

A Newly Discovered Column in the Hieroglyphic Text on La Mojarra Stela 1: A Test of the Epi-Olmec Decipherment

John S. Justeson and Terrence Kaufman

A badly weathered column of hieroglyphs was discovered in November 1995 on the side of Stela 1 from La Mojarra in southern Veracruz, Mexico. Most of the signs in this column have now been identified by nighttime examination under artificial lighting, making possible a nearly complete transcription and translation of this column. This data expands the modest corpus of epi-Olmec hieroglyphic texts and confirms various aspects of the decipherment of the epi-Olmec script.

The remains of a distinctive script tradition are found on monuments from southern Mexico, ranging from Cerro de las Mesas in the north to Chiapa de Corzo in the south. Because the associated art style and artifacts descend from the Olmec tradition, we refer to this script as epi-Olmec.

Only four legible texts currently attest the epi-Olmec writing system (1): three are virtually complete, whereas one fragmentary text preserves portions of just a few words in parts of two short sequences. Epi-Olmec signs are visible on a few other, badly weathered monuments, but these signs are few and isolated, not forming legible connected text. There was too little text data on which to base a decipherment of this script until the discovery and publication of the fourth legible text, that of La Mojarra Stela 1 (2). This stela bears a lengthy text, one of the longest known from ancient Mesoamerica.

It was this fourth text that made it possible for us to decipher a substantial portion of this writing system (3, 4). The fact that it was a single continuous text was important to the decipherment. Topic continuity in texts of this length leads to repetition of lexical items and of larger grammatical units; with a model for the grammar of the text's language, pre-*proto-Sokean*, this repetition was exploited to determine the boundaries of many of the words in the text (boundaries are not explicitly marked in the epi-Olmec script) and thereby some aspects of their grammatical structure. The text on the Tuxtla Statuette provided important additional clues to the decipherment. The state of the decipherment as of December 1992 is summarized in (3), and its state as of January 1994 is partially described in (4).

J. S. Justeson, Department of Anthropology, State University of New York, Albany, NY 12222, USA. E-mail: jsjusteson@aol.com

T. Kaufman, Departments of Anthropology and Linguistics, University of Pittsburgh, Pittsburgh, PA 15260, USA. E-mail: topkat+@pitt.edu

Authorship is equal; correspondence may be addressed to either author.

In 1994, we were able to make a drawing of the other two short texts. These texts have helped to confirm the essentials of the decipherment, to determine the readings of a few additional signs, and to refine some of the uncertainties we had had earlier. Additional progress in the decipherment has been achieved through constant reanalysis, and by applying insights from several years of descriptive and comparative work that we have undertaken on the extant languages of the Mije-Sokean family [work that was identified in (3) as one of the two main avenues for advancing the decipherment]. Few of our readings or interpretations have had to be revised: for example, only two syllabic signs in (3) were changed in (4), and only two in (4) have been changed subsequently. There has, however, been a fair amount of revision in our knowledge of reconstructed *proto-Sokean* and *proto-Mije-Sokean*, based on Wichmann's work (5) and on Kaufman's comparative analysis of data from our own Mije-Sokean Language Documentation Project.

Further evidence concerning the epi-Olmec script now depends chiefly on the recovery of more textual data written in it, but no more texts have since come to light. For now, it remains a poorly attested writing system. A magnetometer survey of the site of La Mojarra was undertaken in an attempt to locate additional inscribed monuments there, but it did not prove to be successful (6).

La Mojarra Stela 1 was brought to scientific attention after it arrived at the Museo de Antropología in Xalapa, Veracruz, Mexico, in 1986. The importance of the text was recognized as soon as it was examined at the museum. George Stuart made a drawing of the monument that was produced on the basis of photographs by Logan Wagner and a rubbing by John Keshishian, both made while it was lying on its back in the basement of the museum; Stuart then revised the drawing by direct examination with a flashlight. Under such condi-

tions, it is difficult to discern all of the details of signs that are at a distance from the edges of the monument; it is remarkable how accurate Stuart's drawing has proven to be, erring mostly in the absence of some lines that are difficult to see. This drawing has been almost the sole basis for research on this text up to the present time.

For reasons that epigraphers have never found compelling (7), doubt was cast on the authenticity of the monument, and recent directors of the museum left it in the basement. Access to the monument was restricted, and even for those of us who were able to see it first hand, viewing conditions were so poor that it was difficult to evaluate many details of the text, particularly on the more badly damaged glyphs.

In September of 1995, Sara Ladrón de Guevara became the director of the museum. Soon thereafter, she arranged to put the monument on public display, which was done in connection with a public ceremony on 24 November 1995. It is now possible to inspect the details of this monument at first hand. Our own detailed examination of the whole text has led to improvements in the identification of several signs, especially those in damaged areas.

A Previously Undetected Column of Glyphs

Early in November of 1995, while the stela was being readied for display, geologist Fernando Muñiz and archaeologist Sergio Vásquez discovered what appeared to be the remains of a column of glyphs on the left side (viewer's right) of the monument (8). On 23 November, the day before the public ceremony, Vásquez satisfied himself that it was a series of eroded glyphs, a little more than 20 by his estimate.

Before going to Xalapa to investigate the matter for ourselves, our knowledge was based on (both first- and second-hand) verbal reports from the scene that it was in poor condition; it was clear that hieroglyphs had once been present, but they were so badly weathered that little could be recovered of the original text. It was not even clear if any of the glyphs could be identified, or how long the text had been.

The main reason for the poor condition of the side text is that the stone is built up in thin layers. Most of the side is deeply scored by weathering, evidently between the layers of stone, and it is badly pitted as well, which makes it difficult to recognize what signs are inscribed. It was mainly the surviving horizontal lines that made it possible to recognize at the outset that a column of text had once been present.

Justeson examined the monument from 10 to 12 June 1996, including a nighttime

session on 11 June. He was able to identify a few signs and became convinced that more could be identified if the surviving details were highlighted at night by artificial lighting. We returned to the museum in October to attempt this. Justeson conducted such an examination and made and revised preliminary drawings of portions of the text from 9 to 12 October 1996. Together we continued this examination and produced further revised drawings on 13 to 16 October, and Justeson rechecked the most badly weathered signs on 20 January 1997, for a total of approximately 42 man-hours of work over 10 nights. Justeson made the final drawing.

The result was an almost complete recovery of the final column of text on the monument (Fig. 1, A and B). The column is at the far left of the surface of the side, ranging 1 to 2 cm from the face of the monument. In this position, it is likely to be the final (22nd) column of text, which we label column V (9). There appear to be 30 sign groups, which we number 1 through 30; four of the legible sign groups contain two signs each (denoted a and b).

In three of the sign groups (at V5, V9, and V16), we detect no surviving features diagnostic of the identities of the signs, and one other sign (in a two-sign group, at V6a) is distinct from all previously known epi-Olmec signs. However, the content of the surrounding contexts of each of these signs provides enough constraint that we can parse, and determine the general sense of, the phrases in which they occur.

There is essentially no doubt about the identity of 18 of the remaining 26 sign groups, containing 22 of the remaining 30 signs. Of these 22 signs, 20 preserve so much detail that they are almost completely recovered; the two remaining signs form a single sign group (at V7ab), found on the front of the monument, whose features, together, are also quite distinctive.

Most of the remaining eight signs have much less surviving detail or have detail that is less definitely discernible. In three cases (at V6b, V13, and V23), the clear details are consistent with just one sign and are rather eccentric, so that there is little chance that these details are the remains of some otherwise unknown sign. In one sign, at V25, the surviving features are a circle far to the right, a central vertical line, and a horizontal line extending leftward from the vertical about halfway across the left half of the sign. Each of these details is simple enough, but the circle alone is enough to identify this sign with **ja** or with SHAPESHIFTER₂/JAMA (which contains **ja**) (10), and the additional features seem adequate to secure that it is indeed one of the two.

Identifications that are open to doubt are those for the signs at V22, V24, V26, and V28, a region where the text has sustained the most damage from weathering and breakage. In three of these cases, the surviving features are consistent with just one or (at V28) two known signs each; in the present state of our knowledge, these are the only viable identifications for these signs. These details, however, involve simple enough visual features that they might plausibly be the remains of previously untested signs. Most doubtful is the identification of the sign at V26. Its surviving diagnostic features are a pattern of vertical lines, but some might be the result of erosion; many vertical lines in this column have been subjected to heavy erosion, one proof of the authenticity and antiquity of the text.

In our previous decipherment work (11), we had already read all of the recognizable signs in column V. This text therefore provides not only more evidence concerning the epi-Olmec script, but also a serious test of the decipherment. We began working on an analysis and translation of the text in October 1996 after the drawings of the individual glyphs had been completed. It has proven possible to provide a complete, coherent, and grammatical analysis and translation for the entire column in terms of previously reconstructed Sokean vocabulary and grammatical structures and of previously established representational principles of the script. Nevertheless, the translation provided here is not definitive in all details. Given the present state of our knowledge of the epi-Olmec language, there are alternatives for some clauses, and the few signs that are unidentifiable or that have only a few simple diagnostic features bring some uncertainty to the identification of linguistic elements, especially with respect to the identity of the verb at V9.

Analysis and Translation

The text in pre-*proto-Sokean*:

V1-5: *7is mak=metz-a 7ame7* [TITLE]

V6-8: AND.THEN *tuku7 ?paks-pa*

V9-10: [UTTER]-*w#*

V11-18: *7i+ne7w-e je7-tz# ?ki7ps-i ?*
TITLE₃+*w#7*

V19-24: *na+tzetz-e nip7-i w#=tuk-i*

V25-30: *jama masa=ni7-APPEAR-w#*

Running translation:

V1-5: Behold, there/he was a twelve-year [title].

or Behold he was for 12 years a [title].

V6-8: And then a garment got folded.

V9-10: He [utter]ed:

V11-18: — The stones that he (had) set in order were thus symbols,

?kingly ones—

V19-24: “What I chopped has been planted and harvested well.”

or “What I chopped is a planting and a good harvest.”

or “What I chopped has been planted; the latter was well harvested.”

V25-30: (A) shape-shifter appeared divinely in his body.

Comments on sign identifications and interpretations.

V1-5: The glyph at V5 is partly traceable, but not identifiable, and is possibly otherwise unattested. No verb occurs in this clause, and V5 must be the final sign in the clause, because V6 represents a conjunction that separates clauses. The clause must therefore be equational, giving a title or status that the protagonist, Harvester Mountain Lord, held for the mentioned 12-year period. Parallel clauses with this type of interpretation, **7i-si 1 YEAR-me TITLE₄** and **7i-si₂ 13 YEAR BUNDLE-ti**, are found at R26-27 and I1-4. The numeral at V3 could be **13** rather than **12**.

V9-10: The (large) illegible glyph group at V9 may be two conjoined glyphs, 9a and 9b. It likely spells an intransitive verb with a third-person subject, because it is followed by **w#** (= {-w#} “completive aspect”) and has no person marking proclitic. It likely spells a verb of speaking, because a probable exclusive ergative marker with a probable noun (possibly a dependent incomplete verb) follows at V19-20. Alternatively, V9-10 might spell a noun or adjective followed by the relativizer {+w#7}, but such an interpretation would not yield a parseable string.

V11-18: The glyph at V16 is illegible and might be either a phonetic complement for the preceding or following word, or an additional word logographically or phonetically. The last possibility is perhaps the least likely. In the given context, if V16 stands for a word, it may represent either a noun or an adjective. Of known signs, **ti**, **7a**, **ke**, **we**, **ja**, **mi**, and **GOD** are all possible; **ma**, **ko**, and **ku** are not.

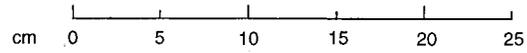
V25: The surviving details are consistent with two signs, **ja** and SHAPESHIFTER₂/JAMA; the latter contains the right half of the former as an infix. Visually, either is equally viable. We reconstruct SHAPESHIFTER₂ in the drawing because our reading of the text uses this identification, but **ja** is not precluded.

Comments on the analysis.

V6-8: At V6a is a previously unknown glyph that occurs conjoined to AND.THEN at V6b. It might be a phonetic complement to AND.THEN, which is known from two other contexts, MOJ I5 and TUX G13. Otherwise, V6a may represent an additional

| | | | |
|--|-----|--|--|
| | V1 | | <i>7i</i> |
| | V2 | | <i>si</i> |
| | V3 | | 12 |
| | V4 | | YEAR/7AME7 or DRUM/KOWA |
| | V5 | | ? ? |
| | V6a | | value unknown |
| | V6b | | AND.THEN |
| | V7a | | <i>tu</i> |
| | V7b | | CLOTH/TUKU7 |
| | V8a | | FOLD |
| | V8b | | <i>pa</i> ₂ |
| | V9 | | ? ? |
| | V10 | | <i>wu</i> |
| | V11 | | <i>7i</i> |
| | V12 | | ORDER.STONES/NE7W or <i>ne</i> |
| | V13 | | <i>je</i> |
| | V14 | | <i>tzu</i> |
| | V15 | | SYMBOL/?KI7PSI |
| | V16 | | ? ? |
| | V17 | | TITLE ₃ (reeds + cross.pillar) |
| | V18 | | <i>wu</i> |
| | V19 | | <i>na</i> |
| | V20 | | <i>tze + tze</i> |
| | V21 | | PLANT/NIP7 |
| | V22 | | <i>7i?</i> |
| | V23 | | <i>wu</i> |
| | V24 | | <i>tuk?</i> |
| | V25 | | SHAPESHIFTER ₂ /JAMA (otherwise <i>ja</i>) |
| | V26 | | <i>ma?</i> |
| | V27 | | <i>sa</i> |
| | V28 | | <i>ni?</i> (otherwise YEAR or DRUM) |
| | V29 | | APPEAR |
| | V30 | | <i>wu</i> |

| | | | | | | |
|----------|----|--|----------------------------------|------------------------------|----------------------------------|--|
| C | T | <i>7i-si</i> | 12 | YEAR | ? | |
| | R | <i>7is</i> | <i>mak=metz-a</i> | <i>7ame7</i> | [TITLE] | |
| | MG | see | ten-two-NUM | year | [title] | |
| | LT | Behold | twelve | year | [title] | |
| | FT | Behold, there/he was for 12 years a [title]. | | | | |
| | T | <i>?+AND.THEN</i> | <i>tu+CLOTH</i> | FOLD+ <i>pa</i> ₂ | | |
| | R | (?) AND.THEN | <i>tuku7</i> | 0-? <i>paks-pa</i> | | |
| | MG | (?) and.then | cloth | 3A-fold-INC | | |
| | LT | (?) and.then | clothing | 3A-fold-INC | | |
| | FT | And then a garment got folded. | | | | |
| | T | <i>?-wu</i> | | | | |
| | R | 0-["UTTER"]- <i>wu</i> | | | | |
| | MG | 3A-["utter"]-CMP | | | | |
| | LT | he-["uttered"]: | | | | |
| | FT | He [uttered]: | | | | |
| | T | <i>7i-ORDER.STONES</i> | <i>je-tzu</i> | SYMBOL | ? TITLE ₂ - <i>wu</i> | |
| | R | <i>7i+ne7w=e</i> | <i>je7-tzu</i> | 0-? <i>ki7ps-i</i> | ? TITLE ₂ <i>wu7</i> | |
| | MG | 3pE-order.stones | yon-MAN | 3A-?remember-RES | ? ?king-REL | |
| | LT | his-ordered.stones | that.way | symbol | ? ?king-type | |
| | FT | -- the stones that he set in order were thus symbols, ?kingly ones | | | | |
| | T | <i>na-tze+tze</i> | PLANT-7i | <i>wu-tuk</i> | | |
| | R | <i>na+tzetz-e</i> | 0- <i>nip7-i</i> | 0- <i>wu=tuk-i</i> | | |
| | MG | XE-chop-RES | 3A-plant-RES | 3A-good-harvest-RES | | |
| | LT | my-chopped-thing | planted-thing | well-harvested-thing | | |
| | FT | "What I chopped has been planted and harvested well." | | | | |
| | or | "What I chopped is a planting and a good harvest." | | | | |
| | T | SHAPESHIFTER ₂ | <i>ma-sa-ni-APPEAR-wu</i> | | | |
| | R | <i>jama</i> | 0- <i>masa=ni7-APPEAR-wu</i> | | | |
| | MG | shape-shifter | (is) 3A-god-BODY-appear-CMP | | | |
| | LT | shape-shifter | it-appeared-divinely-in.his.body | | | |
| | FT | (A) shape-shifter(s) appeared divinely in his body. | | | | |



(probably adverbial) morpheme.

Some clauses were previously identified as verbless predications and were therefore interpreted as equational clauses; equational clauses, and no other clauses, are verbless predications in Mije-Sokean languages, and in Mesoamerican languages generally. This interpretation is confirmed by the clause that begins column V. No sign for a verb suffix, one of which must occur on any verb, occurs in V1-5. The only verbs that sometimes lack orthographic evidence of such a suffix, which is nevertheless present, are incomplete dependent verbs, which begin with ergative pronominal markers; for the epi-Olmec texts we have, they begin with **7i** or **na**. The sign **7i** occurs at V1, but it is part of the spelling of an adverb, {7is} “behold!”, as the parallel passages beginning with the

Fig. 1. The text on the side of La Mojarra Stela 1. **(A)** Slanted hatching indicates lines that have been deepened and widened by erosion; dashed lines are plausible but open to doubt. Sign groups are designated sequentially as V1 through V30; in sign groups consisting of two vertically juxtaposed signs, the individual signs are labeled with the position number of the group, followed by a or b. **(B)** Reconstruction of original form of text. Each sign is identified by its previously determined values. A freestanding ? means that the sign is illegible; a ? after a sign’s value, as in **ni?**, reflects some uncertainty over the identification of the incised form, with the reconstructed form transcribed by that value. We reconstruct SHAPE-SHIFTER₂ rather than **ja** at V25 and **ni** rather than DRUM/YEAR at V28 because our provisional reading of the text uses these identifications, but the alternative reconstructions are not precluded. **(C)** Analysis of text. T = transcription of sign values; R = reading in the epi-Olmec language; MG = morpheme-by-morpheme gloss of R; LT = literal translation; FT = free translation. Conventions: In transcriptions, a hyphen joins transcriptions of signs that are part of the spelling of a single word but are visually in separate groups, in that they are vertically in sequence separated by space; a + joins transcriptions of signs that are part of the spelling of a single word but that visually occupy a single sign group. In readings, +X means X is enclitic; X+, proclitic; -X, suffix; X-, prefix; =X, postpound; and X=, prepound. In morpheme glosses, a hyphen marks any morpheme boundary, and grammatical morpheme functions are described by the following abbreviations: A, absolutive-person marker; E, ergative-person marker; X, exclusive (first) person; RES, resultative nominalizer; NUM, numeral-forming suffix; INC, incomplete-aspect suffix; CMP, complete aspect suffix; REL, relativizer enclitic; and MAN, manner-adverbial-forming suffix. Dots join English words or abbreviations that together translate a single epi-Olmec linguistic unit. A freestanding ? transcribes a morpheme or word whose identity is unknown; parenthesized, it means that such a unit may or may not have been present. A ? preceding a form reflects uncertainty over the meaning or phonological value of the sign whose use is reflected by that form.

sequences **7i-si₂** NUMERAL YEAR show. Thus, no verb occurs in V1-5. The sign pair at V6 spells a conjunction, which elsewhere separates clauses, so V1-5 must constitute a complete, verbless clause. The structure, with an adverbial phrase followed by a seemingly uninflected noun, is in fact one of the possible structures of an equational clause with third-person subject.

Another verbless clause (or two of them) appears to be represented by the sign sequence at V19-24, but the argumentation required to show this is too complex to pursue here.

Comments on the translation.

V1-5: The phrase “Behold there/he was a 12-year [title]” most plausibly refers to a status held by the protagonist for 12 but not for 13 full years, after the last date referred to in the previous part of the text (that on which the protagonist’s brother-in-law was executed; narrated at S7-T46). This brings us to, or somewhat past, 9 August 169 A.D. Gregorian (8.6.9.15.2) (12). This date fell 58 days before the end of an epi-Olmec decade at 6 October 169 A.D. (8.6.10.0.0), a type of date on which monuments were dedicated among neighboring Lowland Mayans, and perhaps the most likely date for the erection of La Mojarra Stela 1. It is possible, however, that what is read as 12 here should be 13. The effaced title borne by the protagonist may refer to a rank he achieved after the defeat of his brother-in-law (narrated in R31-40), maybe something like “regional overlord.”

V6-8: The phrase “. . . a garment got folded” may refer implicitly to a bloodletting event, because folding garments has this association at O*32-33 and Q6-8. An alternative parsing is “. . . he garment-folded.”

V11-18: “The stones that he set in order . . .” are most likely the same stones that are referred to at R28-30 (“when he placed stones in order . . .”) and T24-30 (“the symbol[stone]s got replaced upright”). In “. . . were thus symbols, ?kingly-type ones,” “thus” translates/je7-tzʉ/, literally “in yon way,” referring to a relatively distant past event, rather than a relatively recent one; the event is, presumably, the of setting stones in order referred to on the face of the monument.

The sign at V17 appears as a title of Harvester Mountain Lord at R24, at P31, and, although presumably for a different person, on the Tuxtla Statuette at G4. Visually, at least, this title is of Olmec vintage; whether it refers back to Olmec times or institutions has not yet been determined. In the context at V17, where it is combined with the relativizer {+wʉ7}, it serves as a qualifier, TITLE₃-wʉ, meaning something like “kingly” or “royal.”

According to our reading of this text

segment, V11-18 constitutes an aside or parenthetical remark by the narrators (13) of the text about the situation of the protagonist when he made the remark found at V19-24. Groups V25-30 might be a continuation of the quote at V19-24 or, more likely, is information provided by the narrative voice of the text.

V19-24: “What I chopped is a planting and a good harvest.” No coordinating conjunction like “and” has been found in epi-Olmec texts, although several passages seem to offer lists of nouns, adjectives, or verbs that would require the insertion of “and” in English translation. The words /tetz-e/, /nip7-i/, and /tuk-i/ are resultative verbal nouns or non-active participles that can be rendered both “having been VERBen,” and “VERBen thing,” thus the rendering as “chopped thing,” “planted thing” or “planting,” and “harvested thing” or “harvest.” These three nouns presumably stand for three actions that are linked in some logical order. The chopping may refer to the beheading of a prisoner at L4-7 (“when I chopped [off his head] . . .”) and/or the execution of the protagonist’s brother-in-law at S44-T6. The heads of his enemies or their blood, or both, may be the buried things referred to (“to plant” and “to bury” are the same word, {nip7}). This interpretation may have the prosaic interpretation that the “harvest” is the fruitfulness of the land with respect to some crop or crops at the point of and/or as a result of the burial of the heads or the blood. Human sacrifice was believed to promote good harvests. Among Mayans, at least, the ruler was expected to carry out or sponsor the rituals that would ensure good harvests at the ends of years, especially at the ends of 5-, 10- (as perhaps here), and 20-year stations in their calendar. “Harvester Mountain Lord” (found at L2-3, O10-11, and Q16-17) may be an epithet of the protagonist, rather than a name, and may refer to his success over time in ensuring good harvests for his people.

In this column of text, the protagonist who speaks at V19-24 is not named, although a title is given him at V5. He is presumably the same person as Harvester Mountain Lord, who is named and depicted on the face of the monument, and given various titles.

V25-30: “(A) shape-shifter appeared divinely in his body.” The text spanning Q48-T23 refer to ritual acts that resulted in the protagonist (or him and his supporters) taking 23 jaguars over a 23-day period [confirming the chronology of (4)]. Thus, V25-30 may refer to this set of events; to the garment folding event at V6-8, when a public bloodletting and attendant vision probably took place, perhaps at the end of

a 10-year period; or to a public event after one of the harvests (there could have been 24 each of corn and beans in 12 years) that may be referred to at V24.

Support for the decipherment of epi-Olmec writing.

At a general level, the grammatical model for the decipherment is supported by the results reported here; it is this model that makes it possible to set the parameters for the syntactic parsing, and these parameters constrain the more detailed features of the analysis and translation. Certain specific features of the decipherment are also supported, along with the grammatical framework and much of the specific phonetic and lexical decipherments on which these features were based.

New contexts supporting grammatical analyses.

In any text as long as that on La Mojarra Stela 1 (about 535 glyphs), there is a substantial amount of lexical repetition. This feature, along with a model for Mije-Sokean word structure, was a key to the grammatical analysis that was the primary basis for our ability to decipher the epi-Olmec writing system.

In the case of sign sequences that were not repeated, the determination of word boundaries in the original decipherment work had to be based on a systematic grammatical analysis of the entire text, along with a uniformly applicable set of sign readings and vocabulary identifications. Three of the sign sequences that had occurred only once in the previously known columns of text—but that were analyzed as belonging to single linguistic units on the basis of the way they fit into the overall structure of the decipherment—are now known to occur also in column V. Their recurrence in this column supports the view that the decipherment had built a correct parsing of all of these units and, in part at least, of their immediate surrounding contexts.

1) The combination **je-tzu**, which occurs at M2-3 and is interpreted as /je7-tzɛ/ “thus,” occurs also at V13-14. This recurrence confirms the analysis of this sequence as a word, and the meaning of the word fits both contexts.

2) At V26-27, **ma-sa** spells an incorporated preposed variant of proto-Mije-Sokean *masan (14) “god” that is found also at D2-3; /maas=/, from *masa=, is attested as a variant of *masan used as a preposed incorporee in present-day Sotapan and Ayapa.

3) At V20, **tze-tze** spells the word /tetz-e/, consisting of the verb root {tetz} “to chop” followed by the resultative nominalizing suffix {-e}. The same sign sequence is found at L5, where it spells the root {tetz} only, given that L4-L7 spells /na+tzetz-ji/ “when I chopped it.” The repetition shows

that **tze-tze** at L5 was correctly isolated from its context as spelling a full verb root.

4) At V21-22, **PLANT-7i** spells the word /nip7-i/, with **7i** representing the final /7/ of the root and the resultative nominalizing suffix {-i}. This recurrence confirms the interpretation of the sign **PLANT** as representing the verb root {nip7} in its other two instances, on the Tuxtla Statuette and the O’Boyle Mask. It was correctly isolated as a logogram, not a syllabogram spelling an affix, nor partially spelling a root in combination with other signs in its context.

Support for the identification of grammatical patterns.

The occurrences of **FOLD+pa₂tu+CLOTH** at O*32-33 and **FOLD+pa₂CLOTH** at Q6-8 already suggested that these sign sequences go together in a single clause. This interpretation is supported by the combination **tu+CLOTH FOLD+pa₂** at V7-8. In all three cases, the meaning is “cloth(ing) gets folded,” but the contrary order of this third instance requires recognizing that different ordering of words can occur under some conditions. This change in word order involving the same subject and verb is quite interesting, because it conforms to a pattern of word-order variation that emerged from the overall decipherment described in (3). In fact, we found two grammatical patterns that can account for it: mediopassive usage and noun incorporation.

In every Mije-Sokean language there are many transitive verb roots that can be used intransitively without any intransitivizing derivational affixes and that have a mediopassive meaning in such usages; that is, the logical subject of the transitive verb does not appear, and its logical object appears as its grammatical subject. Whether a particular verb has this property in a particular language is a lexical fact about the verb; not all transitive verbs do this, and this property cannot be predicted from other facts. When different Mije-Sokean languages have descendants of the same transitive verb root, these descendants do not always agree with each other as to whether that root can be so used. This difference shows that this lexical feature has been subject to change through time in individual languages. Because every Mije-Sokean language has many transitive roots that have this property, the pattern itself is reconstructible for pre-*proto-Sokean*. Our recognition of this pattern in several straightforward cases is part of the body of evidence confirming that the epi-Olmec language was Mije-Sokean.

Whether or not the *proto-Sokean* verb *paks “to fold (cloth, among other things)” had this property in pre-*proto-Sokean* cannot be determined from the evidence of the modern Mije-Sokean languages alone:

There are languages in both subgroups of Sokean that have it, and languages in both subgroups of Sokean that do not. On La Mojarra Stela 1, however, this is the only possible grammatical interpretation of the first two instances of the cloth-folding clauses, in which the word /tuku7/ “cloth” follows the verb: Because there is no ergative marker preceding the verb, it must be intransitive, even though “to fold” is semantically transitive.

This grammatical interpretation is consistent with the subject-verb word order found at V7-8. We previously found that nonactive subjects of intransitive verbs usually follow but often precede these verbs. This variable order is not the case for active subjects, which invariably precede the verb (transitive or intransitive).

The other possible explanation is object incorporation. Noun incorporation of various sorts is quite common in Mije-Sokean languages and many instances are found in the epi-Olmec texts. More specifically, in these languages, a transitive verb can be intransitivized by incorporating its direct object, and in such cases the object immediately precedes the verb stem. In the case at V7-8, this would yield the intransitive verb form /tuku7=paks-pa/ “he garment=folded.” Object incorporation is possible only when the object is unpossessed, as it is here, and not definite; the majority of nouns in the text appear to be definite, but no overt marker of definiteness or indefiniteness normally appears. We have recognized several other instances of object incorporation in epi-Olmec texts.

New contexts supporting sign readings.

Several signs are used to spell the same morphemes as in previously known instances, and these examples (for example, the sign **wu** for the verb suffix {-wu}) support the grammatical model for the uses of these signs. The values of three signs are supported by their use in new contexts:

1) All previously known instances of the syllabogram **wu** are used to spell either the completive suffix {-wu} or the relativizer enclitic {+wu7}. At V23, **wu** seems to spell the root {wu} “good.” This example confirms the reading of this sign as the syllable /wu/.

2) The probable **ni** sign seems to spell the prefix /ni7-/ on/ in the body” at V25-30. This prefix is known from both Soke and Mije, as well as Oluta (as {ni:-}), and so must have existed in pre-*proto-Sokean*. This is the first instance of the prefix {ni7-} recognized in epi-Olmec texts. It confirms the phonetic reading of the sign that represents it, which only occurs in one other instance, as the syllable /ni/.

3) The string **7i-si 12 YEAR/7AME7 TITLE_x** at V1-5 is mirrored at H3-14 (**7i-si**

13 YEAR/7AME7 BUNDLE/PIT-ti) and T7-10 (7i-si₂ ONE YEAR/7AME7-me TITLÉ₄); in all three cases, the reading is “behold he/there was a ROLE for n years.” The occurrence of 7i-si at V1-2 alongside 7i-si₂ at H3 and T7 also demonstrates the previously postulated equivalence in value of si and si₂.

Additional evidence concerning certain grammatical constructions.

The five instances of verbs of speaking that occur on the face (columns A through U) of La Mojarra Stela 1 all have the incomplete suffix {-pa}. Sign groups V9-10 apparently spelled a verb of speaking (because it is followed by a first-person ergative pronominal agreement marker, which should occur only in a direct quote) that occurs with the independent completive suffix {-wɛ}. In our documentation of present-day Mije-Sokean languages, incomplete {-pa} is typical on verbs of speaking, even with past time reference, although the complete {-wɛ} is not proscribed.

Sign groups V6-8 and V9-10 spell two clauses in sequence linked through what we have labeled the *pa*-conversive; in this construction (i) the two clauses are adjacent, (ii) the events referred to are in close temporal succession, (iii) and one verb is marked with incomplete {-pa}, whereas the other is marked with completive {-wɛ}, and both verbs are understood as being in the completive. Usually, as here, it is the first verb that takes {-pa} and the second that takes {-wɛ}. It is plausible that V6-10 is an instance of the *pa*-conversive.

Additional evidence for a phonological structure.

The spelling PLANT-7i “plant-ing/plant-ed” at V21-22 shows that the epi-Olmec descendant of proto-Mije-Sokean *ni:p7 “to plant,” with the nominalizer {-i} suffixed, was pronounced /nip7i/, with a postconsonantal /7/, in pre-*proto*-Sokean. This pronunciation is consistent with epi-Olmec postconsonantal /7/ in /RULER ko7=mon7a/ “ruler’s head-wrap,” spelled KNOT+GOVERNOR-7a at Q41-42, and /poy7a/ “moon, month,” spelled *po-7a* at J3-4. In *proto*-Sokean, as it would be reconstructed from surviving languages, postconsonantal /7/ had been lost from these words. Data from Mije languages show that postconsonantal /7/ appeared in all such items in *proto*-Mije-Sokean (5).

Additional evidence for a spelling convention.

A distinctive spelling convention is also supported. In quite a few cases, a syllabogram’s iconic origin is apparent, and in these cases the syllabic value is based on the consonant and vowel that begin the word whose depiction the sign reflects; some such signs can be used as a logogram for that word and as a syllabogram. For example, the icon for “earth,” which was *nas in *proto*-Mije-

Sokean, is almost always used for the syllable /na/, but it occurs at O26 as a logogram for “earth” in spelling /nɛ.tzat7.e=nas/ “ground jointly measured by handspans.” Similarly, the sign for the numeral 2 is used at R43 to spell the syllable /wɛ/ (15), a syllabographic use of what is otherwise known only as a logogram; “two” in Mije-Sokean has two suppletive allomorphs, *metz and *wɛstɛk.

A confirming example is now provided by the sign *ne*, which shows a hand setting down a stone; its logographic origin is pre-*proto*-Sokean {ne7w}, “to set stones in order.” At V12, this glyph is used to spell the logogram ORDER.STONES, not the syllable /ne/. As a logogram for the verb {ne7w}, it may also spell the corresponding participle or verbal noun /ne7w-e/ “having been set in order, of stones,” and that is what it does at V12. The example also confirms the convention by which logograms for verbs could be used to spell their nominalizations. *New evidence concerning uses of titles.*

The use of TITLE₃-wɛ at V17 shows that word for titles, offices, or statuses were applied not only to rulers but also to artifacts and activities that are associated with those statuses.

Conclusion

This study shows that a previously unknown segment of text can be read and understood in terms of the same model for language structure, sign values, and spelling conventions that were developed in the previously achieved decipherment of the epi-Olmec script, and shows that the segment’s content is well integrated with the previously read portion of the same text. Conversely, there are no phenomena in this stretch of text that challenge the model in any way. It is difficult to imagine that this model would yield a complete, coherent, and grammatical text if these portions of the decipherment—language structure, sign values, and spelling conventions—were not essentially correct. In our view, the data confirm the results obtained in the first two of our by now six years of our work on the decipherment of epi-Olmec writing.

REFERENCES AND NOTES

1. These texts are, in order of their discovery, the Tuxtla Statuette (TUX), the Chiapa de Corzo Sherd, the O’Boyle Mask, and La Mojarra Stela 1 (MOJ). When not otherwise mentioned, the text is from La Mojarra.
2. F. Winfield Capitaine, *La Estela 1 de La Mojarra, Veracruz* (Publ. 16, Research Reports on Ancient Maya Writing, Washington, DC, 1988).
3. J. S. Justeson and T. Kaufman, *Science* **259**, 1703 (1993).
4. _____, *Arqueología* **8**, 1992 (1996).
5. S. Wichmann, *The Relationship Among the Mixe-Zoquean Languages of Mexico* (Univ. of Utah Press, Salt Lake City, UT, 1995). Wichmann had made versions of this work available to us in 1991.

6. R. Diehl, A. Vargas, S. Vásquez, in *Memoria del Coloquio Arqueología del Centro y sur de Veracruz*, S. Ladrón de Guevara and S. Vásquez, Eds. (Universidad Veracruzana, Veracruz, Mexico, 1997), pp. 197–205.
7. A. M. H. Schuster, *Archaeology* **47** (no. 5), 51 (1994).
8. In a note to the director, Vásquez wrote that “una revisión cuidadoso de la estela me permitió identificar poco más de 20 glifos, muy erosionados en la costado de la estela [a careful examination of the stela allowed me to identify a little over 20 glyphs, very eroded, on the side of the stela].”
9. Stuart had labeled four signs represented as tattooed on the body of the standing figure, with column labels V through Y. However, these are one-word designators of some status of the individual who bears them, that is, they are captions; they are not texts or text segments, they have no “reading order” relative to one another or to the remainder of the text, and they would not ordinarily have column designations at all.
10. We write Mije-Sokean forms in a practical, Spanish-based orthography. Most letters have their usual Spanish pronunciations, but /j/ represents [h]. We use *ɛ* to represent a high, central-back unrounded vowel, like the *u* of *put* and *bush* as pronounced by many Southerners and Westerners, and of *just* as in *just now*. The symbol 7 represents a glottal stop. Phonologically explicit representations of Mije-Sokean words are between slashes, and transcriptions of morphemes are between curly braces; phonetic transcriptions of epi-Olmec signs are in bold italics. We indicate logograms in transcription by rendering them in capital letters. These transcriptions are in bold italics when they specify a Sokean word they are known or thought to represent, and are in roman type when they specify its (usually basic) meaning only. For example, the sign representing Sokean /tuku7/ “cloth, clothing” may be transcribed either **TUKU7** or CLOTH. In phonologically explicit representations of Mije-Sokean words, grammatical affixes are joined to roots or to one another by a hyphen; elements of compound words are joined by =; and clitics are joined to adjacent words by +.
11. Readings for almost all these signs were reported in the original announcement of the decipherment (2). Only three readings have been subsequently revised. One, appearing at V14, was revised from **tzi** to **tzu** in the spring of 1996, when it was realized that the final vowels of words we believed to be spelled with these signs would conform exactly to existing and reconstructible words if the sign values were exchanged. This change does not impinge on any semantic interpretation. Another, appearing at V29, was identified as a logogram for an intransitive verb, initially identified as referring to the performance of some kind of ritual, but later revised semantically to “to appear.” The reason for this change is that the verb refers to something done by or happening to both a throne (inanimate) and to human beings, to jaguars, probably to a god, and to a constellation, all in a ritual context. The constellation helps to narrow the semantics fairly tightly; becoming manifested (appearing, being revealed) in some way seems to be the only feasible category. The last change was made on 1 May 1997: Although the reading of the sign at V25 as /jama/ is unchanged, we have discovered that the meaning of this term in Mije-Sokean languages is “shape-shifter” rather than “animal spirit counterpart”.
12. Gregorian equivalents of these epi-Olmec dates, expressed in the so-called “long count” calendar, are based on a 584,265 correlation constant, making them 18 to 20 days earlier than the corresponding Mayan dates would be under the two variants of the almost universally accepted correlation of that system with European chronology. A summary of the evidence for this correlation is given in (4).
13. The narrators were apparently elite supporters of Harvester Mountain Lord. We know they were a group, not an individual, because they twice referred to their own actions on the face of the monument using the (plural) ergative inclusive pronominal {tɛn+}, at S7-12 and T42-46.
14. Reconstructed words, which are labeled by an as-

terisk, are pre-*proto-Sokean* unless otherwise stated.

15. The identification of this sign as that for the number 2 is another result of direct examination made possible by the erection of the stela. The drawing in (2) suggested that the numerical dots were ovals, presumably because the photographs on which it was based had to be done at an angle, and they showed a spurious internal line, presumably an effect of lighting.
16. Our greatest debt for the work reported here is to S. Ladrón de Guevara, Director of the Museo de Antropología in Xalapa, Veracruz, Mexico. It was she who made the discovery of the text possible,

and who, for the first time, provided full public access to the monument for all who wish to examine it. She facilitated our work in particular by granting us access to the museum when it was closed to the public, especially at night, and by helping us with the physical arrangements to make accurate tracing of the text possible. I. Graham photographed the monument for us. In 1993 and 1994, our linguistic work documenting the modern Mije-Sokean languages was supported by funding from the National Geographic Society (grants 4910-92 and 5319-94) and the Faculty Research Awards Program grant 320-9753P of the State University of New York at Albany; since 1994, it has been sup-

ported by the National Science Foundation (grants BNS-9411247 and SBR-9511713). This funding included support for the use of these materials in comparative reconstruction of earlier stages of these languages and direct support for our continuing work on epi-Olmec decipherment, including the funding for the work reported here. Travel support for our collaboration since 1993 has been provided under these grants and by the Texas Workshops on Mesoamerican Writing and Iconography, under the direction of P. Keeler.

26 December 1996; accepted 17 April 1997