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## The Arabo-Tiberian Vocalisation System: An Undocumented Set of Medieval Vowel Signs for the Hebrew Script

**Abstract** The three main Hebrew vocalisation systems—Tiberian, Palestinian, and Babylonian—are well-known in the history of Semitic languages. This article describes another previously undocumented Hebrew vocalisation system, the ‘Arabo-Tiberian system’, a sub-variant of the Tiberian system that appears only in Judaeo-Arabic manuscripts around the tenth and eleventh centuries. In addition to the typical Tiberian vowel marks, the Arabo-Tiberian system includes two loaned Babylonian signs, one for the vowel /u/ and another for /a/ (primarily in the diphthongs /aw/ and /ay/). This system never achieved the widespread adoption or standardisation of other Hebrew and Arabic vowel systems, so it survives now only in fragmentary evidence from the Cairo Genizah. This article describes the common Arabo-Tiberian features in ten vocalised manuscripts and offers hypotheses for the system’s origin and extinction.

**Keywords** Hebrew, Arabic, Judaeo-Arabic, vocalisation, Masoretic Studies, Comparative Semitics, Cairo Genizah, Judaism, manuscripts

### 1 Introduction

The medieval history of Semitic languages is a history of scribes and scholars who grappled with the ideal methods for recording vowels in their writing systems. Traditionally, writers of Hebrew, Arabic, and Syriac left most vowels unwritten, leaving the interpretation and pronunciation of their words partly up to their readers. However, with the spread of Arabic as the medieval *lingua franca* of the Middle East and North Africa, Jewish, Muslim, and Christian scribes sought new ways to record the exact details of their liturgical recitation traditions, balancing desires for oral precision against the sacred authority of earlier, less-precise written sources. They accomplished this task by an innovative policy of minimal



intervention: the insertion of small graphemes that could indicate vowel phonemes at a writer's discretion without modifying the consonantal text of a Bible or Qur'an. Scholars now refer to the sets of graphemes invented for this purpose as 'vocalisation systems'.

Several medieval Semitic vocalisation systems survived and still see regular use today. By far the most widespread is the Arabic *tashkil* ('marking') system, which emerged in the ninth century and has persisted relatively unchanged for Arabic-script writing in multiple languages over the last millennium. The next best known among scholars of Semitic languages is the Tiberian Hebrew *niqqud* ('pointing') system, also invented around the ninth century for use in the Hebrew Bible, but now standard for practically all Hebrew writing in the modern day. Modern Syriac Christians still use two different medieval vocalisation systems, mainly for Bibles and liturgical texts: the 'Eastern' dot system and the 'Western' letter-form system, which crystallised in the eighth and tenth centuries, respectively (Segal 1953: 29–30; Coakley 2011: 307–325).

But for every vocalisation system that survived to the present day, there are others that were abandoned, outcompeted, or simply forgotten as scribal practices changed over time. For example, the first Arabic vocalisation system was the set of colour-coded (usually red) dots found in Qur'ans produced between the eighth and tenth centuries CE. This system saw little adoption outside of Qur'anic manuscripts, likely because the need for multiple ink colours made it too expensive and inefficient for less prestigious texts (Abbott 1972: 7–8; George 2015: 13–14). Arabic traditionists also report a defunct system known as *shakl al-shi'r* ('the marking of poetry') which may have been a precursor to the modern Arabic *tashkil* signs during the ninth century (Posegay 2021b: 82–84). Similarly, two other Hebrew *niqqud* systems—the Palestinian system and the Babylonian system—fell out of use during a process known as 'Tiberianisation' between the tenth and twelfth centuries.<sup>1</sup>

This article describes another defunct vocalisation system, one I have designated the 'Arabo-Tiberian' system, because it shares most of the graphemes of the Tiberian vowel system and medieval Jewish scribes deployed it exclusively for recording vowels in Judaeo-Arabic. This system appears to be a parallel development with the standard Tiberian Hebrew system, first appearing in Classical Judaeo-Arabic manuscripts of the tenth or eleventh century. In addition to the typical Tiberian graphemes, it also includes two loaned signs, one for the vowel /u/ and another variously for /a/ or the diphthongs /aw/ and /ay/. The Arabo-Tiberian system never achieved the widespread adoption or standardisation of other Hebrew and Arabic vowel systems, so it survives now only in fragmentary

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<sup>1</sup> Except in Yemen, where Hebrew vocalisers continued to employ the Babylonian *niqqud*.

evidence, mostly manuscripts from the Cairo Genizah.<sup>2</sup> The following discussion describes the common Arabo-Tiberian features in these manuscripts and offers hypotheses for the system's origin and extinction.

## 2 Features of the Arabo-Tiberian system

The following ten Judaeo-Arabic manuscripts are the focus of this study:

1. Cambridge, University Library, T-S Ar.29.185 (Proverbs, paper)<sup>3</sup>
2. Cambridge, University Library, T-S Ar.54.4 (commentary on Kings, paper)<sup>4</sup>
3. Cambridge, University Library, T-S D1.93 (glossary to Samuel, parchment)
4. Cambridge, University Library, T-S NS 301.14 (unknown commentary quoting biblical sources, parchment) (Shivtiel and Niessen 2006: no. 6309)
5. Cambridge, University Library, T-S NS 188.9 (Job, parchment)
6. Cambridge, University Library, T-S NS 285.155 (Ecclesiastes with commentary, parchment)
7. London, British Library, OR 5562A.19 (Proverbs, parchment)
8. New York, Jewish Theological Seminary, ENA 2779.39 (Ecclesiastes, parchment)
9. St. Petersburg, Russian National Library, EVR ARAB I 1151 (calendrical text, paper)
10. Oxford, Bodleian Library, Heb. d.42.28–31 (rhyming commentary on *piyyut*, parchment)

Most of these manuscripts are fragments of Biblical texts or texts otherwise relevant to Jewish law. In other words, they are the work of professional scribes and scholars, rather than popular or documentary material. All of them are written in 'Classical' Judaeo-Arabic, typified by a transliteration system that mimics Classical Arabic orthography with Hebrew characters on a one-to-one basis.<sup>5</sup> They can be dated on the basis of their orthography and palaeography between the tenth and twelfth centuries CE, with Bodleian Heb. d.42.28–31 likely being the oldest.

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<sup>2</sup> On the history of the Cairo Genizah as a source of manuscripts, see Reif (2000); Jefferson (2022). For an overview of vocalised Judaeo-Arabic manuscripts, see Khan (2010).

<sup>3</sup> Belongs with CUL T-S AS 168.2 and T-S AS 168.3.

<sup>4</sup> Note that CUL T-S Ar.54.4 is two separate manuscripts. P1 and P2 are Hebrew liturgical poetry with full standard Tiberian vocalisation. P3 and P4 are an unrelated Judaeo-Arabic commentary on Second Kings 16–18 with isolated Arabo-Tiberian vocalisation. See Baker and Polliack (2001: no. 7793).

<sup>5</sup> On the differences between Classical Judaeo-Arabic and earlier 'phonetic' Judaeo-Arabic, see Blau and Hopkins (1984: 9–27); Khan (2018); Lieberman (2022: 145–182).

None contain an explicit date, so more precise dating is infeasible within the scope of this study.

All Arabo-Tiberian vocalised manuscripts discovered thus far show familiarity with the standard Tiberian vocalisation system, applying other Tiberian signs sporadically to Judaeo-Arabic or Hebrew words. Additionally, all known Arabo-Tiberian manuscripts employ a sign that does not appear in the standard Tiberian system for the vowel /u/ *in Arabic words only*. This sign is a supralinear stroke that usually leans rightward. MS British Library OR 5562A.19, which is an Arabic translation of Proverbs, is instructive here (Figure 1):

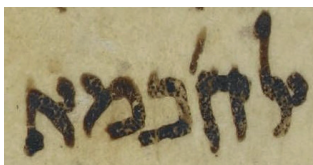


Figure 1. BL OR 5562A.19 r, line 12; *al-ḥukamā* ‘the wise ones’

In the first syllable of this Arabic word, the oblique supralinear stroke indicates the short vowel /u/. If this vocaliser were using the standard Tiberian vocalisation system—as is typical for most vocalised Judaeo-Arabic manuscripts—then we would expect them to mark this syllable with the sublinear three-dot sign *qibbuṣ*, but they obviously do not. Nevertheless, the vocaliser clearly knows the standard Tiberian system as well, as they apply it accurately in other Arabic words. For instance, *pataḥ*, *hiriq*, and *shewa* signs mark /a/, /i/, and ∅ in *mustasliman* (Figure 2), alongside the oblique stroke for /u/.

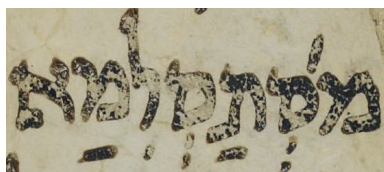


Figure 2. BL OR 5562A.19 v, line 14; *mustasliman* ‘yielding’

All ten manuscripts in our corpus include this sign for /u/. It sometimes appears more vertical than oblique, and it sometimes curves in a way that resembles the Arabic *ḍamma* sign (/u/) or the Hebrew letter *vav*, but these variations amount to stylistic allographs of the same grapheme. They all represent the vowel /u/ (Figures 3–11).<sup>6</sup>

<sup>6</sup> In its vertical form, this sign can resemble to the Palestinian Hebrew sign for /a/ and, in some cases, /o/ or /o/ (Dotan 2007: 625). Despite this resemblance, it is much more likely

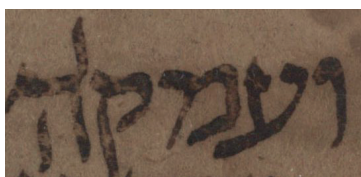


Figure 3. CUL T-S Ar.29.185 2v, line 4; *wa-'amquh* 'and its depth'

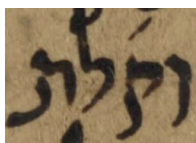


Figure 4. CUL T-S Ar.54.4 P3 r, line 12; *wa-qult* 'and you said'

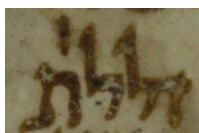


Figure 5. CUL T-S D1.93 2r, line 7; *zalaltu* 'I slipped'

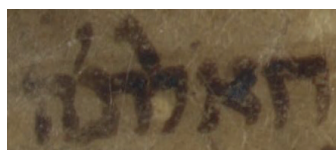


Figure 6. CUL T-S NS 301.14 1r, line 8; *ḥālatuh* 'his/its status'

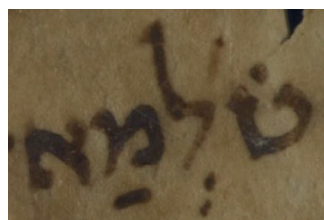


Figure 7. CUL T-S NS 188.9 r, line 3; *zulman* 'unjustly'

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that the loaned signs in the Arabo-Tiberian system come from further east, given the one-to-one correspondence with the Babylonian letter-form sign for /u/ and parallels found in vocalised Judaeo-Persian manuscripts (see below).



Figure 8. CUL T-S NS 285.155 r, line 8; *baytuh* ‘his house’

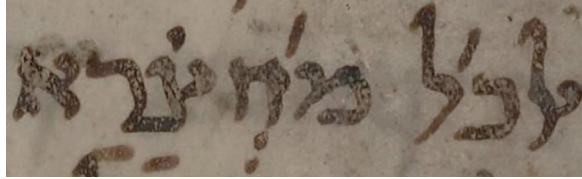


Figure 9. JTS ENA 2779.39 r, line 16; *al-kull muḥḍaran* ‘everything is settled’



Figure 10. RNL EVR ARAB I 1151 1v, line 14; *uḵar* ‘others’<sup>7</sup>

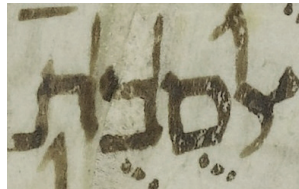


Figure 11. Bodleian Heb. d.42.29 v, line 13; *al-subūt* ‘the Sabbaths’

The supralinear stroke for /u/ is most common in two contexts. The first is in the initial syllable of nouns, especially participles that begin with a prefixed *mīm*, suggesting that such syllables were otherwise open to ambiguity for medieval readers. The second context is in word-final syllables that contain the pronom-

<sup>7</sup> This fragment is somewhat distinct in the corpus. The script style appears to be later (ca. late eleventh/twelfth century) than the others. The vocaliser also included the Arabic *shadda* sign to mark gemination and the dots of *tā’ marbūṭa* to mark the feminine nominal ending in Judaeo-Arabic. It may represent a case where a vocaliser freely mixed signs from the Tiberian *niqqud* and Arabic *tashkil* systems, rather than being an instance of the Arabo-Tiberian system. For more on this manuscript, see Vidro (2021: 286).

inal suffixes *-hu/uh* and *-hum*. In such cases, the marking of the vowel seems to help indicate to the reader that the suffix is a distinct grammatical element from the preceding word. In fact, for some vocalisers—particularly that of CUL T-S Ar.29.185—the supralinear stroke appears to be the preferred sign for pronominal suffixes even while the Tiberian *qibbuṣ* marks /u/ elsewhere in the manuscript. These use cases suggest that, similar to the Palestinian and Babylonian vowel systems, Arabo-Tiberian vocalisers tended to apply vowel signs only sporadically to disambiguate vowels with grammatical import.

The second non-standard Arabo-Tiberian sign is an oblique pair of supralinear dots that lean to the right. This sign is less common than the supralinear stroke for /u/, appearing in only three of our ten manuscripts, and its function is less consistent. In CUL T-S D1.93, it appears only before the letter *yod*, designating the *a*-vowel in the diphthong /ay/. In Bodleian Heb. d.42.28–31, it appears only before the letters *yod* and *vav*, designating the *a*-vowels in the diphthongs /ay/ and /aw/, respectively. In CUL T-S NS 285.155, it appears in multiple contexts to represent /a/.

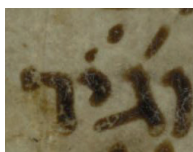


Figure 12. CUL T-S D1.93 1v, line 16; *wa-ḡayr* ‘and besides’<sup>8</sup>

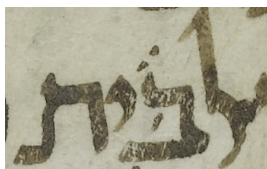


Figure 13. Bodleian Heb. d.42.29 v, line 9; *al-bayt* ‘the house’

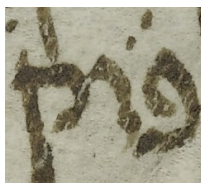


Figure 14. Bodleian Heb. d.42.28 v, line 16; *fawq/fawqa* ‘over’

<sup>8</sup> Note that the supralinear stroke on the *gimel* of this word is not a vowel sign, but rather a diacritic marking that the *gimel* represents an Arabic *ḡayn* (as opposed to *jīm*).

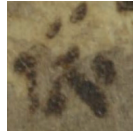


Figure 15. CUL T-S NS 285.155 v, line 4; *aw* ‘or’

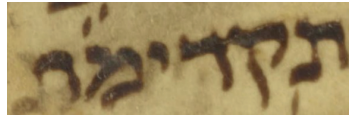


Figure 16. CUL T-S NS 285.155 r, line 6; *taqdimat* ‘presentation of’

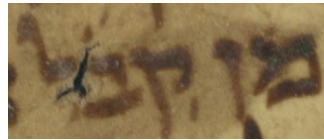


Figure 17. CUL T-S NS 285.155 r, line 3; *min qibal* ‘by means of, through’

The common through-line is that this sign indicates a short *a*-vowel, phonetically equivalent to the Tiberian *pataḥ* and Arabic *fatha*. This fact is noteworthy because its physical appearance—a supralinear pair of oblique rightward dots—is identical to the sign for /a/ in the Babylonian Hebrew ‘dot system’ of vowels (Khan 2013: 954). We will now take a closer look at the idiosyncrasies of these last two manuscripts’ vocalisation. They suggest that the origin of the Arabo-Tiberian system lies in the mixing of Tiberian and Babylonian vowel signs during the tenth- and eleventh-century process of Masoretic ‘Tiberianisation’.<sup>9</sup>

Bodleian Heb. d.42.28–31 is four leaves of an Arabic commentary on a Hebrew *piyyuṭ* poem, specifically the *azharah* known as *Attah Hinḥalta*. The text of this *piyyuṭ* appears in the preceding two folios (Bodleian Heb. d.42.26–27), where it is unvocalised.<sup>10</sup> Written vowel signs only appear when the Arabic commentary begins in Bodleian Heb. d.42.28, although from the first line, it is clear that the vocalisation is irregular. At least two separate vocalisers applied vowel signs to this manuscript. The first added only a handful of isolated Babylonian letter-form signs (‘*ayin* for /a/, *vav* for /u/; Figures 18–19),<sup>11</sup> and likely, the nu-

<sup>9</sup> See Dotan (2007: 646).

<sup>10</sup> A partial identification appears in Neubauer and Cowley (1906), Heb. d.42.26–31. The full identification cited here comes from Nissim Sabato of the Friedberg Genizah Project’s Judeo-Arabic Halakhic Literature team.

<sup>11</sup> On the designation ‘letter-form’ for the various Semitic vocalisation systems that employ miniaturised letters to mark vowels, see Posegay (2021a: 13, n. 4). On the letter-form Babylonian signs, see Khan (2013: 954).

merous oblique supralinear strokes in the manuscript that mark fricative forms of Arabic letters (Figure 20). As an aside, this is the only Babylonian-vocalised Judaeo-Arabic manuscript that I have ever encountered.<sup>12</sup>

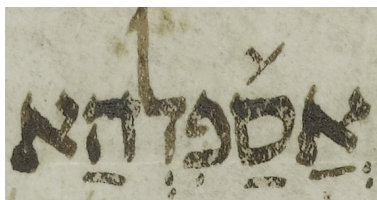


Figure 18. Bodleian Heb. d.42.29 v, line 1; *'asāfilhā* 'its lowest points'

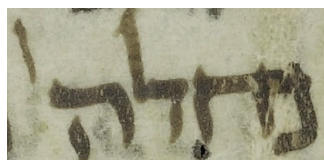


Figure 19. Bodleian Heb. d.42.29 r, line 12; *niḥlatū* 'gift, faith'

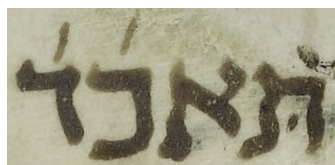


Figure 20: Bodleian Heb. d.42.29 r, line 1; *tākud* 'you take'<sup>13</sup>

The second, later vocaliser applied a form of the Arabo-Tiberian system, using the oblique pair of supralinear dots that marks the /ay/ and /aw/ diphthongs (Figures 13–14) in addition to the standard Tiberian *pataḥ* (/a/), *ḥiriq* (/i/), *qibbuṣ* (/u/), and *shewa* (usually /a/ or Ø).<sup>14</sup> These signs are sufficient to transliterate any vocalised Classical Arabic text into Hebrew script on a one-to-one graphemic basis, with *pataḥ*, *ḥiriq*, *qibbuṣ*, and *shewa* filling the roles of *fatha*, *kasra*, *ḍamma*, and *sukūn*, respectively. Consequently, this vocaliser did not often need the other Tiberian vowel points, although the sign *qameṣ* appears rarely (e.g. Bodleian Heb. d.42.29 v, line 2) for what is presumably a rounded backed *a*-vowel (approxi-

<sup>12</sup> Thank you to Amir Ashur and Nadia Vidro for discussing this topic with me.

<sup>13</sup> The supralinear strokes here are not vowel signs, but rather diacritics marking fricative allophones of consonants (see also Figure 12).

<sup>14</sup> On the quality of the Tiberian *shewa* in vocalised Judaeo-Arabic, see Khan (1992; 2010: 208–210); Posegay (2020: 38).

mately /ɔ/) that the Classical Arabic writing system has no explicit sign for (Khan 2020: 244; Al-Nassir 1993: 97, 103–104; Posegay 2021a: 187). This vocaliser was also more consistent than the earlier Babylonian one, marking many more words. The *qibbuṣ* sign occurs by far the most frequently.

For our study, the most significant feature of this manuscript is a single word that has been vocalised twice: *al-subūt* ‘Sabbaths’ (Figure 11). The original scribe spelled this word defectively, so if left unvocalised, the most natural reading is the much more common singular form *al-sabt* ‘Sabbath, Saturday’. The initial Babylonian vocaliser clarified the two *u*-vowels by adding miniature supralinear *vav* signs. This mark is the standard sign for /u/ in the Babylonian letter-form system and is the most likely original source for the supralinear sign for /u/ in the Arabo-Tiberian system, especially in its more vertical form (e.g. Figure 3). At a later time, the Arabo-Tiberian vocaliser came across this word and—evidently aware that their reader might not know the Babylonian signs—reinforced the vowels of *al-subūt* with the standard Tiberian *qibbuṣ* points. The final result is a mixed form of the Arabo-Tiberian system, with the standard Tiberian signs (including *qibbuṣ*) and oblique supralinear diphthong dots of one vocaliser complementing the Babylonian letter-form signs of another. This visual mixing of different vowel systems in re-vocalised manuscripts was likely a key contextual component in the creation of the Arabo-Tiberian system.

CUL T-S NS 285.155 is a small parchment fragment from a Judaeo-Arabic translation and commentary on Ecclesiastes. Only about fifteen partial lines of text survive, and while there are enough signs to tentatively reconstruct the manuscript’s vocalisation system, it is not certain that every sign the vocaliser would have used has survived in the extant section. Only three discrete vowel signs are present: the oblique supralinear stroke for /u/, the oblique pair of supralinear dots for /a/, and Tiberian *hiriq* (/i/). Like every known Arabo-Tiberian manuscript, the vocalisation is sporadic, but in theory, these three signs are the minimum that a vocaliser would require to fully point a Judaeo-Arabic text. This manuscript is unique because it is the only member of our corpus in which the two-dot supralinear sign represents /a/ in non-diphthong contexts (Figures 16 and 17). It is thus plausible that this sign is a direct loan of the identical sign for /a/ in the Babylonian dot system.

### 3 Relics of Tiberianisation

The process of ‘Tiberianisation’, by which the Tiberian vocalisation system gradually replaced the Palestinian and Babylonian systems between the tenth and twelfth centuries, is well known in Masoretic studies. The actual pronunciation tradition of the Tiberian Masoretes never achieved widespread distribution, but its perceived prestige conveyed a greater level of authority to their written vowel signs than those of other vocalisation systems (Khan 2020: 85, 108). The Tiberian

signs thus became the standard for nearly all written Hebrew (outside of Yemen) by the end of the twelfth century, and we find numerous medieval Bibles with ‘non-standard Tiberian’ vocalisation (Dotan 2007: 642; Blapp 2017; Khan 2020: 129–132; Arrant 2020; Outhwaite 2020); that is, local Hebrew pronunciation traditions that differed from the pronunciation tradition of the Tiberian Masoretes, but were nevertheless recorded using Tiberian vowel points. Such was the authority of the Tiberian system that even Babylonian scribes began to transcribe their local reading traditions with Tiberian signs. Manuscripts like Bodleian Heb. d.42.28–31, originally given Babylonian vowels but re-vocalised with Tiberian signs, are material evidence of this transitional period.<sup>15</sup>

At the same time that Tiberianisation was taking place, Arabic was replacing Aramaic as the vernacular language of Middle Eastern Jewish communities. Arabic thus became a key language of Masoretic scholarship (Khan 2020: 107, 117–121). Transcribing the new scientific vernacular into Hebrew script presented problems that Jewish scribes mitigated with innovations in diacritics and vocalisation. Yet scribal customs for writing Judaeo-Arabic were also much less standardised than those for writing Biblical Hebrew, resulting in multiple simultaneous methods for solving these transcription problems. The best known case of diacritic pluriformity in Judaeo-Arabic is how scribes differentiated the 22 letters of the Hebrew alphabet, which are insufficient to represent all 28 Arabic letters on a one-to-one basis. Some solved this issue with the Biblical Hebrew *dagesh* dot, which distinguishes between fricative and plosive allophones of Hebrew letters, allowing them to approximate the sounds of additional Arabic consonants (Posegay 2020: 47–50; Posegay and Arrant 2021: 270–271).<sup>16</sup> More commonly, however, Judaeo-Arabic scribes added new supralinear or sublinear diacritic dots to Hebrew letters to indicate the Arabic consonants that did not have unique characters in Biblical Hebrew (including fricatives like *khāʿ*, *dhāl*, *ḡayn*, etc., as well as *ḏād* and *zāʿ*). As we have seen from some of the Arabo-Tiberian manuscripts, another strategy was to mark fricative consonants with an oblique supralinear stroke (e.g. Figures 12 and 20).

It is in this context of Babylonian Tiberianisation and Judaeo-Arabic diacritic innovation that the Arabo-Tiberian system likely took shape. Judaeo-Arabic texts may not have been subject to the same perceived Tiberian authoritativeness as Hebrew texts, so it may not have been inevitable that scribes would adopt the standard Tiberian system to vocalise Judaeo-Arabic. Moreover, despite adopting Tiberian signs to vocalise their Bibles, Tiberianising scribes of the late tenth and eleventh centuries still knew the old Babylonian vowel systems and had ample opportunity to adapt them to improve their Judaeo-Arabic transcriptions. I thus hypothesise that the Arabo-Tiberian signs for /u/ and (especially in diphthongs)

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<sup>15</sup> See Khan (2020: 109, esp. n. 134). The same phenomenon is attested in Palestinian-vocalised manuscripts (Blapp 2013).

<sup>16</sup> See also Blau (2002).

/a/ were both originally Babylonian vowel signs that saw continued use after Tiberianisation for a specific reason: signs which disambiguate the *language* of a word, not just its vowels, provide additional utility to a writer.

It is likely that Jewish scribes quickly—perhaps immediately—identified the Babylonian letter-form *vav* sign for /u/ as equivalent to the standard Arabic letter-form *wāw* sign (i.e. *ḍamma*) for the same vowel.<sup>17</sup> As a result, it was a logical choice to include in a new vowel system contrived specifically for writing their (Judaean-)Arabic vernacular. The particular utility of this new system was that its use would unambiguously mark a Hebrew-script word as Arabic. The *vav/ḍamma* sign (/u/) could thus be preferable to the standard Tiberian *qibbuṣ* sign for /u/, as *qibbuṣ* failed to make explicit the language of an ambiguous vocalised word. The oblique pair of supralinear dots (i.e. /a/) from the defunct Babylonian dot system likewise became the first sign for /a/ in the Arabo-Tiberian system. It was phonologically identical to the Tiberian *pataḥ*, but it disambiguated the language of a marked word. It also (perhaps just coincidentally) shared the same supralinear position and oblique orientation as the Arabic *tashkīl* sign for /a/ (i.e. *fatha*). Finally, the sublinear Tiberian *hireq* dot became the sign for /i/ in the new vowel system, again (perhaps just coincidentally) sharing the same position as the Arabic *tashkīl* sign for /i/ (i.e. *kasra*), as well as the Arabic red dot sign for /i/. These three signs (for /u/, /a/, and /i/) are the form of the Arabo-Tiberian system apparently attested in CUL T-S NS 285.155 (Figures 8, 15–17 above). Since these three signs are the minimum needed to transcribe the three cardinal vowels of Classical Arabic,<sup>18</sup> I suspect that this is also the *original* form of the Arabo-Tiberian system.

However, this basic system clearly did not achieve widespread use, as evidenced by the multiple variants in our corpus that include the rest of the Tiberian vowel points while restricting or not containing the oblique dots for /a/. As discussed above, most of our manuscripts only use the Tiberian *pataḥ* and *shewa* to mark /a/ in Judaeo-Arabic, and two of the three that use the oblique dots for /a/ (T-S D1.93 and Bodl. Heb. d.42.28–31) restrict them to marking diphthongs (/aw/, /ay/).<sup>19</sup> This restricted usage suggests the sign may have had some alternative utility that allowed it to exist alongside standard Tiberian *pataḥ*, at

<sup>17</sup> The Arabic *tashkīl* signs (*fatha*, *kasra*, *ḍamma*) are first attested in the ninth century (George 2015: 13–14; Posegay 2021b: 82–85).

<sup>18</sup> Recall that all the manuscripts in our corpus follow the ‘Classical’ system of Judaeo-Arabic transcription.

<sup>19</sup> After reading an earlier draft of this paper, Nadia Vidro began sending me classmarks of more manuscripts in which she observed Arabo-Tiberian signs (e.g. T-S Ar.24.29, T-S Ar.28.138, and MS Alliance Israélite Universelle, VIII.E.35). I received T-S Ar.28.138 late in the production of this article, but it is worth highlighting here. It is a biblical commentary that employs only three vowel signs in Judaeo-Arabic: a supralinear stroke for /u/, a sublinear dot (i.e. Tiberian *hireq*) for /i/, and an oblique pair of supralinear dots for /a/ before *yod* and *vav* in the /ay/ and /aw/ diphthongs.

least for a short time. For instance, it may have been valuable to have a vowel sign that marked the letters *yā* or *wāw* as consonants, signalling to the reader that they should not be read as *matres lectionis*.<sup>20</sup> It might also be that the use of the Babylonian sign for /a/ meant to approximate the sounds of monophthongised vowels pronounced in place of historical diphthongs, such as /e/ instead of /ay/, or /ɔ/ instead of /aw/. Regardless, we need data from more Arabo-Tiberian vocalised manuscripts before we can draw any definitive conclusions about the development and fate of these dots.

While this reconstruction of the Arabo-Tiberian system is speculative, the re-adaptation of Babylonian vowel signs to vocalise a non-Hebrew language transcribed in Hebrew characters is actually not unprecedented.<sup>21</sup> Shaul Shaked has identified a similar phenomenon in MS CUL T-S K24.16, a hybrid Judaeo-Persian/Arabic letter from the pre-Mongol period. In this letter, the Arabic text is written in Arabic characters while the Persian text is written in Hebrew characters. The (Judaeo-)Persian is vocalised with what Shaked posits are a system of signs inspired by the Babylonian vowels. He documents two familiar marks in this adapted system:

Two dots placed next to each other in a nearly horizontal fashion, with a slight slant downwards towards the left, indicate a simple vowel (or sometimes diphthong?) *ē(y)* in words and particles such as *nē* (line 3 and several other occurrences), *hēm* (line 5), *mē* (the durative verbal particle, line 8), *-ē* (the indicator of the indefinite, *yā-ye vaḥdat*) in *tis-ē* (line 4), *dāng-ē* (line 6), also *kunēd* (line 9, impv. 2nd person pl.) . . . . Two dots placed vertically one on top of the other indicate the vowel *a*, e.g. *š(a)vaḥ* (lines 3, 4). The same sign occurs also on top of the *vav* in *ṭwry* (line 5), a word of uncertain derivation and meaning; it may have been meant to be a **short vertical stroke**, as the sign occurring over the *vav* in *rōyaš* (line 10), *ōbast* (although it looks like an elongated dot; line 8) [**emphasis mine**]. (Shaked 2010: 327–328)

The first sign, which Shaked hypothesises represents either /ē/ or a diphthong, is nearly identical to the pair of dots that we have shown to represent /a/, especially in diphthongs, in some Arabo-Tiberian manuscripts. Both versions of the sign are likely inspired by the signs for /a/ and /e/ in the Babylonian dot system of vowels (Khan 2013: 954). Meanwhile the second sign, a short vertical stroke

<sup>20</sup> Another Genizah biblical manuscript, consisting of the fragments T-S Ar.28.170 and T-S Ar.27.60, has several instances of the oblique two-dot sign fulfilling this function to mark consonantal *yod*; see Kantor (2025: 753 nn. 7–8, 756 n. 11). I suspect this usage is a further restriction of the Arabo-Tiberian/Babylonian vowel sign as pure Tiberian vocalisation became ever more dominant among Arabic-speaking Jewish writers.

<sup>21</sup> I know, I couldn't believe it either.

above *vav* which Shaked interprets as /ō/, is the same as the Arabo-Tiberian stroke for /u/, a direct loan from the Babylonian letter-form system.

One might wonder why the Judaeo-Persian vocaliser did not simply use the standard Babylonian or Tiberian system to vocalise Persian, but I would suggest the same hypothesis as for the Arabo-Tiberian system: signs which disambiguate the *language* of a word, not just its vowels, can provide additional utility to a writer. In this case, the unique vowel system indicates to the reader that the Judaeo-Persian words should not be interpreted as Hebrew. Shaked even mentions a similar phenomenon later in his study. In one notable twelfth-century letter (CUL T-S 8J19.28), the scribe writes primarily in Judaeo-Arabic, but intersperses it with Judaeo-Persian phrases. Because both languages are transliterated in the same (Hebrew) script, the scribe adds supralinear dots to differentiate Persian words from the surrounding Arabic text (Shaked 2010: 325). These dots do not represent vowels at all, but they demonstrate that the disambiguation of languages via diacritics was a potentially desirable feature for a medieval Hebrew-script writing system. Analogous diacritic dots are also attested in mixed Hebrew/Judaeo-Arabic manuscripts. For example, CUL T-S 8K12 is a fragment from the conclusion of Sa'adya Gaon's poetic dictionary, *Egron*.<sup>22</sup> In this manuscript, pairs of supralinear diacritic dots mark individual Hebrew words within the running Judaeo-Arabic text (e.g. T-S 8K12 r, lines 6–7).

Because Judaeo-Arabic scribes readily interpreted the Babylonian/Arabo-Tiberian sign for /u/ as equivalent—functionally and graphically—to Arabic *ḍamma*, it was the most logical sign available to disambiguate the language of a vocalised Judaeo-Arabic word. This property is the most likely explanation for why that sign seems to have seen more widespread and prolonged use than the Arabo-Tiberian dots for /a/. We must also consider that while the oblique dots for /a/ were in direct competition with the Tiberian *pataḥ*,<sup>23</sup> the Arabo-Tiberian sign for /u/ only competed with Tiberian *qibbuṣ*. Despite its frequent utility in marking Judaeo-Arabic passive forms, *qibbuṣ* is, objectively, the worst Tiberian vowel sign.<sup>24</sup> To vocalise a letter with *qibbuṣ*, a Hebrew writer must stop moving right-to-left, fully reverse their direction of motion, and place *three*<sup>25</sup> sublinear dots leaning downward to the right.<sup>26</sup> This reversal was less of an issue when producing fully vocalised manuscripts, such as formal Bible codices, where the

<sup>22</sup> On the *Egron*, see Brody (2016: 79–84).

<sup>23</sup> One of the greatest vowel signs of all time.

<sup>24</sup> Some people may say that this is 'just an opinion'. Those people would be wrong.

<sup>25</sup> Nobody has time for three dots. The Tiberian *qibbuṣ* (/u/), Tiberian *segol* (/ε/), and Palestinian *holem* (/o/) are the only vowel signs in any medieval Hebrew, Arabic, Syriac, or Samaritan vocalisation system that consist of three dots. All other signs are one dot, two dots, or combinations of strokes.

<sup>26</sup> *Qibbuṣ* also makes little sense with the internal phonetic logic of the Tiberian vowel scale (Posegay 2021c: 70–71).

work of the scribe (the *sofer*) and the vocaliser (i.e. the *naqdan*) often occurred in successive stages. By contrast, the sporadic vocalisation common in Judaeo-Arabic manuscripts is more likely to have been added continuously by the person producing the consonants as they noticed ambiguous words. For such scribes, a single supralinear stroke, either fully vertical or leaning slightly downwards in the direction of writing, would have been more efficient than *qibbuṣ*.

Unfortunately for Arabo-Tiberian vocalisers, there were two more influential systems on the rise. By the end of the twelfth century, when practically all Jewish communities had adopted the standard Tiberian vowel signs, anyone using an obscure Tiberian sub-variant likely only caused confusion. In a sense, Judaeo-Arabic *itself* became Tiberianised.<sup>27</sup> At the same time, the standard Arabic *tashkil* system had superseded the cumbersome system of Qur'anic red dots, resulting in a single, standardised vocalisation system as Arabic became the majority language of Jewish communities in Iraq, Palestine, and Egypt. As memory of the Babylonian vocalisation system faded and its miniature *vav* sign was reinterpreted as the Arabic *ḍamma* (compare *ḍamma* with the signs in Figures 6, 8, and 10 above), it became natural for some vocalisers to deploy the full Arabic *tashkil* system when pointing Judaeo-Arabic. Manuscripts attesting this combination of Hebrew letters with Arabic vowel signs are likewise extant from the Cairo Genizah, for instance:<sup>28</sup>



Figure 21. CUL Lewis-Gibson Arabic 2.85 3v, line 8; *rabbakum* ‘your (pl.) Lord’

#### 4 Conclusion: Tiberian variants

The ten Genizah manuscripts in our corpus reveal a novel variant of the Tiberian vowel system that is exclusive to Judaeo-Arabic (and perhaps Judaeo-Persian) texts. We thus designate it the ‘Arabo-Tiberian’ system. This system is typified by the use of a supralinear stroke that indicates the vowel /u/ and, less often, an oblique pair of dots that represent /a/, especially in diphthongs. It is likely that both of these signs are loaned graphemes from Babylonian Hebrew vowel

<sup>27</sup> To some degree, I suspect this happened because diligent vocalisers realised the expansive Tiberian graphemic inventory (sufficient for seven vowel phonemes) provided a more effective system for recording Arabic vowel sounds that Jewish Arabic-speakers pronounced, but which had no distinct graphemes in the Classical Arabic script (only three vowel signs). See Posegay (2020; 2025).

<sup>28</sup> See also Vidro (2018).

systems that medieval vocalisers repurposed between the tenth and twelfth centuries, during the process of ‘Tiberianisation’. The Arabo-Tiberian system was never widely adopted, but it was not without utility, signalling to readers that they should interpret (Judaean-)Arabic text as explicitly not Hebrew. Its lack of a distinct identity, however, led to its disappearance in approximately the twelfth century as the standard Tiberian system gained near-universal authority in Jewish communities. At the same time, the Arabic *tashkil* system achieved widespread acceptance for Arabic-script writing and was even sometimes deployed to vocalise Judaean-Arabic, further diluting the Arabo-Tiberian system’s utility in marking languages. This development was likely the final nail in the coffin for the system. Interestingly, it may be that Jewish vocalisers also found that leaving Judaean-Arabic text *unvocalised* was sufficient to mark its language. It is typical, for instance, for manuscripts of bilingual (Hebrew/Judaean-Arabic) and trilingual (Hebrew/Aramaic/Judaean-Arabic) Bibles to include fully vocalised Hebrew and Aramaic passages alongside an unvocalised Judaean-Arabic translation.<sup>29</sup> In general, fully-vocalised Judaean-Arabic manuscripts in any genre are exceedingly rare.

While the standard Tiberian vowel points eventually supplanted other written Hebrew vocalisation systems, pluriformity was still the rule during the period when the Arabo-Tiberian system was in use. Tiberianisation also affected Palestinian and Babylonian vocalisers as they adjusted to the rising authority of the new system. Rather than simply switching to Tiberian signs, some Palestinian vocalisers adopted a new vowel sign equivalent to Tiberian *qameṣ* /ɔ/, allowing them to better imitate the more prestigious system (Dotan 2007: 625; Sáenz-Badillos 1996: 88–89; Kantor 2023: 34–35).<sup>30</sup> Conversely, some vocalisers adopted the Tiberian system but retained the Palestinian sign for /o/, rather than using the Tiberian *holem* (Dotan 2007: 633). For Judaean-Arabic specifically, it is likely that the standard Tiberian, Arabo-Tiberian, and Arabic *tashkil* systems saw parallel use between different regions based on sociocultural and linguistic factors, most of which we still do not have sufficient evidence to determine. It is plausible, for instance, that the Arabo-Tiberian system was more popular among Jews in Iraq, Iran, and Yemen who had previously used Babylonian vowel systems before switching to Tiberian (Khan 2013: 953–954). Overall, it seems that there may have been more contact between Hebrew vocalisers and Arabic vocalisation during the Tiberianisation process than is apparent from Hebrew and Aramaic Masoretic sources. We note that besides the Arabo-Tiberian system, Samaritan vocalisers also adopted the Arabic *ḍamma* sign to represent /u/ in their vowel system (Dotan 2007: 647), and numerous Judaean-Arabic masoretic treatises demonstrate knowledge of Arabic grammatical and phonological theories in their analysis of Tiberian vowels (Posegay 2021a: 285–304). More examples

<sup>29</sup> E.g. MSS CUL T-S B1.3, CUL T-S B1.17, CUL T-S B1.25, etc.

<sup>30</sup> See Phillips (2022: 61–98).

of the Arabo-Tiberian system and better localisation (through palaeography and codicology) of known Arabo-Tiberian manuscripts will further illuminate these phenomena.

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