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**How Did the
Hebrew Scribe
Form His Letters?**

Having once taught calligraphy, I have always been curious about the manner in which the Hebrew alphabets were drawn. It is easy to analyze the various Latin and Greek alphabets which were written with a broad-nibbed pen to determine how the letters were formed. With Hebrew, however, a new dimension is added, in that the language, written as it is from right to left, is ill-suited to the broad-nibbed pen.

This paper admittedly is no definitive study of the cursive. To date, the most basic study of the typology of Hebrew scripts is to be found in several articles of F.M. Cross.¹ My interest is somewhat more restricted than that of Cross. I am interested not so much in the shape of the characters as in the causes behind the shapes, namely the direction and the order in which the strokes were made in writing these characters. The study will be limited to inscriptions of the Iron Age.

The Hebrew penman used a pen made from a reed which was cut to a chisel-point and then frayed at the point in order to make a sort of brush that would hold the ink. Later, a pen was developed with a hard chisel-shaped point

¹ F. M. Cross, "The Evolution of the Proto-Canaanite Alphabet," BASOR 134 (1954), 15-24; "A New Reading of a Place Name in the Samaria Ostraca," BASOR 163 (1961), 12-14; "The Muraba'at Papyrus and the Letter Found near Yabneh-yam," BASOR 165 (1962), 34-46, esp. 34-42; "An Inscribed Seal from Balatah (Shechem)," BASOR 167 (1962), 14-15; "The Inscribed Jar Handles from Gibeon," BASOR 168 (1962), 18-23; "The Origin and Early Evolution of the Alphabet," Eretz-Israel 8 (1967), 8-24.

and a split to feed the ink down to the point.² Such pens do well with three types of stroke: toward oneself (i.e., toward the elbow of the right arm), toward the right, or toward the left. They do poorly, however, when pushed upward on the writing surface. The ink distributes itself poorly and the point frays. If one has to make an upstroke, he will make it as short as possible and will prefer to make it on an angle. This is beautifully exemplified in later forms of the shin.

The Hebrew letters seem to have been designed originally for a stylus. Making a circle with a stylus on soft material is as simple as with a fountain pen or pencil. But the chisel-point pen, since it works well only in a downward or sidewise direction, requires two separate strokes for a circle, both downward: . The same type of stroke is found in Greek and Roman hands for the O and in the Hebrew 'ain: .

But the Hebrew penman was afflicted with further problems. Held in a normal right-handed position, his pen was at this angle: . This meant that his vertical strokes would tend to flow from left to right: . As soon as he tried to connect two strokes, he found that he had to start with the leftmost stroke and work toward the right. This meant that, while the general movement of his hand in writing Hebrew was right to left, the movement in each cursive letter is likely to be from left to right.

I was particularly interested in seeing whether the scribes fought this tendency, to see if there was any attempt to preserve a steady leftward progress of the hand. I found little evidence of it, as the notes on individual letters will show.

My method was a careful scrutiny of photos of epigraphic materials. (Facsimiles show as much about the facsimilist as about the scribe. The best example of this is a comparison of the Ophel ostrakon drawings by Cook and Albright.³) I wanted to discover small telltale signs such as the little downward tic which sometimes appears at the end of a writer's stroke. My discoveries are modest and are concerned mainly with the direction in which the strokes were made. When it comes to the order in which strokes were made, most cursive elements are ambiguous. A tic on the bottom line

² H. Breasted, "Physical Processes of Writing in the Early Orient and Their Relation to the Early Origin of the Alphabet," AJSLL 32 (1915-16), 239.

³ S. A. Cook, "Inscribed Hebrew Objects from Ophel," PEFQS 56 (1924), 180-186 and fig. 6; and W. F. Albright, "The New Hebrew Ostrakon from Jerusalem," JPOS 6 (1925), 88-93, esp. figure, p. 91.

of a three-stroke sade  indicates, of course, that the scribe is drawing his hand back toward the left, which does not show whether he is trying to draw (1) the upper horizontal, (2) the vertical, or (3) the following letter.

For the time being, this study is in the realm of pure science. I have not yet found any instances where reading disputed passages would be helpful. But one can imagine such instances developing.

A listing of the photographs studied--all in printed reproductions--with notes when necessary on the character of the photograph, will help in explaining some of the limitations of the study.⁴ It soon became clear that access to the actual materials would be essential in most cases for a definitive study. In incised materials one could better distinguish the path of the pointed instrument from the chance surface flaking which results around that path, thus indicating, for instance, when the instrument was raised. In penned materials one could detect heavier concentrations of ink (usually at the end rather than the beginning of a stroke) and would perhaps be able to determine when the pen was dipped--important for determining the order of strokes if the pen were ever dipped in the course of the formation of a letter.



I can find no clear evidence whether the vertical stroke or the horizontal V was made first. The backstroke of the Avigad cursive  proves that, as one would expect, the upper horizontal was made before the lower. If the Avigad sweep were ever combined with a vertical with a counterclockwise bend ()⁴, this would suggest that the vertical was made first, since a cursive penman is not likely to sweep clockwise to the top of the vertical and then reverse his hand motion to make a counterclockwise downstroke, thus . I am not aware of instances of this, though I have not checked exhaustively for it. On the other hand, Sam.2, 1. 5, has Avigad flourish and slightly clockwise vertical. Further, in the last line of the Ramath-negeb, there is an aleph with a thin gap through half the length of the vertical ()⁴, the result of the defective pen which was used for this ostrakon. This gap extends through the place of intersection with the

⁴ See Appendix for this listing. Abbreviations of the titles will be used throughout the paper.

upper bar of the horizontal V and is best explained by supposing the vertical to have been made last: Ink from the horizontals, not yet soaked into the surface, was gathered up again by the nib as it descended, and was redistributed in the path of the later stroke. If the vertical had been made first, I can see no reason why the horizontal stroke would not then have covered the surface of the gap.

Aharoni seems to be correct in doubting that Cross's formal aleph  or  ever existed in penned texts, that it is only an inscriptional modification which is more easily scratched than the aleph with the V-shaped horizontal.⁵

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The beautiful G-shaped cursive beth, which is found in mid-eighth century at Samaria (14, l. 1), is surely made in two downward strokes, but the order of the strokes is not clear.

A fine cursive B in Lachish 2, l. 5, which seemed to indicate that the penman had begun with a very brief leftward upstroke going into the left loop to a point immediately under the upstroke, then beginning a short downstroke from the right, surely without lifting his pen: ; and so the facsimile reproduces it. However, close inspection of the photos makes it almost certain that this is an illusion produced by a scratch across the conventionally drawn right downstroke.

G

In Yavneh Yam the daleth is at times apparently made with one stroke, beginning at the upper right with the left-hand downstroke. See the last daleth in l. 4 and l. 9. This would seem to suggest to me a tradition in which the left-hand stroke of the letter was made before the right, even when the right stroke was still separate. I would suggest tentatively that the overlapping of the left stroke in daleth and he (but not in resh!) beyond the top of the right stroke indicates that the left stroke was made first.

⁵ "Three Hebrew Ostraca from Arad," BASOR 197 (1970), p. 41.



In making strokes at the angle of the three left strokes of he, the reed pen would function equally well in either a leftward or a rightward direction. However, the occasional existence⁶ of a stroke of this shape  seems to indicate clearly enough that the upper left was made in a leftward direction. I suspect, as in the case of daleth, that this stroke was made before the right-hand one, but am not prepared to speculate about the direction in which the lower left strokes were made. It should be noted that the middle bars which are shown as consistently shorter than the other two on the Reisner facsimiles of Samaria are not so on the photos.



The horizontals of the zayin were truly horizontal, unlike the quasi-horizontals of the he and at least the upper part of the horizontal V of the aleph. Therefore, as is to be expected, the bars were drawn from left to right. This is proved by the ticks which frequently appear at the right end of both horizontals.



In Birnbaum's fine photo of the incised Samaria Cl101 the left and lower lines of the heth in l. 2 seem from the rounded corner to be made in one L-shaped stroke. Further, a shadow within the left-hand stroke seems to indicate that the upper "horizontal" was scratched over the left "vertical." The order would then be right, left-and-bottom, upper, middle. I can only guess that the upper and middle strokes were made from left to right. The rounded lower left corner of heth in l. 1 of the Wheat Ostrakon suggests that here also we have one L-shaped stroke for left and bottom lines. Despite the appearance of the facsimiles, I can find no evidence on the photos of any overlap or underlap in the other heth's of the Wheat and Ramath-negeb texts which would indicate that these lines were made in two strokes.

⁶ In Samaria 2, l. 1, at Lachish (Birnbaum, Pl. 23, l. 3, byhw), and in Nehemyahu, first H in l. 4.



A cursive yod which developed is best seen in the Yavneh Yam letter with a rounded Z- or 7-shaped stroke beginning in the upper left corner, and touched or intersected in the stem by the lower left-hand bar. It is surprising therefore to find at Ramath-negeb a clear three-stroke yod † (l. 8 h y m and ' l y s...). None of the other yod's in the letter gainsays these two clear examples.



The earlier formal kaph with two separate lines from the left touching the main downshaft gave way to various cursive forms. My guess, but I have no evidence, is that the downshaft was made first. At Yavneh Yam a wonderful 2-shaped stroke at the left shows that the penman still thought of both lines as being drawn with rightward strokes toward the stem: †. The best examples are at the ends of ll. 4 and 9. Lachish 3 reverse, l. 3, hmlk shows a left part which again seems to be made of one stroke, but here the upper line scarcely seems to be drawn toward the stem. Ramath-negeb has two kinds of K basically, one with the two left strokes forming an X (l. 3, and the first K in l. 6), the other forming a V with two broad strokes (l. 8): ✕, †. On the Nehemyahu facsimile all the lower left strokes could be backstrokes from the upper: †. The two fairly clear K's of the photos (l. 3 no. 1 and [on fig. 4] l. 8) do not gainsay this.



In addition to the normal samek with three rightward horizontals, we have on Lachish 4 obverse, l. 6 and Yavneh Yam l. 7 fine samek's with a counterclockwise horizontal V above a rightward stroke, thus: †.



In line 5 of Gezer the Z-shaped right section is clearly one continuous stroke, as one can see from the rounded corners in the PEFOS and especially the Birnbaum photo. Photos lighted from the SE pick up too much of the unerased previous inscription and the bad rock surface.

Again in the photos lit from SE, the other $\$$'s in ll. 3 and 4 appear to overlap on top, and in l. 4 on the bottom, but PEFQS and Birnbaum prove this to be false. In Samaria 31, l. 2, 'p $\$$ h, the lower horizontal does start very far to the left, but the angle of the tic of the upper stroke allows the possibility that the whole right side of the letter is still being made in one exaggerated Z-shaped stroke, especially since the lower horizontal has a fine tic at a much more vertical angle Z .

In the Nehemyahu inscription, where, according to Aharoni,⁷ the šade consists of three lines, the two horizontals are clearly separate: The tic on the upper is too vertical to be a backstroke. But the photo does not make it clear that the upper horizontal is separated from the left vertical.



In the gof of Gezer l. 4, q $\$$ r, the corner rounded from the left side to the top of the vertical is clear in all photos Q , but especially PEFQS. But in Jensen's strange photo, this gof seems to have a perfectly round head with a more shallowly incised downstroke. In l. 2, there is no clear indication of the rounded corner at the beginning of the downstroke, but the heart-shaped top in PEFQS (not visible on the SE photos) suggests that, at any rate, the top was not made in one stroke. In l. 5, the top is not clear on any photo. In line 7, the gof has a very flat top. In Michaud, IDB, and PEFQS, it looks as if the vertical may be an extra stroke because of a light nick on the upper surface of the top stroke, which looks as if it was caused by the beginning of the incision of the vertical line.

Samaria Cl101: Q . Whether the left line is made in one stroke or, because of the problems of incision on pottery, in three strokes, the writer surely would do it in only one if he were writing with a pen, for he would have to start at the top on the left and work down. There would be no reason to lift his pen at the top of the downstroke to begin a new stroke.

The Siloam gof must be seen in terms of this. The only gof that I can identify as being made thus Q is the second one in line 1. Since all the others definitely look like Q , it seems probable that the odd one in line 1

⁷ "Three Hebrew Ostraca...", BASOR 197 (1970), p. 41.

results from a slip of the chisel. (See the photos both in Birnbaum and Guthe.) Albert Socin in his handsome, if highly interpretive facsimile,⁸ understands the shape as I do.

In the Wheat Ostrakon and Ramath-negeb gof's, the tail is also possibly a continuation of the left-hand curve, but in Ramath l. 5 the top of the tail looks a bit ragged, which would not be expected had it been smoothed out with a sidestroke. Also, the tail of the l. 4 Q looks darker than the rest of the letter, as if the pen had just been dipped, though it seems perilous to judge darks and lights as resulting from ink-dipping rather than from weathering.



In line 2 of the Gezer Calendar, the shin is clearly made of four lines, as can be seen from the overlap of the strokes on the left sides of the V's over the right sides. This is clearest on PEFQS: . In l. 4, the right side of the left V overlaps the left:  (IDB, Michaud.) In l. 3, r š t (seen in SW photos), the lines running toward SE are curved. This makes it look as if in each case the straight lines had been drawn first and when the letterer saw that he was making his NW-SE strokes too vertical, he had to correct their direction in mid-stroke so that they would meet the right-hand strokes which were, in fact, also almost vertical: . This would suggest that the letter was written from right to left, but such poor execution makes precision difficult, if not impossible.

On the Wheat Ostrakon in l. 5, š m 'y h w, the shin seems to be made of four separate strokes.

In Ramath-negeb, the "breakthrough" of the left V over the right shows that at least two strokes (probably only two, since no breakthrough is visible on the bottom) were used. While it is certain that if each V was made in one stroke, the left side of the V is made first on the downstroke and the right is the low-friction thin upstroke, there is no certain evidence as to which V was made first. The fact that the left V was drawn completely and overlaps suggests that the left V was made first.

The low, flat shape of shin in l. 5 of Nehemyahu suggests that it was made in one stroke. The letter is surely made from left to right, as the broader line is naturally made on the downstroke. The low flat shape reduces friction on the upstroke. The very fat strokes of shin in the last two

8 "Die Siloahinschrift," ZDPV 22 (1899), 61-64 and Plate 4.

lines with no breakthrough suggest that the scribe made his right upstrokes directly against the grain of the pen stub and kept them short precisely for that reason. The similar problem of the upstroke in the mem had been solved much earlier in a different way. The old, almost horizontal M of the Mesha stone () in many cursives gave way to a very vertical M (), which was a more rational character for a language written from right to left. It was, moreover, a reversion toward the form of the vertical Gezer mem.

Conclusion

Quite frankly, in view of the tentative and fragmentary character of my findings, I find it difficult to generalize. It is clear that the typological development of the Hebrew alphabet is largely understandable in terms of the physical characteristics of the reed pen. Surprisingly, the Hebrew scribe seems to have felt little discomfort in having to form many of his letters in a left-right direction contrary to the basic right-left movement of his hand (a phenomenon which in Roman capitals is found only in C, G, and S). While he did develop the vertical mem and nun, and the Ramath-negeb yod, he chose--unnecessarily, it seems--to form his zayin, his samek, and his daleth from left to right. (Indeed I am led to wonder whether the essential difference for the scribe between daleth and resh may not have been that the former was formed with the left side first, the latter with the right first.)

No doubt the reason for this is that, while these particular letters could have been formed in a right-left direction, the scribe was still faced with a whole series of letters (gimel, yod, mem, nun, sade, and shin) which essentially had to be written from left to right. The vagaries of the origin of such an alphabet must be sought in a past which is still not wholly accessible to us and which is certainly beyond the scope of a study devoted to the Iron Age. It is not unlikely that the explanation lies in the writing instruments and the scribal practices of the period when the direction of writing shifted from vertical columns to horizontal lines.⁹ Verification of this hypothesis awaits a careful study of the Canaanite alphabets of the Bronze Age.¹⁰

⁹ I am indebted to Professor George Landes for this observation.

¹⁰ Sources for such a study are to be found in the first article by F. M. Cross cited in footnote 1.

SOURCES

To indicate the direction of the light source I will use directional indications as if the object were a map, with North at the top. If the light is kept low, near the surface of the object, incised lines will show a deeper shadow, but surface grit will also show a rougher texture and make it impossible to distinguish just what is going on in the crucial bottom of the trough. One can do the best work when he has several photos with different light patterns to work with.

I. GEZER CALENDAR (950-900 B.C.)

M. Lidzbarski, "An Old Hebrew Calendar Inscription from Gezer," PEFQS 40 (1909), 26-29. Photo facing p. 28; lit from SW, low.

IDB, vol. 1, p. 485; lit from SE, fairly high.

H. Michaud, Sur la pierre et l'argile (Cahiers d'archéologie biblique, no. 10), Paris: Delachaux et Niestlé, 1958, Pl. 1. Lit from SE; still higher light, lower contrast, and not the best focus.

S. Birnbaum, The Hebrew Scripts (London: Palaeographia, 1954-57), Pl. 2. Lit from SW; higher than PEFQS.

Hans Jensen, Die Schrift in Vergangenheit und Gegenwart, 2nd ed. (Berlin: VEB Deutschen Verlag der Wissenschaften, 1958), p. 275. A remarkable, and suspiciously clean-looking, photo lit primarily from SW; but I can't see how it avoids surface shadows on what is in other photos a very rough surface. Perhaps two lights are used, one from W and one from S.

II. SAMARIA OSTRACA (Ninth - eighth century B.C.)

Birnbaum, op. cit., Pls. 4-9, 12-13, show numbers 2, 12, 14, 16, 30, 31, C1101, and another which I have been unable to identify. The first six are penned on potsherds and are in various states of disrepair. C1101 is incised on a dark-colored sherd showing a fine contrast between the dark slip and the underlying lighter body. The ink-written ostraca can be interpreted only with the help of George A. Reisner, Israelite Ostraca from Samaria (Harvard University Palestine Expedition), no publisher, no date. The facsimiles must be constantly checked against the photos, as they are sometimes deceptive, especially in the question of the thickness of strokes.

III. SILOAM INSCRIPTION (Late eighth or early seventh century)

It is very easy to find facsimiles and poor reproductions--practically every illustrated atlas or history has one--but surprisingly we have been able to find only two good photos of this important piece.

Birnbaum, op. cit., Pl.14. Lit from N.

H. Guthe, "Die Siloahinschrift," ZDMG 36 (1882), 725-750, with plate. It looks to me as if this is the impression itself of the inscription, whereas Birnbaum's photograph would be a positive made from the impression. Lit from S.

IV. YAVNEH YAM (Last half of seventh century)

J. Naveh, "A Hebrew Letter from the Seventh Century B.C.," IEJ 10 (1960), 129-139 and Pl.17.

V. LACHISH OSTRACA (Early sixth century)

H. Torczyner, Lachish I: The Lachish Letters (London: Oxford University Press, 1938).

Birnbaum, op. cit., Pls. 23-26. Good photos and helpful facsimiles.

VI. ARAD OSTRACA (Early sixth century)

Y. Aharoni, "Three Hebrew Ostraca from Arad," BASOR 197 (1970), 16-42, Fig. 1, p.17, Ramath-negeb ostrakon; Figs. 4 and 5, pp. 27,28, Nehemyahu ostrakon; Fig. 7, p.7, Wheat Ostrakon. Fine photos.