THE feminine numeral ‘two’ has been a perennial problem of Biblical Hebrew orthography and phonology. It is the only word in Hebrew with a dagesh in the second consonant following an initial letter marked with a shewa. It thus must violate at least one of the following principles, which are generally assumed to govern the phonetic interpretation of Hebrew orthography:

1. The rule of spirantization applies invariably: non-geminate b g d k p t are always spirantized if preceded by a vowel, even a reduced vowel.
2. A reduced vowel (written with shewa or hatef) can occur only in an open syllable, never in a closed syllable, even one closed by a long consonant.
3. There are no syllable-initial consonant clusters; hence a shewa symbol under the first letter of a word must indicate a reduced vowel, not zero.

The word for ‘two’ begins with š-shewa-t-dagesh, and both the shewa and dagesh are multivalued symbols: a shewa symbol can indicate a reduced vowel or no vowel at all, and a dagesh can indicate a geminate (long) consonant or simply the stop character of one of the spirantizable letters. Two choices times two variables gives four logical possibilities, and most of these possibilities have been proposed by scholars in the past. According to one’s choice of which principle to violate, one will consider this word to have been phonetically šṭáyim (violates principle 1),¹ šṣṭáyim (violates principle 2 or 3),² šṭáyim (violates principle 3);³ the only logical combination which does not seem to have its advocates is šṭáyim (violates principle 3). H. Bauer and P. Leander raise the possibility that the spelling is designed to indicate a choice between two readings, šḥlāyim and šittāyim.⁴ Occasionally it has been suggested that the unusual spelling indicates a more unusual pronunciation; for instance, “It may well be . . . a phonetic reality best indicated as ':š-t-.'”⁵ In this paper, it will be argued on comparative and typological grounds that the most likely interpretation is simply šṭáyim.
An analogous problem exists with regard to Syriac words based on the number 'six': štā 'six' and šīm 'sixty', and in the East Syriac tradition also šīḇāyā 'sixth'. These have optional variant forms with an epenthetic initial vowel: ḫeštā 'six', ḫešīm 'sixty'. To these we must add the word for 'drink', where the form with the epenthetic vowel is the only one attested: Biblical Aramaic ḫešīw 'they drank', Syriac ešșī he drank.6

While these Hebrew and Aramaic words all show the same synchronic form, they have disparate histories, and so a historical analysis will not give us an unequivocal interpretation of the orthography. Therefore, we shall turn to a general, typological line of reasoning, and come back to the history afterwards.

Speech sounds differ in their sonorosity. Vowels are more sonorous than consonants; among consonants, the voiceless obstruants p t k are the least sonorous, the nasals, liquids, and glides m n r l y w the most; and the fricatives and sibilants in between. Here are a few examples of sounds arranged according to the sonority hierarchy:

<table>
<thead>
<tr>
<th>Most sonorous</th>
<th>Least sonorous</th>
</tr>
</thead>
<tbody>
<tr>
<td>ieaou</td>
<td>pbtdkg</td>
</tr>
<tr>
<td>yw</td>
<td>sszf</td>
</tr>
<tr>
<td>rl</td>
<td>mn</td>
</tr>
</tbody>
</table>

Surveys of many languages have shown that at the beginnings of syllables sounds tend to be ordered from the least to the most sonorous; in contrast, at the ends of syllables sounds are most frequently arranged in order of decreasing sonority.7 For example, at the beginning of a syllable in English a tr cluster occurs (as in tree) but not rt because r is more sonorous than t. At the end of a syllable the opposite is true: rt occurs (cart) but no tr. Similarly, sl occurs initially (sleep) but ls finally (false). The only exceptions in English are clusters of s plus a stop; the sp, st, sk in spill, stop, skip violate the generalization that initial clusters are of increasing sonority. Furthermore, these may be followed by a third consonant (spring, splash, spew [spyu], stray, scream, square [skwə], skew [skyu]); no other three-consonant clusters occur at the beginning of syllables in English. Thus not only do the initial s-stop clusters occur, standing outside the generalization that initial clusters increase in sonority, but also the s-stop combination counts as only a single consonant in that it allows another consonant to follow.8 The sibilants s and ŋ are of the same sonority; in German, it is ŋ rather than s that has the special freedom to occur in clusters: spät [spet], stark [Stark], Strasse [Sträsə] in violation of the sonority principle.

According to principle 3 above, Hebrew and Aramaic are assumed to have had no consonant clusters at the beginnings of syllables. However, the anomalous spellings cited above suggest that initial št- clusters did in fact occur in these languages, in precisely these words. Thus there were isolated exceptions to principle 3, but this is not

6 Alongside the masoretic Hebrew štāyim there are forms of the number 'two' with epenthesis in a tenth-century Tiberian grammatical essay and in Phoenician; Rudolf Meyer, Hebräische Grammatik, 4 vols. (Berlin, 1966–72), vol. 1, pp. 79–80; vol. 2, pp. 85–86.
INITIAL CONSONANT CLUSTERS

unexpected because the very same clusters are exceptions to generalizations about clusters in other languages for which we have direct phonetic information. A suggestion that, say, clusters such as pt-, lt-, yt- occur in the absence of any other clusters in a language attested only in writing would rightly be met with incredulity; conversely, the fact that the anomalous spellings in Hebrew and Aramaic involve precisely a sibilant-stop cluster can hardly be a coincidence.

If Hebrew and Aramaic had phonetic štáyim and štā, with the initial clusters atypical for these languages, how did these forms come into existence? In the case of Hebrew štáyim, many proposals have been advanced, mostly involving an unexplained reduction from *sittayim or something similar.9 The key to this form lies in the fact that the numeral ‘two’ was one of the few stems with initial clusters in Proto-Semitic. This is attested in Arabic, where the i of masc. (i)bānānī is epenthetic, as it is in (i)bān- ‘son’, (i)sām- ‘name’, and a few other basic stems. D. Testen has shown that the initial cluster must have survived into the earliest Aramaic, where it accounts for the change from n to r in Aramaic tren ‘two’ from *būayn and bar/brā ‘son’ from bn-.10 Original n became r in Aramaic only when it is the second member of an initial cluster; thus the change took place in the singular bar/brā but not in the plural bānīn from *bānīn. Since the initial cluster in the numeral ‘two’ survived into Aramaic, it is not unreasonable to suppose that it survived into Hebrew as well, so that the earliest Hebrew forms for ‘two’ were masc. šnāy(i)m, fem. *sīsāy(i)m or *sītay(i)m (perhaps becoming *sittay(i)m). Whatever the original feminine form was, it was reshaped on the model of the masculine štáyim with the initial cluster, as štāy(i)m. At least at that time, both the masculine and the feminine had initial clusters.

As for Syriac štā ‘six’, C. Brockelmann11 has plausibly proposed that original Aramaic šittā was modified under the influence of a proportional analogy with the -CCd termination of the adjacent numeral ‘five’: fem. hamesš is to masc. hamsā as fem. set (šēd) is to X, where X became štā. This idea is supported by the fact that the opposite direction of change occurred in Hebrew, where masc. *hamšā became hamiššā on the model of šiššā.

Subsequently, an already existing general Aramaic rule of epenthesis came to apply to the newly formed initial consonant cluster.12 This applied both to borrowed words which had initial clusters in the original languages (including Greek στ-, στ-) and to some native words, among them Syriac štā. The word for ‘he drank’, formerly *ṣāṭī, at some point lost its first vowel and (simultaneously?) gained an epenthetic one, ‘ištī, ‘eštī.13 If it seems surprising for this one verb to have undergone such a change when, phonologically similar verbs (even those with št- roots) did not, it is relevant to note that ‘drink’ and ‘two’ are among the earliest words a child learns, probably even

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9 An exception is Bravmann, “Hebrew štáyim.” The rationale Bravmann offers for the reduction from *sittayim to štáyim has nothing in common with the present analysis.


12 Note that the earliest attestation of initial epenthesis in Aramaic is ‘sm ‘name’ (Rainer Degen, Alteramatisches Grammatik, Abhandlungen für die Kunde des Morgenlandes 38/3 [Wiesbaden, 1969], p. 42), a word with an initial cluster since the Proto-Semitic stage.

This is the answer to the question asked by S. Kaufman, "But if total reduction of the initial vowel is the cause of the prothetic vowel here, why did such prothesis not occur in many other verbs? Surely there are many common verbs whose first two root consonants would make an initial cluster whose pronunciation would be difficult to the speaker of Semitic (e.g., bd-, qt-)." Note that it is precisely the pairs of consonants that are the easiest to pronounce as clusters that induce epenthesis. This has an exact parallel in the pronunciation of English by speakers of Egyptian Arabic, another language that disallows initial clusters, who say filōr ‘floor’, bilastik ‘plastic’, thīrī ‘three’, silayd ‘slide’, siswētar ‘sweater’, but istādi ‘study’, iski ‘ski’, izbasāl ‘special’. Something very similar must have been heard in the pronunciation of Greek words by speakers of Syriac.

The ancestor of modern Eastern Aramaic (a close sister of Syriac) had epenthesis in the numeral 'six' but not the verb 'drink': Tūrōyo .notifications as clusters. This has an exact parallel in the pronunciation of English by speakers of Egyptian Arabic, another language that disallows initial clusters, who say filōr ‘floor’, bilastik ‘plastic’, thīrī ‘three’, silayd ‘slide’, siswētar ‘sweater’, but istādi ‘study’, iski ‘ski’, izbasāl ‘special’. Something very similar must have been heard in the pronunciation of Greek words by speakers of Syriac.

This suggests the following history: in an early Aramaic ancestor of Syriac and modern Eastern Aramaic, there were initial ș- clusters only in āṣṭā ‘six’ and its derivatives; all other initial ș-plus-consonant combinations were pronounced with an inter-

15 Ellen Broselow, “Nonobvious Transfer: On Predicting Epenthesis Errors,” in Larry Selinker and Susan Gass, eds., Language Transfer in Language Learning (Rowley, Massachusetts, 1983), pp. 271, 277–78. Broselow cites (in that paper and personal communication) similar facts from the pronunciation of English by speakers of Sinhalese, Persian, Turkish, Bengali, Hindi, Indonesian, and Telugu, as well as native-language facts pointing to the special character of initial sibilant-stop clusters in Old English, Old Norse, Gothic, Sanskrit, and Armenian. Broselow suggests that in many languages s-stop clusters are a kind of affricate in reverse, two consecutive articulations with the distribution of a single consonant. In a survey of consonant clusters in over one hundred languages, Greenberg has observed that the most widespread kind of initial cluster are those containing dental or alveolar consonants. For instance, the only initial cluster in Chiricahua Apache, besides affricates, are st- and sd-; Joseph H. Greenberg, “Some Generalizations Concerning Initial and Final Consonant Clusters,” in Greenberg, ed., Universals of Human Language, vol. 2 (Stanford, 1978), p. 269.
17 Georg Krotkoff, A Neo-Aramaic Dialect of Kurdistan, AOS 64 (New Haven, 1982), pp. 46, 150.
vening (reduced) vowel. Subsequently, two changes took place, the deletion of reduced vowels (creating certain other š-consonant clusters) and the extension of epenthesis to new forms, but the relative chronology of the two changes differed in different dialects. In Syriac, many words lost the reduced vowel, acquiring initial clusters and hence epenthesis; this epenthesis is attested in old manuscripts, but in the standard language epenthesis was retained only in a few words: forms of 'six' and 'drink', (ē)šṭārā 'written bond', Greek words with (ē)sī- and (ē)sīp-, and perhaps a few others.¹⁸ (Many more words have initial clusters in the modern reading traditions of Syriac, but this has more to do with the readers' native languages than with classical Syriac.) In the ancestor of modern Eastern Aramaic, besides 'six', the reduced vowel was lost and epenthesis applied in several additional words, such as ādxē 'mill' (from the unattested absolute state corresponding to Syriac rahyā) and perhaps a few others, but not, as it happened, in 'drink' or any other verb.¹⁹

Two conclusions follow from the facts presented in this paper. The first is that the phonetic reality of the Hebrew feminine numeral 'two' and the Syriac masculine 'six' was štāyim, štā. All other proposals for the reading of these words are less likely on both typological and comparative-historical grounds: typological grounds, in that sibilant-stop clusters are especially licensed in many other languages, and comparative-historical grounds in that the number 'two' had a stem with a ṯn-cluster in Proto-Semitic and 'six' shows the effect of epenthesis in modern Eastern Aramaic. Thus the transcription štāyim, šnāyim, torēn (cf. Neo-Aramaic tre), frequently seen in the literature,²⁰ present a completely false picture, however conventional. The words were štāyim, šnāyim, and trēn. The second, and more general, conclusion supports the major point of the article by Kaufman cited above, that the Aramaic shortening and reduction of vowels to a is historically separate from and prior to the complete deletion of some of those vowels and that the deletion was conditioned by several factors including the adjacent consonants, differed in the various Aramaic dialects, and cannot be inferred directly from the orthography.

¹⁹ Arthur John Maclean, Grammar of the Dialects of Vernacular Syriac (Cambridge, 1895; repr. Amsterdam, 1971), p. 308. Most of the words in Maclean's list have more complex histories, and in many, epenthesis applied at a much later date and not in all the Neo-Aramaic dialects. Subsequently, reduced vowels were lost in nearly every context in Neo-Aramaic, so that nearly any pair of consonants can cluster initially, as documented by Solomon I. Sara, A Description of Modern Chaldean, Janua Linguarum, Series Practica 213 (The Hague, 1974), pp. 41-47.
²⁰ For instance, Brockelmann, Grundriss, pp. 230, 485.