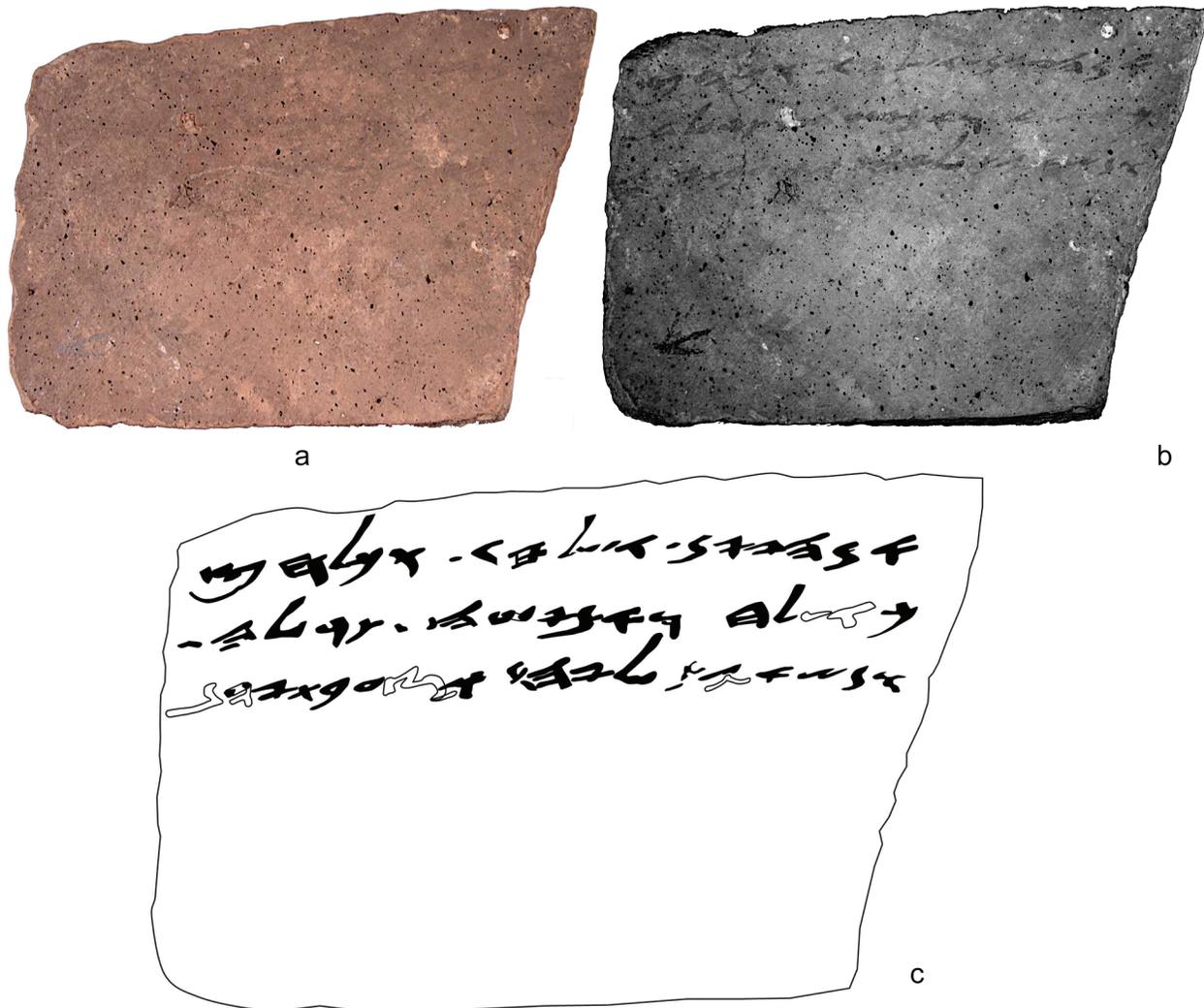


Fig. 2. Verso of Arad Ostrakon 16: (a) Current color image; (b) 890 nm image taken via our multispectral imaging system; and (c) our facsimile. (Photos by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

took this kinship term, here and in Letters 21 and 40 (בִּנְךָ, בְּנֵיךָ, “your son/s”), at face value.⁴ Indeed, the noun “brother” (as well as “sister”) is used in the *praescriptio* of letters throughout the ancient Near East—in Akkadian, Aramaic, Ugaritic, as well as in Hebrew letters (Dion 1982; Fitzmyer 1982; Pardee et al. 1982; Moran 1992; Michalowski 1993); to the best of our knowledge, אֶהְבֵּךְ is

⁴ Interestingly, Letters 16, 21, and 40 are a distinct group of military reports within the Arad corpus. Besides sharing the salutation formula בְּרֵךְ לִי (which was also taken by Pardee to support his theory about genuine kinship, though he later expressed a less confident approach to this question [see Pardee et al. 1982: 49–50 and Pardee 2003: 83]), they are accounts concerning various matters such as money transfer, mail delivery, and the military situation, as opposed to instructions of supply to the *Kittim* (see Lemaire 1977: 224–26; cf. Na’aman 2015b: 50).

never found in this corpus. However, with the new photographs, its reading here is certain, and this may be its first attestation. To explain its meaning philologically, we adopt the Greek and Latin translations for אֶהְבֵּךְ אֶבְרָהָם אֶהְבֵּךְ (Isa 41:8; 2 Chr 20:7), “Abraham thy friend.” We cannot say for certain if אֶהְבֵּךְ signifies a military rank, but it would seem that a “friend” could be regarded as Elyashiv’s equal.

Lines 1–3 (Figs. 3–5): שְׁלַח לְשָׁלוֹם אֶל־יֹשֵׁב וְלְשָׁלוֹם בֵּיתְךָ. The idiom שְׁלַח לְשָׁלוֹם בֵּיתְךָ also occurs in Arad Letters 21 and 40⁵ (בֵּיתְךָ is missing only in the latter). Another occurrence in Hebrew epigraphy is in the Murabba‘at

⁵ See n. 4 above.

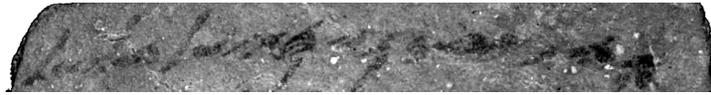


Fig. 3. Line 1 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

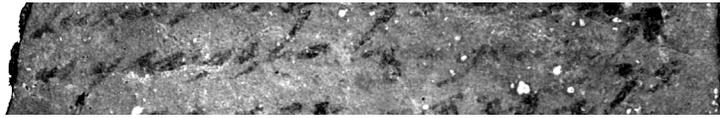


Fig. 4. Line 2 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

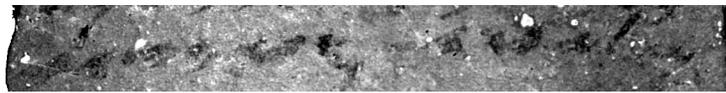


Fig. 5. Line 3 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

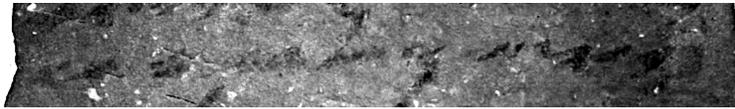


Fig. 6. Line 4 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

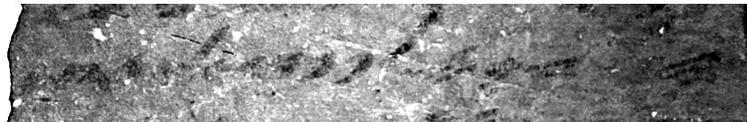


Fig. 7. Line 5 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

Papyrus (Ahituv 2008: 213–15), and there are other occurrences in Aramaic letters (Pardee et al. 1982: 50; cf. Porten and Yardeni 1999: 16–33).

We agree with André Lemaire (1977: 173) that there is no final *kaph* that some other scholars see. In the Hebrew Bible, only the passive formulation, DN ברוך/ברוך ל- (Gen 14:15; Judg 17:2; Ps 115:15; etc.). In West Semitic epigraphy, the transitive formula is attested as well (Pardee 2003: 83–84; Ahituv 2008: 113–16): in Hebrew, at Kuntillet 'Ajrud: ברכתך ליהוה, "I bless you to Yahweh" (Ahituv, Eshel, and Meshel 2012: 87–91, 95–97; cf. לעבדיו בן עדנה. ברכך הא ליהוה [Ahituv, Eshel, and Meshel 2012: 76–77]); in Aramaic, on an ostracoon from Elephantine: ברכתך ליהוה, ולחננום, "I bless you to YHH and to Khenum/to Ptaḥ" (e.g., Porten and Yardeni 1999: 172); in Phoenician, in a letter found at Saqqara in Egypt: אל, תחפנס ברכתך לבעל צפן ולכל אל, "I bless you to Ba'al Zaphon and to all the gods of Taḥpanes" (KAI 50); and in Edomite, in the causative

H-stem (Hebrew Hip'il), והברכתך לקוס, "I bless you to Qos," in an ostracoon from Ḥorvat 'Uza (Beit-Arieh 2007: 133–37; Ahituv 2008: 351–54). Given this well-attested salutation formula, we see ברכתך as a scribal error wherein the author forgot to add the personal pronoun (ך-).

Line 3 (Fig. 5): כצאתי: As Aharoni had already noted, only the letters צא are clear; the rest is a reconstruction in light of מביתך ("from your house") and of the first person ושלחתי in line 4. Still, this reconstruction is plausible enough. This "house" may have been Elyashiv's residence as well as the storeroom of the fortress (Dobbs-Allsopp et al. 2005: 33). The tense of the construct infinitive כצאתי is defined by the tense of the following verb, ושלחתי (cf. Exod 9:29 and Ahituv 2008: 116). Also, since this is a military report, it seems more probable that this lexeme refers to an accomplished act (*pace* Pardee 2003: 84; cf. Pardee 1978: 311).

Lines 4–5 (Figs. 6, 7): ושלחתי את ספ[ר] זכה לפני גאליהו: The multispectral photographs show that Aharoni's

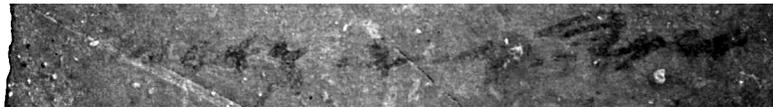


Fig. 10. Line 8 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

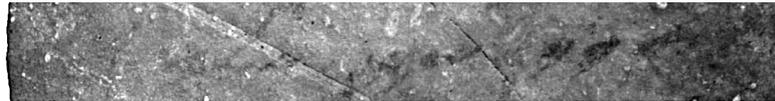


Fig. 11. Line 9 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

Interestingly, the phenomenon of silver hoards is attested in various Iron Age II sites in Israel, among them Tel Miqne-Ekron (Golani and Sass 1998; Gitin and Golani 2001), Eshtemoa (Kletter and Brand 1998), ‘Ein Gedi (Kletter and de Groot 2007: 370), and Arad itself (Aharoni 1980). In Arad, even though earlier than the period discussed here, the silver—jewelry and metal pieces—was צרוּר (wrapped up) in cloth (Aharoni 1980; cf. Singer-Avitz 2002: 161, n. 16).⁸

Line 7 (Fig. 9): This line opens with the verb שֵׂא, in the imperative. This reading explains אָתְךָ which Aharoni and others already saw: “carry the bundle (of money) with you” (for bundles of money, see above).

[וְהִשְׁבַּתְּ?]: Our photo complements and clarifies Aharoni’s original reading: “and you shall return.” There are traces of an additional letter after the *tav*, perhaps *mem*, but they are not sufficiently legible. A separation mark follows this and then comes a *kaph*. There is room for one or two additional letters after the *kaph*; we suggest reconstructing here בְּלוּ, “all of it.”⁹

Line 8 (Fig. 10): We read אִם כֶּסֶף, instead of אֵת כֶּסֶף, which was accepted by many. The phrase “אִם (+ עוֹד) + [noun]” is current in Arad: on Ostracan 2, lines 7–8: וְאִם עוֹד חֲמֶץ, וְנָתַתְּ לָהֶם, “If there is any vinegar left, give (that) to them (also)” (see Aharoni 1981: 15–16; the translation from Pardee 2003: 82). כֶּסֶף is followed by two signs that are probably hieratic. The first one is reminiscent of the numeral 5; some traces of ink are attached to its right side, but they are only barely recognizable. Perhaps they could be read as the *sheqel* sign. The second sign may be understood as the “Xar” sign, attested on Inscriptions 25 (line 2) and 34 (right column, line 2) from Arad and in Kadesh Barnea’s Ostracan 6, left column. It is a sign for measure which has two variants—one

with a single downstroke, the other with a double downstroke; both have short horizontal lines on each side of the downstroke(s) (Wimmer 2008: 37, 264).¹⁰ The latter variant is attested, according to our reading, on the verso of our ostracan, as well as on Arad Ostracan 8, line 2. The difficulty is that “Xar” represents a measure of dry commodities, not of money; however, an idiosyncratic use of hieratic numerals is evident throughout our ostracan, recto and verso (for more examples, see below).

Lines 8–9 (Figs. 10, 11): וְאִם יִשׁ בְּמִצְבֵּךְ. שְׂמֵן שְׁלַח. The first *vav* marks the beginning of a new sentence, as in other supply instructions from Arad. If our reconstruction is correct, then the phrase וְאִם יִשׁ is attested one more time in this ostracan, on the verso (see below). It is known from various biblical passages (Gen 23:8, 44:26; 2 Kgs 9:15; Jer 27:18; Job 33:23), to be translated “if there is.” Next, we suggest reconstructing an additional letter *bet* at the end of line 8 which is connected to the first word in line 9, reconstructed as מִצְבֵּךְ, “your military post,” “your fortress” (Isa 29:3).¹¹ The verb שְׁלַח¹² was already seen by other commentators; שְׂמֵן is now visible with the multispectral photo. The sender here inquires whether there is any oil left in Elyashiv’s post, and if the answer is in the affirmative, then he asks him to send it along: “And if there is any oil left at your post—send it!”¹³

Line 10 (Fig. 12): הִנֵּה וְאֵל תְּשַׁלַּח: Aharoni’s reading was . . . לְ וְאֵל תְּשַׁלַּח. While the letters נַח are indeed visible in our new photo, אֵת* is not. We suggest reconstructing הִנֵּה [ה], “let it be, drop it,” which suits the rest of the line—וְאֵל תְּשַׁלַּח, hence: “drop it, don’t send (it).” At the end of the line, we discern a long oblique line.

¹⁰ We wish to thank Prof. Stefan Wimmer (pers. comm., 2016) for suggesting these readings.

¹¹ We are indebted to Prof. Nadav Na’aman for this reconstruction.

¹² To be sure, the imperfect form is used in the Arad Letters as an imperative (cf. also נָתַן in Letters 1, 2, 7), but we also find the imperative forms תֵּן and שְׁלַח in Letters 4, 5, and 6, for example.

¹³ We are indebted to Prof. André Lemaire for this reconstruction.

⁸ For a review of silver hoards, see Kletter 2003; Thompson 2003; and Peyronel 2010 (cf. Garfinkel and Mendel-Geberovich 2016).

⁹ We wish to thank Prof. Nadav Na’aman (pers. comm., 2016) for suggesting this reconstruction.

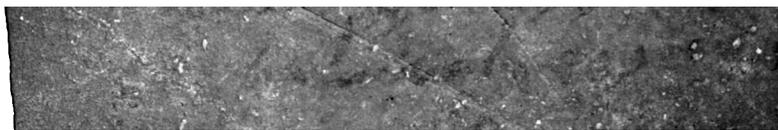


Fig. 12. Line 10 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

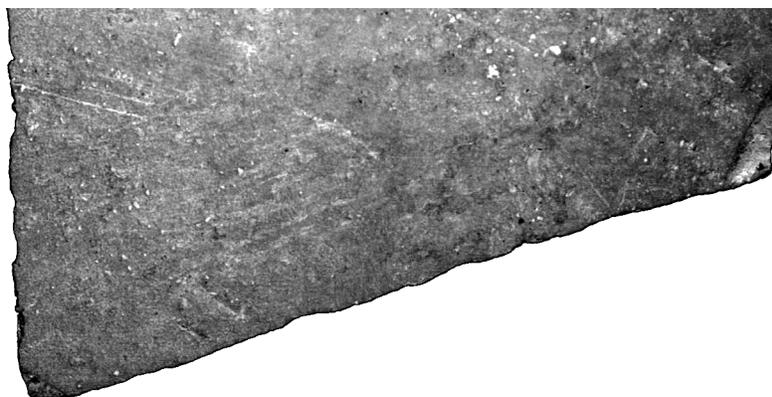


Fig. 13. Lines 11–14 of the recto. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

It is to be interpreted as a unit sign, comparable to Arad Ostraca 10 (line 3), 14 (line 3), and 17 (recto line 3, verso line 2). The fact that in all of these instances this mark either immediately follows or precedes the lexeme שמן supports our interpretation. It could be that the writer intended for this sign to represent the quantity of oil (line 9) but wrote it here too far down in the text. This lack of proficiency is attested in other features of the ostracum (see below).

Lines 11–14 (Fig. 13): We have some traces of letters and symbols. In line 13, we recognize two signs that resemble a sign from Kadesh Barnea Ostraca 6, col. 2, line 11 (Lemaire and Vernus 1983; Cohen 2007). This sign looks like the letter *f* and probably stands for “30” (Wimmer 2008: 221–22). In line 14, we recognize the word צח, which Aharoni (1981: 40–41) read in Arad Inscription 20 but which is today read otherwise (see Lemaire 1973). In short, some other traces of ink are seen on the bottom quarter of the recto, but no coherent reading can be obtained from them. Suffice it to say that its entire surface was used for writing, a fact that supports our conclusion that the verso is a continuation of the recto (see below).

Verso

The verso, which until now showed no indication of writing, had not been photographed in the past. While

the regular current color image shows no traces of ink, three lines were discovered on the verso by multispectral imaging (see Fig. 2). They read:¹⁴

1. אם היין. תשלח <. וכל חפצ
2. ך תשלח ואם יש ה [] {חאר} לה []
3. ונשא גא/מליהו הצע בת יין

The lack of a letter opening formula indicates that the text on the verso is a continuation of that on the recto.

Line 1 (Fig. 14): אם היין. תשלח <: In Arad Ostraca 2, line 7, we read: ואם עוד חמץ ונתת להם. In Ostraca 21, there is ואם עוד, but the context is unclear. This is an elliptical sentence, which was translated previously as “If there is any vinegar left, give (that) to them (also)” (cf. line 8 of the recto above). This could be considered as a clause serving as a protasis, with the next clause—< תשלח—serving as the apodosis.

The sign < is hieratic, fairly common at Arad (Ostraca 30, 33, 34, 41; cf. Ostraca 83) and at other sites, such as Ḥorvat ‘Uza (Beit-Arieh 2007: 171–72), Tell Jemmeh (Ostraca 2 [see Naveh 1985]), and Tell Jalul in Jordan (Ostraca 1 [see Gane 2008]). However, the closest parallels are found in Arad Inscription 34, left column, line 2, and in Ostraca 6 from Kadesh Barnea, recto, col. 1, line 10. In these cases, the sign is followed on the left by a dot or a small circle. These are the Hekat fractions 1/2 and

¹⁴ In the bottom left corner of the verso, there is a sign made in pencil in modern times.

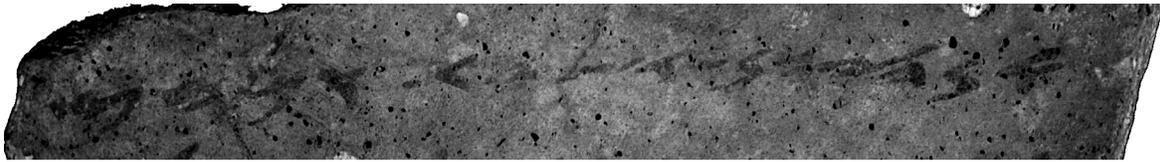


Fig. 14. Line 1 of the verso. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

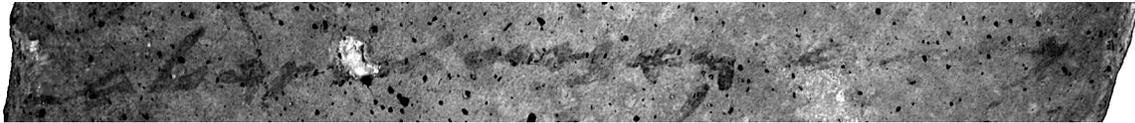


Fig. 15. Line 2 of the verso. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

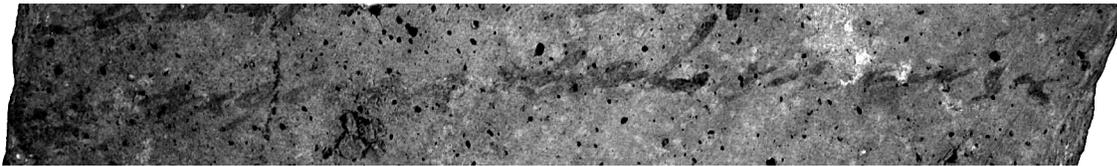


Fig. 16. Line 3 of the verso. (Photo by M. Cordonsky; courtesy of the Institute of Archaeology, Tel Aviv University)

1/4 (Wimmer 2008: 106–7). It is clear, therefore, that this is a measure of dry commodities (Milik 1961: 97; Naveh 1966: 68; Renz and Röllig 1995: 285–87; see esp. Arad Inscription 33, where it is preceded by the morpheme חטט). Hence, we have a problem with its interpretation, as here it is clearly juxtaposed to “wine”; and, as is well known, the measure for wine, in Arad and elsewhere, is *bat* (written in abbreviated form, “ב”). At any rate, the reading for this line is clear; thus, this could be a mistake on the part of the author. A less likely conclusion would be that we do not fully comprehend the meaning of this sign. Still, we know of no other instance of confusion of measures and types of goods such as this one.

Lines 1–2 (Figs. 14, 15): וכל חפצך תשלח, “whatever you desire, send (word)”—that is, write to me about it. חפץ is attested in Biblical Hebrew both as a noun (1 Kgs 5:22, 10:13; Isa 44:28; etc.) and as a verb (Gen 34:19; Num 14:8; etc.). In the context of the military reports and supply orders from Arad, we interpret this sentence as a request to notify the sender in writing whether the recipient needs anything else (cf. Lachish Letter 3, recto, lines 1–2: שלח שלח; line 7: מאז שלחך; and verso, line 2: שלח לקחת מזה; Hermopolis Papyrus III: כל זי חצבה שלח לי, “whatever you desire, send (word)” (see Bresciani and Kamil 1966: 392–96; cf. Porten and Yardeni 1999: 160, 171).

[] לה {חאר} לה [] ואם יש. ואם יש, “if there is,” is a repetition of the recto, line 8. The rest of the line is hard

to reconstruct. After a clear *he*, an inclusion hinders the view. Next, we see two unusual characters which do not resemble known palaeo-Hebrew letters of the 7th–6th centuries B.C. The closest parallel is the “Xar” sign; again, this is a sign for a dry commodities measure, not of wine, which is the context here. They are found, however, on ostraca with hieratic signs: in Arad Ostracoon 8, line 2; Arad Ostracoon 34, left column, lines 1, 7, and right column, lines 2, 3, 7; as well as on Kadesh Barnea Ostracoon 6, col. 1 (left), lines 18, 19. According to our new reading, the “Xar” sign is also attested on the recto of our ostracoon but in its variant form (with only one downstroke). However, common to both sides is the unusual usage of hieratic symbols for dry commodities—on the recto with money, and on the verso with wine. [] לה is also followed by traces of ink that are difficult to identify.

Line 3 (Fig. 16): ונשא גמליהו/גמליהו: The third line opens with the letters ונשא. The subject is a personal name. The first two letters are problematic and difficult to read, but the name could be transcribed either גמליהו or גאליהו. As the latter is mentioned on the recto, this reading is preferable, if conjectural.

הצע בת ין: The reading of הצע is uncertain. This lexeme is unknown in Hebrew epigraphy. The root צעה is attested in the Hebrew Bible (Isa 51:14, 63:1; Jer 2:20, 48:12) and has various interpretations (“bowed down,” “subdued”; “wandering,” “traveling”), none of which

makes much sense in our context. However, the passage in Jer 48:12, “וְשִׁלְחֵתִי לְוֹ צַעֲמִים וְצִעֲהוּ” is interpreted by Rabbi Meir Leibush ben Yehiel Michel Wisser (“Malbim”) (1956: 576–77) as “a wine that is fermented and bubbling to the point of bursting from its container” (as a metaphor for social agitation [our translation]). This suggestion seems plausible when it is followed by “wine” on our ostrakon. We therefore interpret הֲצַע here as a certain type of wine that has hitherto been unattested.

יִי: The usage of the full name, בַּת, preceding “wine,” is unusual in Arad, where it is always written in short, ב. However, inscriptions that use the full name are known from other sites such as Tell Beit Mirsim, Lachish, and Tel Miqne-Ekron (Lipschits et al. 2010: passim). The reading יִי is also conjectural. In addition, what seems like a double construct form, יִי הֲצַע בַּת יִי, is hard to explain. We make do with putting forward this suggested reading.

Summary

Along with the rest of the Hebrew epigraphic corpus from Arad, Ostrakon 16 has been well known for over 40 years. However, it was hitherto unknown that this ostrakon bears a second inscription on its verso. All in all, multi-spectral imaging has added 53 new characters (Hebrew letters and hieratic signs) on the recto and 52 on the verso. There are more than 20 words on the recto with a reading now changed, and 17 completely new words on the verso.

The verso seems to be a continuation of the recto. Supporting evidence for this hypothesis includes a full utilization of the recto surface for writing; an absence of a greeting formula on the verso—a mainstay of ancient Hebrew correspondence and a clear indication for the opening of a text; the similar topics of the two texts (details regarding the provision of supplies); the probable mention of the same person, Ge’alyahu, on both sides; and the seemingly idiosyncratic usage of the “Xar” sign on both sides.

How, then, should we characterize the author of our ostrakon? He was not a novice; he certainly knew how to read and write. He even knew how to write a letter: using the salutation formula in the opening (but, according to our understanding, forgetting the *kaph* in בְּרַכְתֶּךָ), using וְעַתָּה to mark the passage to the main message of the letter (Pardee et al. 1982).

However, the high variance in letter stance and morphology indicates that he was not a professional scribe (see

Faigenbaum-Golovin et al. 2016). In addition, his use of hieratic symbols is atypical of what we know today about the meaning of these signs. These, as well as some syntactic peculiarities, attest to the idiosyncrasy of this writer.

All these features add up and contribute to the complexity of the picture of ancient Hebrew literacy (Rollston 2006; 2010; 2015; Mendel 2011; 2013), implying that reading and writing were an integral component of military life during the last days of Judah (Faigenbaum-Golovin et al. 2016). We suggest that officers and logistic personnel knew how to compose letters but that some of them lacked practice in professional letter-writing.

For the reader’s convenience, we present below a continuous transliteration of the text and our new translation:

Transliteration:

Recto:

אהבך חנניהו. שלח לשלם אלישב. ולשלם ביתך ברכתך <ד>. ליהוה. ועת כצאתי מביתך. ושלחתי את ספ[ר] זכה. לפני גאליהו. ביד ע[ז]ריהו. ואת הצירוף שא אתך. והשבת[ם?]. כ[לו] [אם כסף. 5 {חאר}] ואם י[ש ב]מ[צבד]. שמן שלח [הנח ואל תשלח]. [non-coherent letter remains].

Verso:

אם היין. תשלח <. וכל חפצך תשלח ואם יש ה[] [חאר] לה []; ונשא גא/מליהו הֲצַע בַּת יִי

Translation:

Recto:

“Your friend, *Hananyahu*, (hereby) sends greetings to (you), Elyashiv, and to your household. I bless (you) by Yahweh. And now, when I left your house, I sent the receipt to Ge’alyahu [by the intermediary] of Azaryahu. Carry the purse with you! And return a[ll of it]. If (there is still) money < . . . > (in the sum of) 5 *sheqels* Xar. And if there is still any oil left at your [p]ost—send it! (As for the other thing,) drop it, don’t send it/ one unit [unintelligible traces].”

Verso:

“If there is any wine, send {1/2 1/4?}. If there is anything (else) you need, send (= write to me about it). And if there is still < >, gi[ve] them (an amount of) Xar out of it. And Ge’alyahu/Gemalyahu has taken a (type of wine)/ *bat* wine.”

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References

- Aharoni, M.
1980 A Silver Hoard from Arad. *Qadmoniot* 13: 39–40 (Hebrew).
- Aharoni, Y.
1975 *Arad Inscriptions*. Judean Desert Studies. Jerusalem: Bialik Institute (Hebrew).
1981 *Arad Inscriptions*. Judean Desert Studies. Jerusalem: Israel Exploration Society.
- Ahituv, S.
2008 *Echoes from the Past: Hebrew and Cognate Inscriptions from the Biblical Period*. Trans. A. F. Rainey, from Hebrew. Jerusalem: Carta.
2012 *HaKetav ve HaMiktav: Handbook of Ancient Inscriptions from the Land of Israel and the Trans-Jordanian Kingdoms from the First Commonwealth Period*. Jerusalem: Bialik Institute (Hebrew).
- Ahituv, S.; Eshel, E.; and Meshel, Z.
2012 The Inscriptions. Pp. 73–142 in *Kuntillet 'Ajrud (Horvat Teman): An Iron Age II Religious Site on the Judah–Sinai Border*, by Z. Meshel. Jerusalem: Israel Exploration Society.
- Avigad, N., and Sass, B.
1997 *Corpus of West Semitic Stamp Seals*. Jerusalem: Israel Academy of Sciences and Humanities; Israel Exploration Society; Institute of Archaeology, Hebrew University of Jerusalem.
- Beit-Arieh, I.
2007 *Horvat 'Uza and Horvat Radum: Two Fortresses in the Biblical Negev*. Monograph Series of the Sonia and Marco Nadler Institute of Archaeology 25. Tel Aviv: Emery and Claire Yass Publications in Archaeology.
- Bresciani, E., and Kamil, M.
1966 *Le lettere aramaiche di Hermopoli*. Atti della Accademia nazionale dei Lincei Mémoire, Classe di scienze morali, storiche e filologiche 8, 12 (5). Rome: Accademia nazionale dei Lincei.
- Cohen, R.
2007 Inscriptions. Pp. 245–53 in *Excavations at Kadesh Barnea (Tell el-Qudeirat) 1976–1982*, Vol. 1, by R. Cohen and H. Bernick-Greenberg. IAA Reports 34 (1). Jerusalem: Israel Antiquities Authority.
- Davies, G. I.
1991–2004 *Ancient Hebrew Inscriptions: Corpus and Concordance*. 2 vols. Cambridge: Cambridge University Press.
- Dijkstra, M.
1999 Ugaritic Stylistics, 1.3: Administrative Prose. Pp. 146–49 in *Handbook of Ugaritic Studies*, ed. W. G. E. Watson and N. Wyatt. Handbook of Oriental Studies 1, The Near and Middle East 39. Leiden: Brill.
- Dion, P. E.
1982 The Aramaic “Family Letter” and Related Epistolary Forms in Other Oriental Languages and in Hellenistic Greek. Pp. 59–76 in *Studies in Ancient Letter Writing*, ed. J. L. White. Semeia 22. Chico, CA: Scholars.
- Dobbs-Allsopp, F. W.; Roberts, J. J. M.; Seow, C. L.; and Whitaker, R. E.
2005 *Hebrew Inscriptions: Texts from the Biblical Period of the Monarchy with Concordance*. New Haven, CT: Yale University Press.
- Eshel, E.
2006 Hebrew and Aramaic Inscriptions from the Jewish Quarter. Pp. 389–407 in *Jewish Quarter Excavations in the Old City of Jerusalem Conducted by Nahman Avigad, 1969–1982*, Vol. 3: *Area E and Other Studies; Final Report*, by H. Geva. Jerusalem: Israel Exploration Society; Institute of Archaeology, Hebrew University of Jerusalem.
- Faigenbaum, S.; Sober, B.; Finkelstein, I.; Moinester, M.; Piasetzky, E.; Shaus, A.; and Cordonsky, M.
2014 Multispectral Imaging of Two Hieratic Inscriptions from Qubur el-Walaydah. *Egypt and the Levant* 24: 349–53.
- Faigenbaum, S.; Sober, B.; Moinester, M.; Piasetzky, E.; and Bearman, G.
2015 Multispectral Imaging of Tel Malḥata Ostraca. Pp. 510–13 in *Tel Malḥata: A Central City in the Biblical Negev*, Vol. 1, ed. I. Beit-Arieh and L. Freud. Monograph Series of the Sonia and Marco Nadler Institute of Archaeology 32. Winona Lake, IN: Eisenbrauns.
- Faigenbaum, S.; Sober, B.; Shaus, A.; Moinester, M.; Piasetzky, E.; Bearman, G.; Cordonsky, M.; and Finkelstein, I.
2012 Multispectral Images of Ostraca: Acquisition and Analysis. *Journal of Archaeological Science* 39: 3581–90.
- Faigenbaum-Golovin, S.; Mendel-Geberovich, A.; Shaus, A.; Sober, B.; Cordonsky, M.; Levin, D.; Moinester, M.; Sass, B.; Turkel, E.; Piasetzky, E.; and Finkelstein, I.
2017 Multispectral Imaging Reveals Biblical-Period Inscription Unnoticed for Half a Century. *PLOS ONE* 12 (6): e0178400. <https://doi.org/10.1371/journal.pone.0178400>.
- Faigenbaum-Golovin, S.; Rollston, C. A.; Piasetzky, E.; Sober, B.; and Finkelstein, I.
2015 The Ophel (Jerusalem) Ostrakon in Light of New Multispectral Images. *Semitica* 57: 113–37.

- Faigenbaum-Golovin, S.; Shaus, A.; Sober, B.; Levin, D.; Na'aman, N.; Sass, B.; Turkel, E.; Piasezky, E.; and Finkelstein, I.
2016 Algorithmic Handwriting Analysis of Judah's Military Correspondence Sheds Light on Composition of Biblical Texts. *Proceedings of the National Academy of Sciences* 113: 4664–69.
- Fitzmyer, J. A.
1982 Aramaic Epistolography. Pp. 25–57 in *Studies in Ancient Letter Writing*, ed. J. L. White. Semeia 22. Chico, CA: Scholars.
- Gane, R. E.
2008 Jalul Ostrakon 1. *Bulletin of the American Schools of Oriental Research* 351: 73–84.
- Garfinkel, Y., and Mendel-Geberovich, A.
2016 The Administration of Judah in Light of the Geographical Distribution of Epigraphic Finds. *Eretz-Israel* 32: 33–44 (Hebrew).
- Gitin, S., and Golani, A.
2001 The Tel Miqne-Ekron Silver Hoards: The Assyrian and Phoenician Connections. Pp. 27–48 in *Hacksilber to Coinage: New Insights into the Monetary History of the Near East and Greece; A Collection of Eight Papers Presented at the 99th Annual Meeting of the Archaeological Institute of America*, ed. M. S. Balmuth. Numismatic Studies 24. New York: American Numismatic Society.
- Golani, A., and Sass, B.
1998 Three Seventh-Century B.C.E. Hoards of Silver Jewelry from Tel Miqne-Ekron. *Bulletin of the American Schools of Oriental Research* 311: 57–81.
- Grant, E., and Wright, G. E.
1939 *Ain Shems Excavations (Palestine)*, Vol. 5. Haverford, PA: Haverford College.
- Hestrin, R.; Israeli, Y.; Meshorer, Y.; and Eitan, A.
1972 *Inscriptions Reveal: Documents from the Time of the Bible, the Mishna and the Talmud*. Jerusalem: Israel Museum.
- Hoftijzer, J., and Jongeling, K.
1995 *Dictionary of the North-West Semitic Inscriptions*. 2 vols. Handbook of Oriental Studies 1, The Near and Middle East 21. Leiden: Brill.
- Hurvitz, A.
1996 The Origins and Development of the Expression מַגִּלַּת סֵפֶר: A Study in the History of Writing-Related Terminology in Biblical Times. Pp. 37*–46* in *Texts, Temples, and Traditions: A Tribute to Menahem Haran*, ed. M. V. Fox, V. A. Hurowitz, A. Hurvitz, M. L. Klein, B. J. Schwartz, and N. Shupak. Winona Lake, IN: Eisenbrauns (Hebrew).
- KAI = Donner, H. and Röllig, W.
1966– *Kanaanäische und aramäische Inschriften*. 2nd ed.
1969 Wiesbaden: Harrassowitz.
- Kletter, R.
2003 Iron Age Hoards of Precious Metals in Palestine—An “Underground Economy”? *Levant* 35: 139–52.
- Kletter, R., and Brand, E.
1998 A New Look at the Iron Age Silver Hoard from Esthemoa. *Zeitschrift des Deutschen Palästina-Vereins* 114: 139–54.
- Kletter, R., and de Groot, A.
2007 The Iron Age Hoard of “Hacksilber” from En-Gedi. Pp. 367–75 in *En-Gedi Excavations I: Final Report (1961–1965)*, ed. E. Stern. Jerusalem: Israel Exploration Society.
- Lemaire, A.
1972 L'ostracon C 1101 de Samarie: Nouvel essai. *Revue Biblique* 79: 565–70.
1973 Note épigraphique sur la pseudo-attestation du mois “šh.” *Vetus Testamentum* 23: 243–45.
1977 *Inscriptions hébraïques*, Vol. 1: *Les Ostraca*. Littératures anciennes du Proche-Orient 9. Paris: Cerf.
- Lemaire, A., and Vernus, P.
1983 L'ostracon paléo-hébreu N° 6 de Tell Qudeirat (Qadesh-Barnéa). Pp. 302–26 in *Fontes atque Pontes: Eine Festgabe für Hellmut Brunner*, ed. M. Görg. Ägypten und Altes Testament 5. Wiesbaden: Harrassowitz.
- Lipschits, O.; Koch, I.; Shaus, A.; and Guil, S.
2010 The Enigma of the Biblical Bath and the System of Liquid Volume Measurement during the First Temple Period. *Ugarit-Forschungen* 42: 453–78.
- Mendel, A.
2011 Who Wrote the Aḥiqam Ostrakon from Ḥorvat 'Uza? *Israel Exploration Journal* 61: 54–67.
2013 Literacy: 1. Biblical Hebrew. Pp. 552–58 in *Encyclopedia of Hebrew Language and Linguistics*, Vol. 2, ed. G. Khan. Boston: Brill.
- Michalowski, P.
1993 *Letters from Early Mesopotamia*. Writings from the Ancient World 3. Atlanta: Scholars.
- Milik, J. T.
1961 Textes hébreux et araméens. Pp. 67–205 in *Les grottes de Murabba'at*, ed. P. Benoit, J. T. Milik, and R. de Vaux. Discoveries in the Judean Desert 2. Oxford: Clarendon.
- Moran, W. L., ed. and trans.
1992 *The Amarna Letters*. Baltimore: Johns Hopkins University Press.
- Na'aman, N.
2011 Textual and Historical Notes on Eliashib Archive from Arad. *Tel Aviv* 38: 83–93.
2015a A Request for Blessing and Prosperity in an Inscription from Samaria. Pp. 91–101 in *History, Memory, Hebrew Scriptures: A Festschrift for Ehud Ben Zvi*, ed. I. D. Wilson and D. V. Edelman. Winona Lake, IN: Eisenbrauns.
2015b Literacy in the Negev in the Late Monarchical Period. Pp. 47–70 in *Contextualizing Israel's Sacred Writings: Ancient Literacy, Orality, and Literary Production*, ed. B. B. Schmidt. Ancient Israel and Its Literature 22. Atlanta: Society of Biblical Literature.

- Naveh, J.
 1966 Canaanite and Hebrew Inscriptions. *Leshonenu* 30: 65–80 (Hebrew).
 1985 Writing and Scripts in Seventh Century B.C.E. Philistia: The New Evidence from Tell Jemmeh. *Israel Exploration Journal* 35: 8–21.
- Pardee, D.
 1978 Letters from Tel Arad. *Ugarit-Forschungen* 10: 289–336.
 2003 Arad Ostraca. Pp. 81–85 in *The Context of Scripture*, Vol. 3: *Archival Documents from the Biblical World*, ed. W. W. Hallo and K. L. Younger Jr. Leiden: Brill.
- Pardee, D.; Sperling, S. D.; Whitehead, J. D.; and Don, P. E.
 1982 *Handbook of Ancient Hebrew Letters: A Study Edition*. Sources for Biblical Study 15. Chico, CA: Scholars.
- Peyronel, L.
 2010 Ancient Near Eastern Economics: The Silver Question between Methodology and Archaeological Data. Pp. 925–48 in *Proceedings of the 6th International Congress of the Archaeology of the Ancient Near East, May 5th–10th 2008, "Sapienza"–Università di Roma*, Vol. 1: *Near Eastern Archaeology in the Past, Present and Future—Heritage and Identity; Ethnoarchaeological and Interdisciplinary Approach: Results and Perspectives; Visual Expression and Craft Production in the Definition of Social Relations and Status*, ed. P. Matthiae, F. Pinnock, L. Nigro, and N. Marchetti with the collaboration of L. Romano. Wiesbaden: Harrassowitz.
- Porten, B., and Yardeni, A.
 1999 *Textbook of Aramaic Documents from Ancient Egypt*. Vol. 4: *Ostraca and Assorted Inscriptions*. 2 vols. Winona Lake, IN: Eisenbrauns.
- Renz, J., and Röllig, W.
 1995 *Handbuch der althebräischen Epigraphik: Die althebräischen Inschriften*, Vol. 1, part 1: *Text und Kommentar*. Darmstadt: Wissenschaftliche Buchgesellschaft.
- Rollston, C. A.
 2006 Scribal Education in Ancient Israel: The Old Hebrew Epigraphic Evidence. *Bulletin of the American Schools of Oriental Research* 344: 47–74.
 2010 *Writing and Literacy in the World of Ancient Israel: Epigraphic Evidence from the Iron Age*. *Archaeology and Biblical Studies* 11. Leiden: Brill.
- 2015 Scribal Curriculum during the First Temple Period: Epigraphic Hebrew and Biblical Evidence. Pp. 71–101 in *Contextualizing Israel's Sacred Writings: Ancient Literacy, Orality, and Literary Production*, ed. B. B. Schmidt. *Ancient Israel and Its Literature* 22. Atlanta: Society of Biblical Literature.
- Shaus, A.; Faigenbaum-Golovin, S.; Sober, B.; Turkel, E. and Piasezky, E.
 2017 Potential Contrast—A New Image Quality Measure. Pp. 52–58 in *Proceedings of the IS&T International Symposium on Electronic Imaging 2017, Image Quality and System Performance XIV Conference (IQSP 2017)*. <https://doi.org/10.2352/ISSN.2470-1173.2017.12.IQSP-226> (accessed October 19, 2017).
- Singer-Avitz, L.
 2002 Arad: The Iron Age Pottery Assemblages. *Tel Aviv* 29: 110–214.
- Sober, B.; Faigenbaum, S.; Beit-Arieh, I.; Finkelstein, I.; Moinester, M.; Piasezky, E.; and Shaus, A.
 2014 Multispectral Imaging as a Tool for Enhancing the Reading of Ostraca. *Palestine Exploration Quarterly* 146: 185–97.
- Thompson, C. M.
 2003 Sealed Silver in Iron Age Cisjordan and the “Invention” of Coinage. *Oxford Journal of Archaeology* 22: 67–107.
- Weippert, M.
 1975 Zum Präskript der hebräischen Briefe von Arad. *Vetus Testamentum* 25: 202–12.
- Wimmer, S. J.
 2008 *Palästinisches Hieratisch: Die Zahl- und Sonderzeichen in der althebräischen Schrift*. Ägypten und Altes Testament 75. Wiesbaden: Harrassowitz.
- Wisser, M. L.
 1956 *Mikra'ei Kodesh: Commentary on the Prophets and Hagiographa*. Jerusalem: Pardes.
- Zadok, R.
 1988 *The Pre-Hellenistic Israelite Anthroponymy and Prosopography*. *Orientalia Lovaniensia Analecta* 28. Leuven: Peeters.