22. Dead languages

22.0.1. For this section, which is decidedly a little odd, some preliminary remarks are required, because caution is necessary. Indeed, it must be stressed that what follows is the result of careful considerations based on extensive comparative records between languages that we know (including some of their variants), as well as on their reflexes found in loanwords in –and from– those same languages (considering alternations and spelling uncertainties). Of course, we have also taken into due account modern and present-day reflexes, in terms of substratum characteristics, which are to be found in the areas where the relevant languages were once spoken.

Linguistic reconstruction, if undertaken with appropriate instruments, should not limit itself to just vocabulary or morphosyntax. In fact, the rigorous direct phonemic and phonetic experience of the numerous living languages treated in this handbook (including both the phonosyntheses of the living languages, given in §§ 16-21 and the 12 languages and their variants systematically dealt with in *HPr*), in conjunction with the specialists' work, certainly makes it possible to sketch an outline for these other languages. They have been filtered, though, through a way of ‹seeing› their phonic systems truly ‹from the inside›, and directly bringing them back to life in a fond way, instead of merely considering them simply theoretically, and more out of duty than for fun.

Those who do not deem it possible to accept the results proposed in the synopses of these 81 tongues of the past are positively at liberty not to credit what will be said. The fact remains, however, that such hypotheses, including our inferences on intonation, might prove to be anything but fanciful ideas. It is no longer absurd, in fact, to allow for the possibility of retrieving sound documents from the past, which can be useful for empirical analyses and tests… And, as long as someone is not in a position to prove them wrong, these phono-tonically detailed reconstructions should remain valid and reliable.

22.0.2. It would equally be interesting to apply the (segmental and suprasegmental) indications given to the reading and dramatizing of ancient texts. This way, they would at least not be the predictable lackluster renditions of different texts of totally different languages, all invariably done with the same sounds (of one's own personal variant of an official language) and artificial and contrived intonation patterns, so as to send –literally– to sleep even the best-intentioned listeners. By means of computerized text-to-speech synthesis, among others, it will be possible to credibly give a(n almost authentic) voice to those texts, thus considerably rejuvenating the same old, soporific, academic lectures.

For dead languages, different scholars (and reconstructors) present phonemic systems that sometimes are only partially different, but at other times strikingly different indeed – even conflicting. Such ‹detailed› proposals as those presented here should be interpreted in the right spirit… until we are able to travel back in

time, by going to and fro at will, bringing good recorders and –above all– using an excellent time-machine, which would enable us to give definitive answers!

After analyzing so many actual systems of living languages, as said, a certain sensitivity towards fine nuances may be developed almost naturally, possibly (but not necessarily) with a certain bent for symmetry, which so many living languages already show. Thus, the mapping of vocoids in the vocograms, the compilation of consonant tables, even the assessment of tones and intonations, can be considered to be fairly precise as to their possible realizations, since they are based on almost fifty-year experience (with reference to the analyzer). Of course, it goes without saying, they are also based on careful consideration of the actual data that many present-day languages have, with regard to the dead languages they come from, which have been reconstructed. All in all, we are dealing with an experience which is centuries-old, or even thousands of years old (with reference to the languages themselves).

22.0.3. In a sense, the Neogrammarians' comparative method is thus accomplished, by acquiring entirety and naturalness. After all, we restate here, they can be safely held as reliable, as long as recordings can be produced, ascribable to exactly the same languages, which might reveal differences compared to what is presented here. But, if such languages were actually synthesized according to the indications given, we would get more than plausible results. After all, no-one can be ‹sentenced› without ‹evidence› to prove different facts... The widespread and unshakeable slapdash way of doing things which distinguishes much of the academic ‹tradition› is definitely worse...

Unfortunately, the ‹standard› practice, for those who write linguistics –or even phonetics– books is unashamedly more approximate than what has been done in this section (about the phono-tone[ma]tic reconstruction of dead languages), based on necessarily indirect data and on ‹sound› common sense.

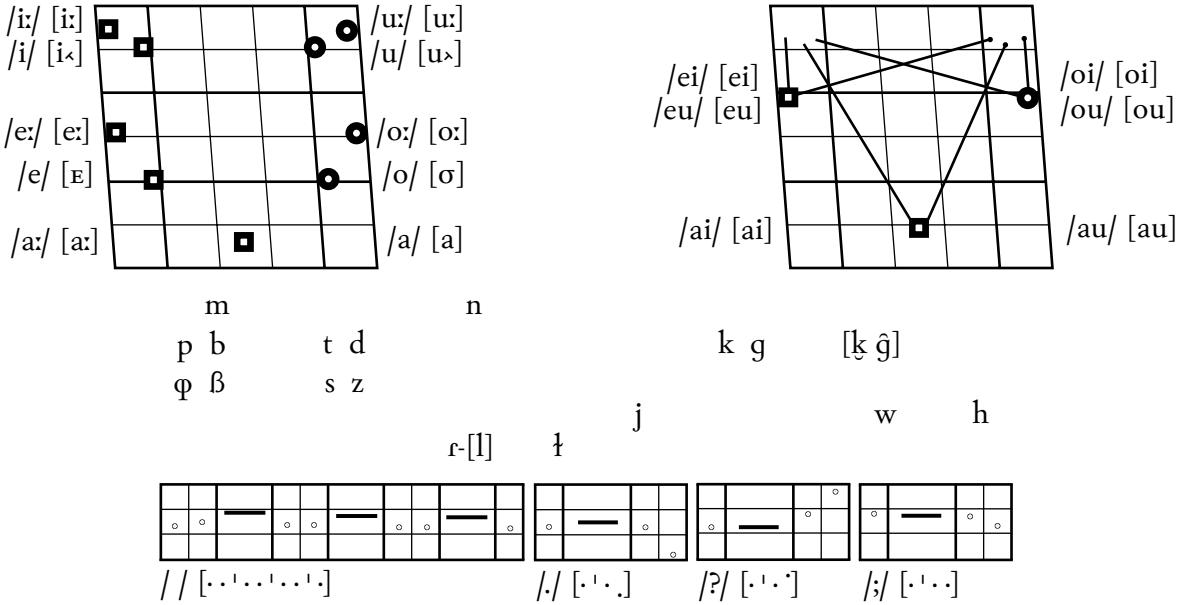
The order of presentation of the 81 dead languages given in this chapter is categorically a ‹timeless› one and of a rather ‹itinerant› or ‹peripatetic› (or, in a loftier way of saying it, ‹periodontic›) nature. In fact, on the one hand, we have indifferently included languages such as *Ainu*, which no longer has any exclusively monolingual speakers, or languages which have died out recently, such as *Ubikh* (whose last speaker, Tevfik Esenç, died on October 7, 1992); on the other hand, we have also included a good number of *proto-languages* (some definitely more conjectural than others).

Moreover, their dating is not always easily determinable, sometimes not even for the ‹golden age› of each single language. And the precise geographical position, linked as it is (for some, at least) to historical periods, is also challenging at times, especially for the oldest languages. The sharp difference pertaining to the space-time information available for our various dead languages does not allow us to venture such consistent indications. Interested readers can certainly find by themselves any available information on given languages.

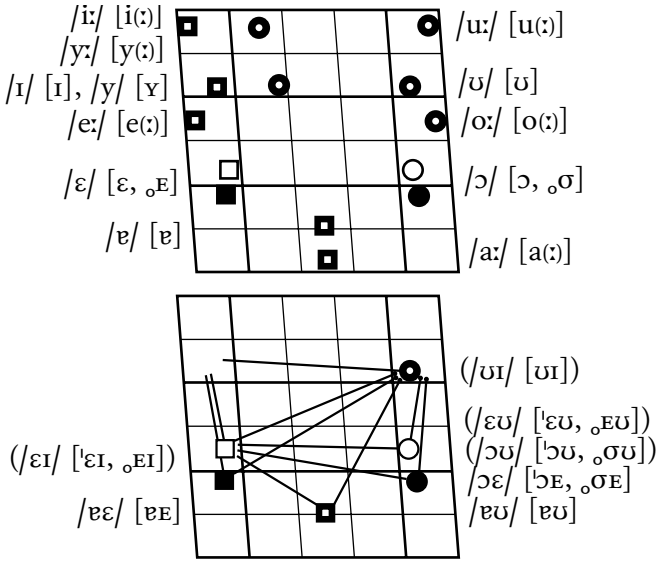
Therefore, we have imagined an ideal journey which is to take the same route as that made for the living languages (*ie* the languages and dialects dealt with in §§ 16–21), as though we were setting out to visit many specialized phono-museums: starting from Italy, going through Europe and Africa, and getting as far as Asia and America.

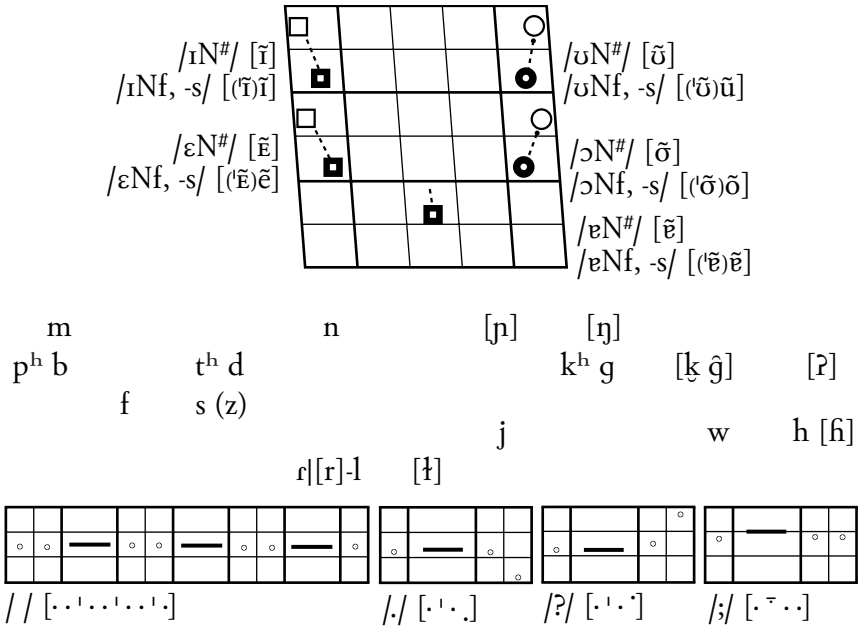
22.1. *Old Latin* (Italic, IE) had five *V*, both short and long, which were phonetically nasalized before /NC, N#|/, *NC* or *N#*|, their timbres remaining unaffected and the *N* being preserved, even before constrictives, with [n≡C]. It had also six diphthongs and length opposition for the *C*.

There were no Greek phonostylemes yet, but there was *z* /VzV/ [VzV], which later became *r* /ɾ/, or *Vs#* /Vh/ [Vh], *eg flozis* [ˈɸɬoːzih] (later *floris*); also, *gn* /gn/ [gn]. The phoneme /l/ was [ɬ] before pauses, or *C* (including heterosyllabic /j/, /*C*#j/), or before back *V* (including /a, aː/), but [l] before tautosyllabic /j/, /#Cj/), or before front *V*; /kw, gw/ [k̟, ĝ].



22.2. *Classical Latin* (Italic, IE), besides the Greek stylistic xenophonemes (/ʏ, yː/, /Ch/, and /z/ for *ζ*, to replace old /z/), had five *V*, both short and long (with a difference in timbre, /ɪ, ɛ, ɐ, ɔ, ʊ; iː, eː, aː, oː, uː/ [ɪ, ɛ, ɐ, ɔ, ʊ; iː, eː, aː, oː, uː]), as well as three basic diphthongs, /ɐɛ, ɐʊ, ɔɛ/ [ɐɛ, ɐʊ, ɔɛ], and three secondary ones, which were rarer, /ɛɪ, ɛʊ, ʊɪ/ [ɛɪ, ɛʊ, ʊɪ]. It had /VnC/ [Vn≡C]), but /VN/ [ṼṼ] + /f, s/, and *Vm#* /VN/ [Ṽ] (*ie V* timbres were unaffected); /kw, gw/ [k̟, ĝ]. There was length opposition for the *C*. The five basic *V*, when word-final (written as

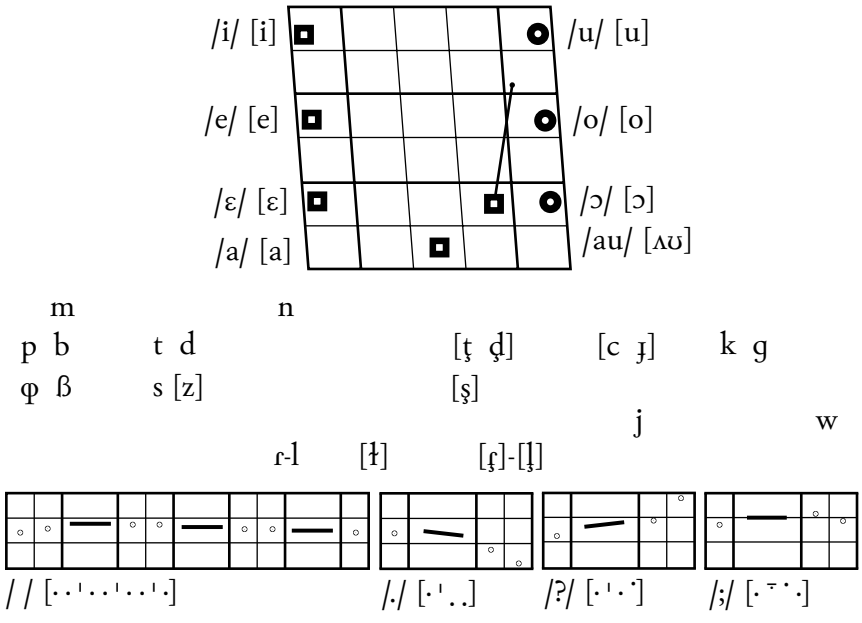




-*Vm*), and either word- or sentence-internal *Vn*(#)*f, Vn*(#)*s*, became nasalized, loosing their *N*, and diphthongized if stressed: [(ˈĩ)ĩ, (ˈɛ̃)ɛ̃, (ˈã)ɐ̃, (ˈɔ̃)õ, (ˈũ)ũ]. In the website *http://venus.unive.it/canipa/* a whole chapter deals with this kind of Latin –although in Italian– including the /Ṽ/ vocogram and the transcription of *The North Wind and the Sun*.

22.3. *Empire Latin* (Italic, IE), in the *neutral* form stemming from the central area of Italy, had seven short *V* and only one traditional diphthong, /au/ [ʌʊ]; all *V* were phonemically short, being phonetically lengthened in stressed unchecked syllables. Consonant gemination was distinctive.

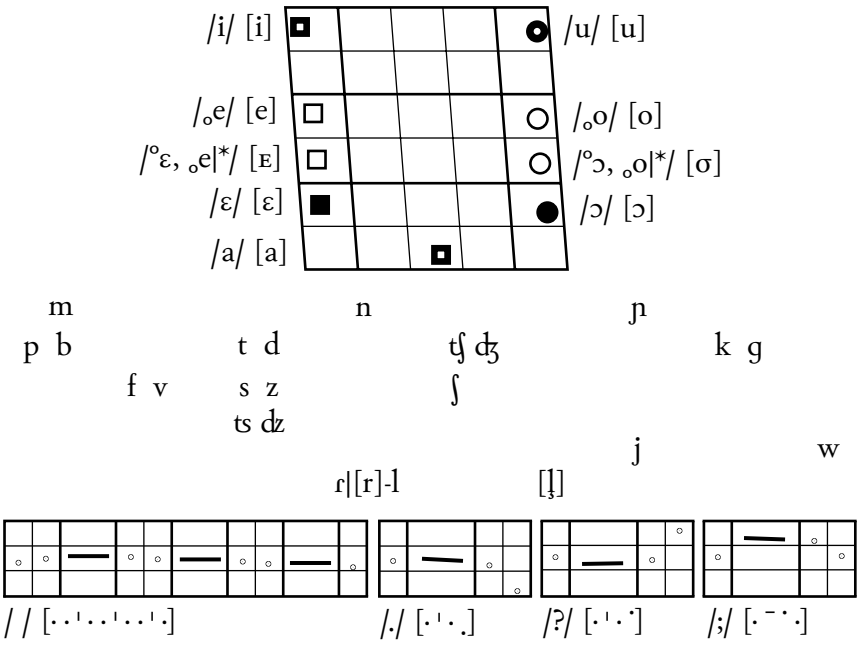
Many words had different stress-patterns from those they had in Classical Latin, eg *filĭŏlŭm* /ˈlio-/ → /ˈljɔ-/ (and unstressed *e*, *u*/*o* + *V* became /j, w/ as well), *ĭntĕgrŭm* /ˈintegr-/ → /inˈtɛgr-/ (with /VC*И*/), *dēcădĭt* /ˈdeːka-/ → /deˈka-/ (*ie* with stress-neutral prefixes). It had /VnC/ [Ṽn≡C]), but /VN/ [Ṽ] + /f, s/, and *Vm*# /V#/ [V] (where *V* timbres were unaffected); *h* had gone to ‹zero› by this stage, even



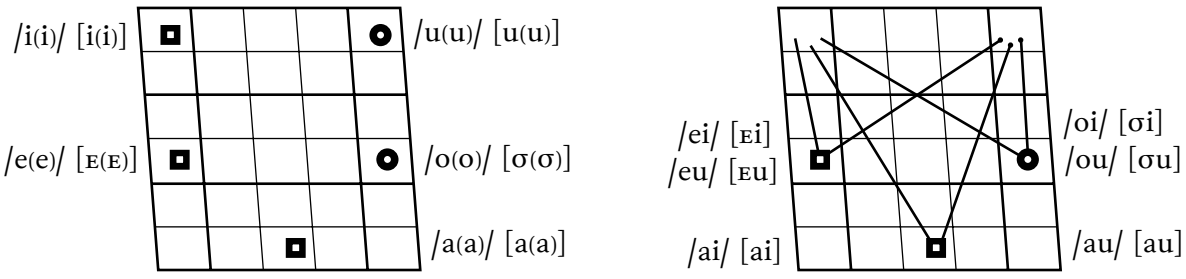
in *th*, *ch*, *rh* (while *ph* had become /f/). Let us also notice: *f*, *v*, *z*, *gn* /f, v, z, gn/ [ɸ, ß, z, gn]. In central Italy, /n, t, d, s, ɾ, l, k, g/ + /j, i, e, ɛ/ developed to [n̡, t̡, d̡, s̡, ɾ̡, c, ɟ] (without absorbing the [j]) by gradual adjustments, like [t̡j, d̡j, cj, ɟj] → [t̡s̡j, d̡z̡j, kç̡j, gʝ̡j] → [t̡s̡, d̡z̡, kç̡, gʝ̡] → [ʦ, ʣ, ʧ, ʤ].

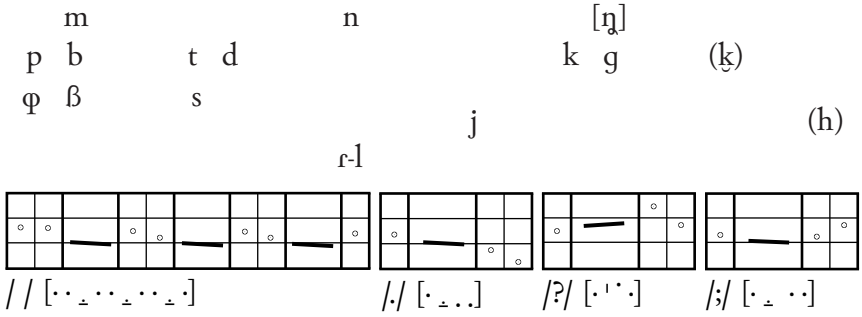
22.4. (*Italian*) *Church Latin*, or *Italian ‹Academic› Latin* (Italic, IE), came to have only five *V* in stressed position, /i, ɛ, a, ɔ, u/, *eg* even *habēre* or *Rōma* became /aˈbɛre, ˈrɔma/ [aˈbɛːɾe, ˈrɔːma]. Similarly to Italian, in unstressed syllables only /e, o/ [e, o] occurred, with intermediate timbres, [ɛ, ʊ], as a result of *V* adjustments of either half-opening (for /˳e|, ˳o|/) or half-closing (for de-stressed /°ɛ, °ɔ/), which is typical of Italian (cf *HPr* § 3.1.1).

Length and the various *V* sequences also correspond to those found in neutral Italian, although with *ae*, *oe* /ˈɛ, °ɛ, ˳e/. It preserves *CC*, [n≡C], but /mC/ [mC]; it rigorously has *VsV* /VzV/; *z* is /ʣ/, and *tiV* (with unstressed *i*) is /ʦjV/, *eg* *ōtium* [ˈɔʦːʦjum*] (the example shows both self-gemination, shared by /ʣ/, /ʃ/, *piscem* [ˈpiʃːʃɛm*], and /ɲ/, *lignum* [ˈliɲːɲum*], and audible release, even for /m#/, as can be seen). Before front *V*, we have /ʧ, ʤ/: *Cyrus* [ˈʧiːɾus], different from *Chiron* [ˈkiːɾʊn].

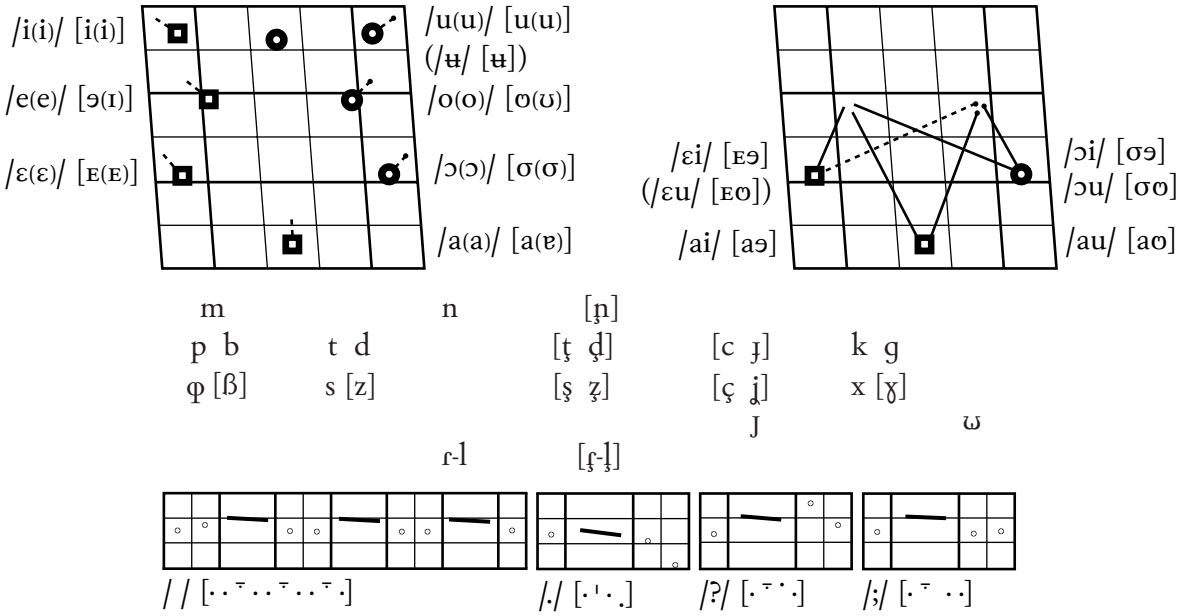


22.5. *Venetic* (Italic, IE) had the five short *V* and six diphthongs given; few *C* and [n≡C], also geminable; in its more ancient phases, it had /h, kß/ [h, k̡]; [ŋC, ŋ#], as well.

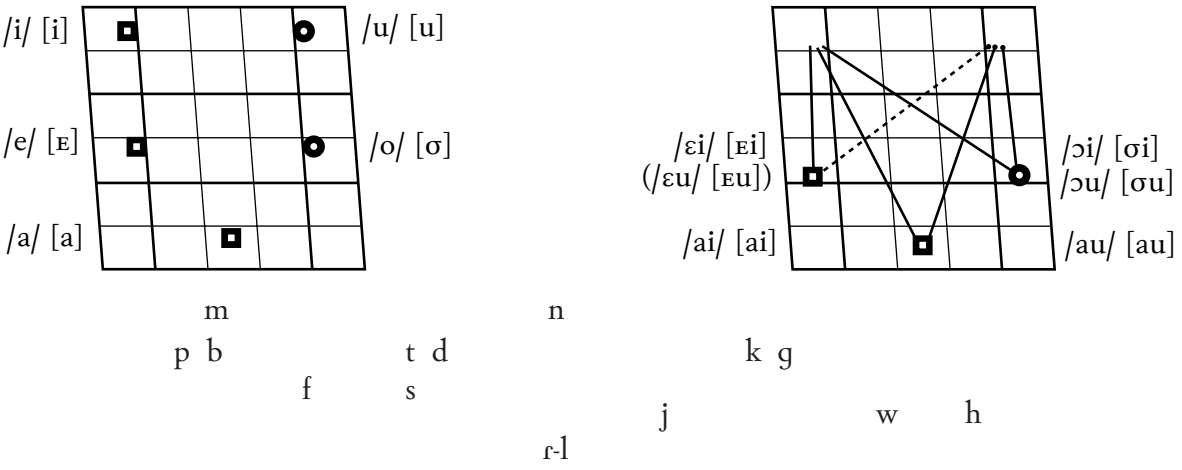


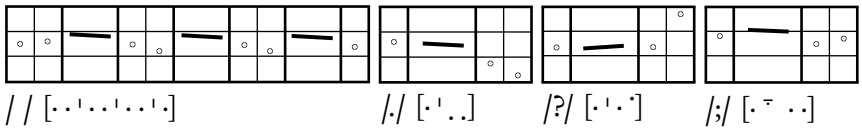


22.6. *Oscan* (Italic, IE) had the seven *V*, both short and long (the latter actually were narrow diphthongs), while /o, oo, ɔɔ/ were rather rare or secondary; and the six diphthongs given (one was of lesser importance); /ʉ/ in loanwords. Besides, [n≡C] and *C* ≠ *CC* (even if quite rare); palatalization was frequent for /Cj/ [Ç]; the constrictives had voiced taxophones.

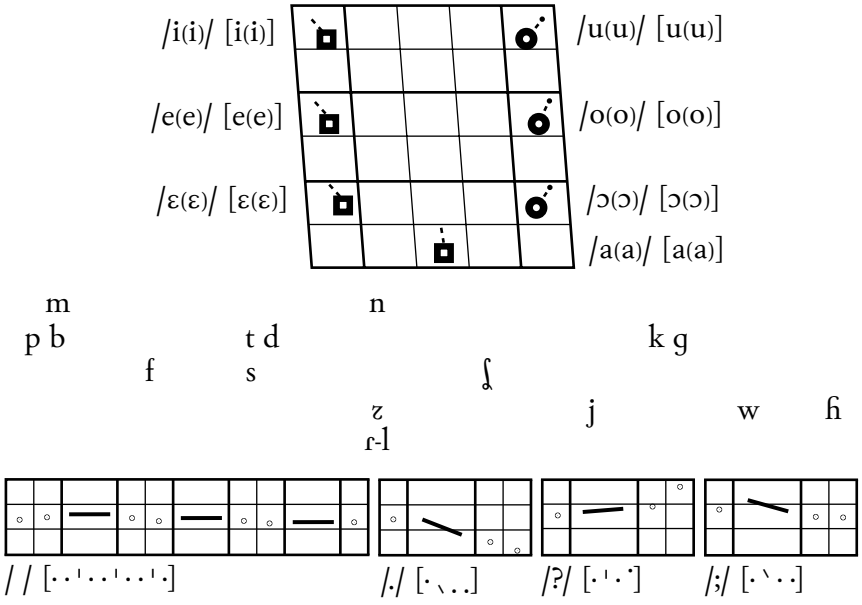


22.7. *Faliscan* (Italic, IE) had the five short *V* and six diphthongs given (one was of lesser importance), and [n≡C].

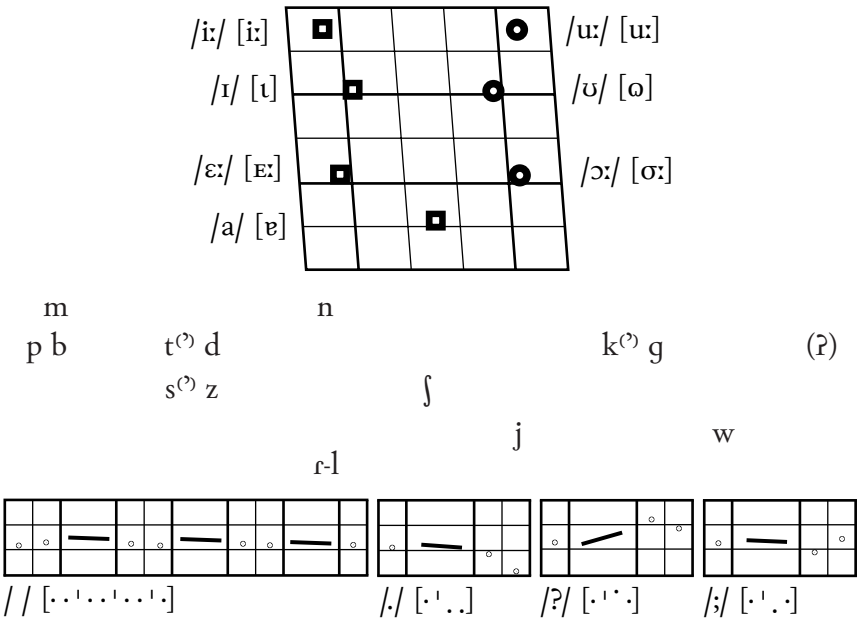




22.8. *Ancient Umbrian* (Italic, IE) had seven short and long *V*, but no diphthong; its *C* were as shown, with /z/ different from /ɾ/ and /ɦ/; [n≡C].

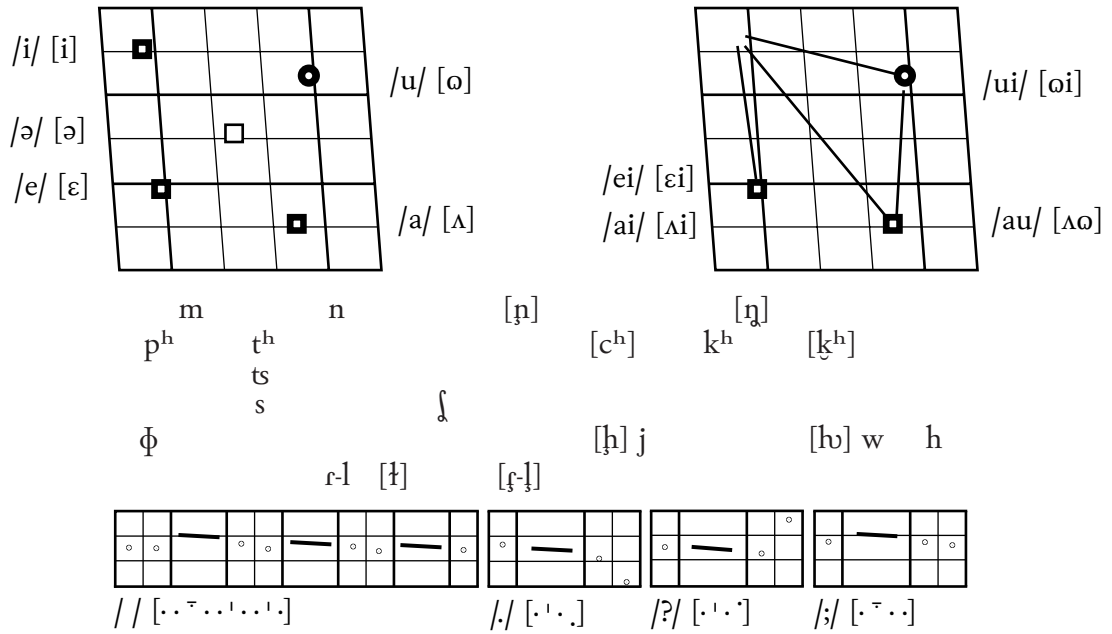


22.9. *Punic* (Afro-Asiatic), spoken in the present-day territories of Sardinia & Tunisia, had three short and four long *V*, shown in the vocogram. In addition to the *C* indicated, it presented three ejective obstruents in opposition; also *C* ≠ *CC* and [n≡C]. Often, /ʔ/ was dropped, and loanwords could have /h; ħ, ʕ/, as well.

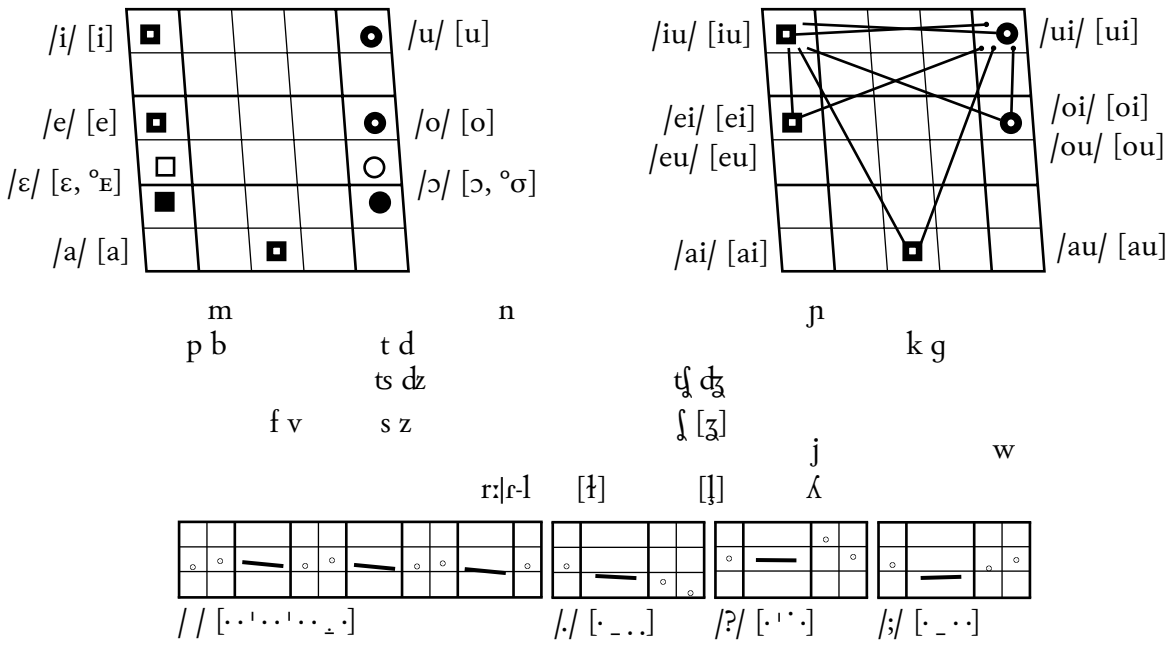


22.10. *Etruscan* (isolated) had five short *V*, including /ə/. It opposed voiceless and ‹aspirated› stops, /C, Ch/. The phoneme /k/ was [c] before front *V* and [k̟]

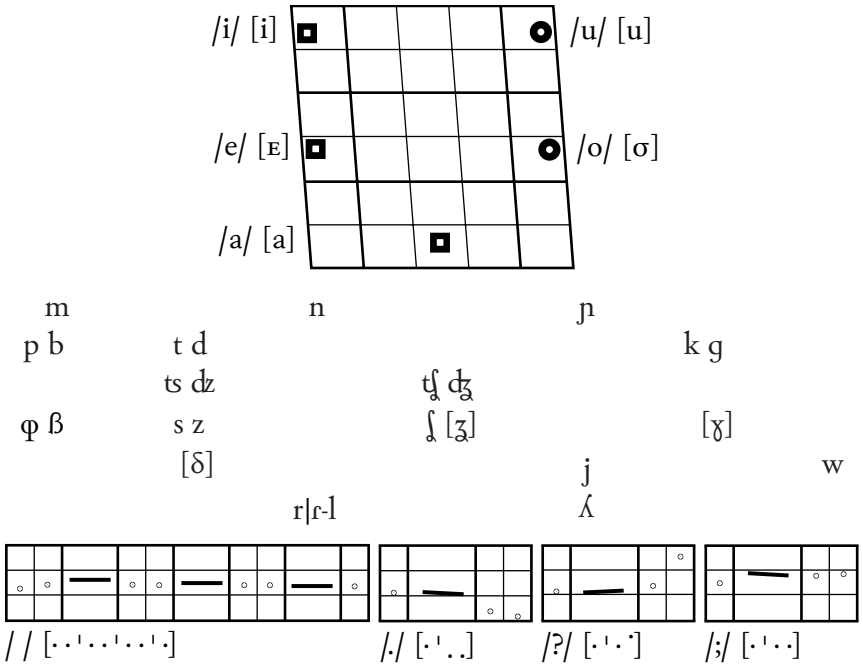
before /u/; /h/ behaved likewise: /h/ [h, ɧ, hʊ], but confusion often arose between those taxophones and /ɸ/ [ɸ] (as between /C/ and /Ch/, too), mainly due to differences between northern and southern areas. It had several *V* sequences (even with identical elements). /j, w/ [j, w] could occur between *V*, even if in complementary distribution with prevocalic /i, u/; besides, /nj, ɾj, lj/ [ɲ, ɾʲ, lʲ]. It generally had [n≡C]; [m̩, n̩, ɾ̩, l̩] were possible realizations of /əИ/, as [ŋ̩, ɬ] were for /an, al/ + /C, #/.



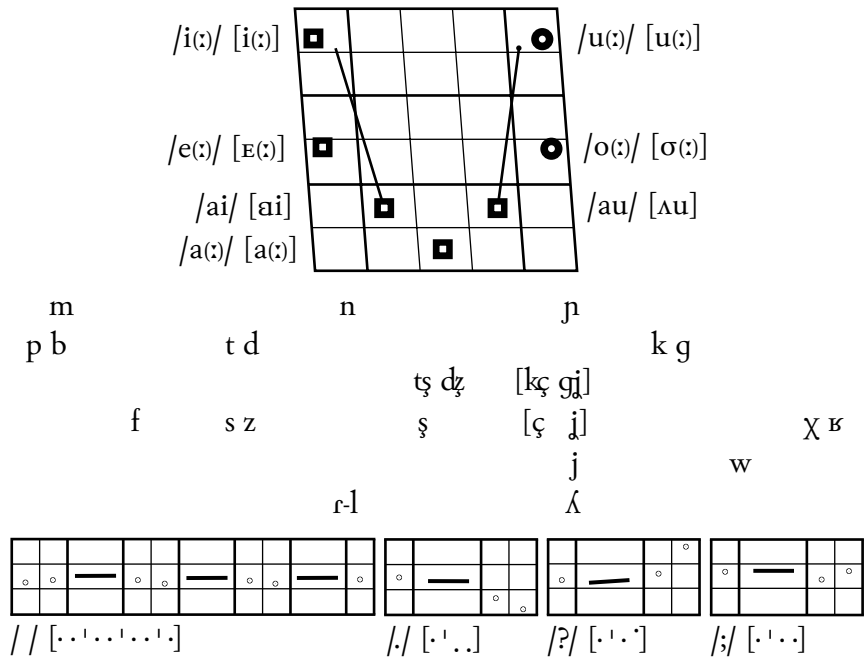
22.11. *Galego-Portuguese* (Rom., IE) had the seven short *V* and eight diphthongs given, which were phonetically nasalized before *N*, even in unchecked syllables. For /VʤV/ the variant [VʒV] was frequent, and in other contexts too, as in /#ʤV/ [#ʒV]; /l/ was [lV, ɬC, ɬ#].



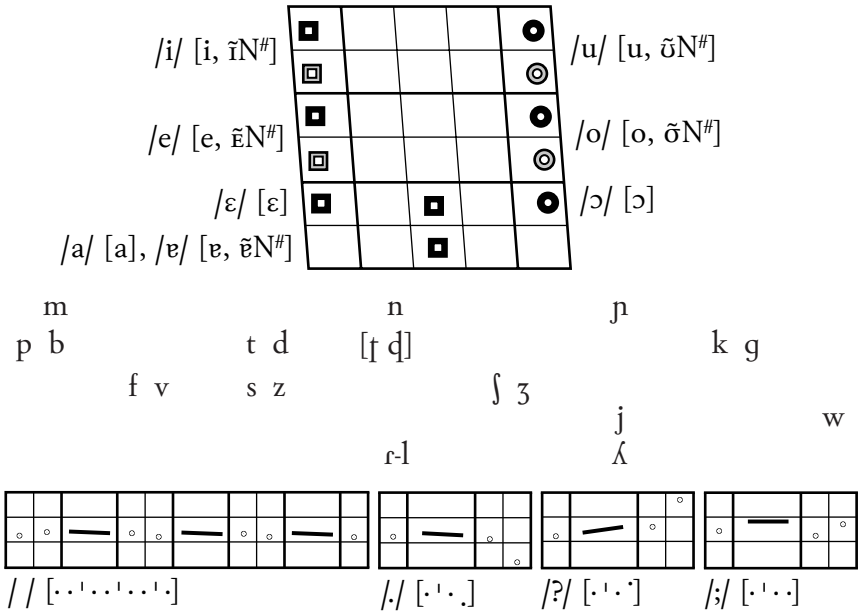
22.12. *Old Spanish* (Rom., IE) had five short *V*, as well as diphthongs resulting from their juxtaposition; between *V*, /d, g, ʤ/ were [ð, ɣ, ʒ]; further, /ɾ/ [ɾ] ≠ /r/ [rː], [n≡C], and *x* /ʃ/, as it still is in Catalan, thus in Italian we have *Don Chisciotte*, with /ʃʃ/, without the later evolution (which, in Spanish, changed *x* /ʃ/ into /x/), while in English we have *Don Quixote* /ˈdɒn kɪˈhɔʊṭi, -tɛɪ/ (apart from /ˈdɒn ˈkwɪksət, -ɔʊt/).



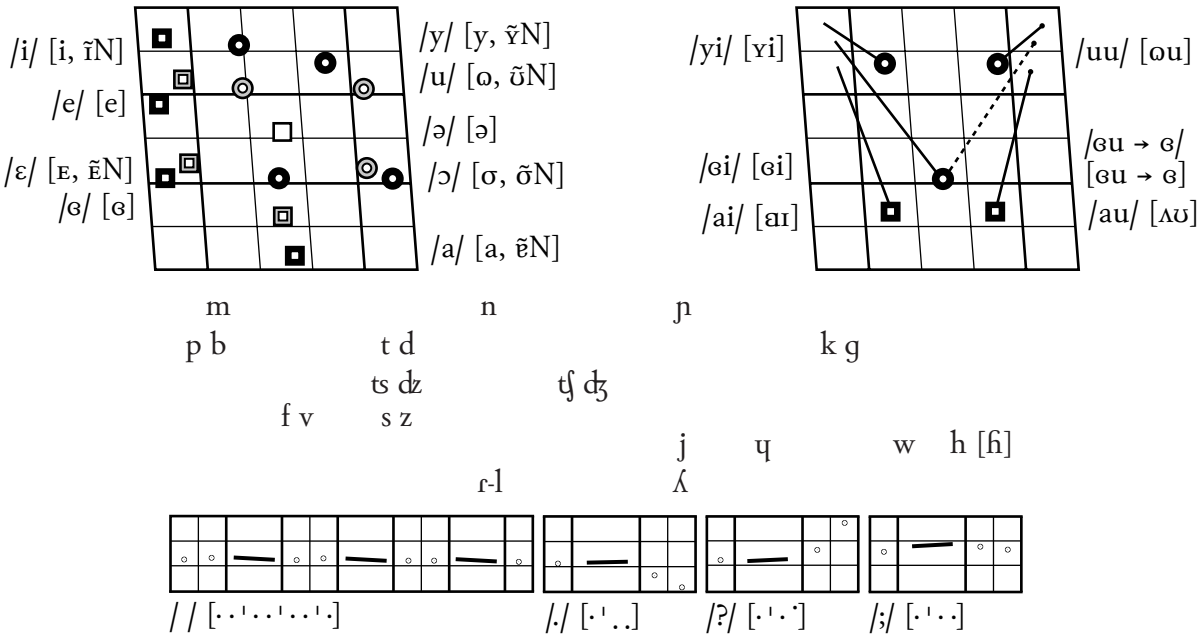
22.13. *Mozarabic* (Rom., IE) had five *V*, both short and long, two diphthongs with a peculiar first element, and the *C* given; [tş, ʤ, ş, j] could alternate with [kç, gʝ, ç, ʝ]; it had [n≡C] and *C* ≠ *CC*.



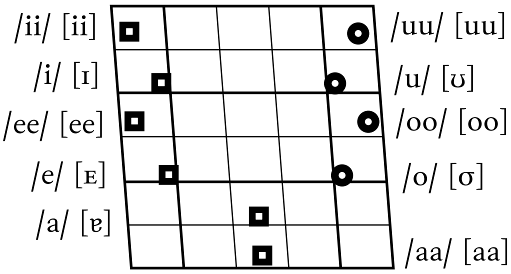
22.14. *Old Occitan* (Rom., IE), or *Old Provençal*, had eight short *V*, five of which were phonetically nasalized in checked syllables, changing timbres, but maintaining *N*; [n≡C]. Further, it had diphthongs in /i, u/, except /ii, uu/; it opposed /ɾ/ and /ɾɾ/. There were also the sequences /ts, dz; tʃ, dʒ/ [ts, dz; ʧ, ʤ] (*not* stopstrictive phones).

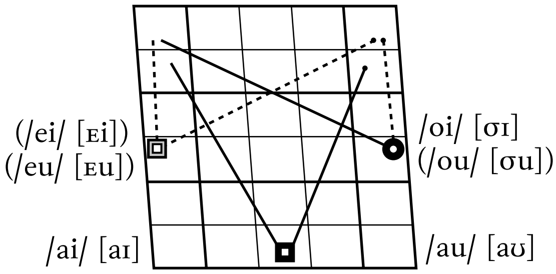


22.15. *Old French* (Rom., IE) had ten short V, six of which were phonetically nasalized, even in unchecked syllables, with partially different timbres, but maintaining *N* even in checked syllables; [n≡C]. It also had six diphthongs (but /ɷu/ was already developing into /ɷ/); /ə/ [ə] was always sounded, even in final position after *V*: *bon* [ˈbõn], *bonne* [ˈbõnə], *terre* [ˈtɛrrə], *vie* [ˈviə], (only final /ə/ + #*V* was elided). There was /h/ in words of Germanic origin: *hache* [ˈhaʧə], and possibly /h/ in /sC, zC/: *feste* [ˈfɛhtə], *isle* [ˈiɦlə].

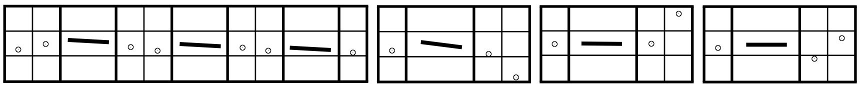


22.16. *Proto-Celtic* (IE) had five *V*, both short and long, with different timbres, and six diphthongs, three of which (indicated with a broken line) on the way to die out. As for *C*, there were palatalized taxophones as well as velarized ones (or rather labialized in the case they were velar). It also had phonemic voiceless sonants, and [n≡C].



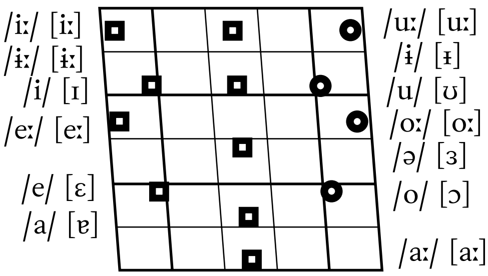


ɦm m [ɦm̡ m̡] [ɦᵯ ᵯ] ɦn n [ɦn̡ n̡] [ɦᵰ ᵰ] [ɲ] ŋ [ŋ̂]
p b [p̡ b̡] [ꝑ ƀ] t d [ţ ḑ] [ŧ đ] [c ɟ] k g [k̫ ĝ]
ɸ ß [ɸ̡ ß̡] [ɸ̵ ß̵] θ|s ð [θ̡|ş ð̡] [θ̵|s ð̵] [ç ʝ] x ɣ [x̂ ɣ̂]
[ɦj] j [ɦj] [ɦʋ] w h
ɾ-ɬ ɾ-l [ɾ̡-ɬ̡ ɾ̡-l̡] [ɾ̵-ɬ̵ ɾ̵-ɫ]

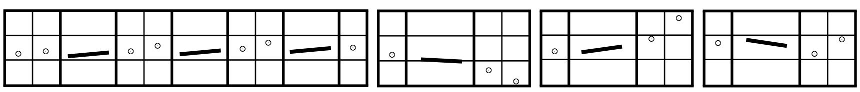


/ / [· · ˈ · · ˈ · · ˈ ·] /./ [· ˈ · .] /?/ [· ˈ · ˙] /;/ [· ˈ . ·]

22.17. *Gaulish* (Celtic, IE) had six *V*, both short and long, with different timbres, as well as /ə/ [ɜ], which occurred in the diphthong /əu/ [ɜu] too. Other diphthongs, resulting from *V* juxtaposition, were /ei, ai, oi, ui; iu, ɨu, eu, au, ou; eɨ, aɨ; aːɨ, oːɨ, uːɨ/. It also had phonemic voiceless sonants, and some weakened taxophones.



ɦm m ɦn n [ɦŋ ŋ]
p b t d k g
ɸ ß θ|s ð|[z] ʃ [x ɣ]
j w h
ɾ-ɬ ɾ-l

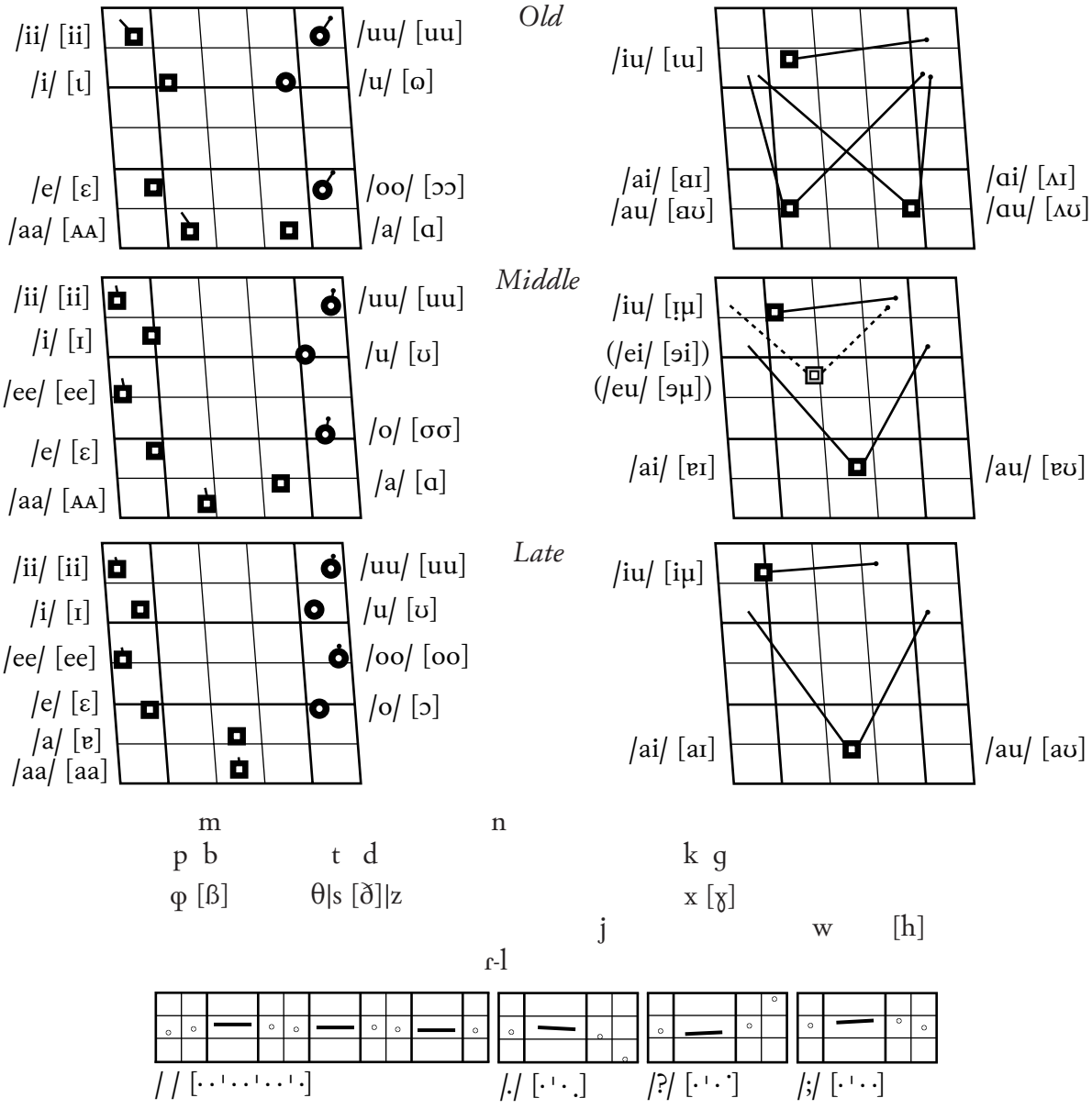


/ / [· · ˈ · · ˈ · · ˈ ·] /./ [· ˍ . .] /?/ [· ˈ · ˙] /;/ [· ˈ · ·]

22.18. *Cornish* (Celtic, IE) had six *V*, both short and long (the latter being narrow diphthongs), with different timbres, as well as /ə/ [ɜ], besides the seven diphthongs given, two of which (/ai, oi/) occurred in loanwords only. There was

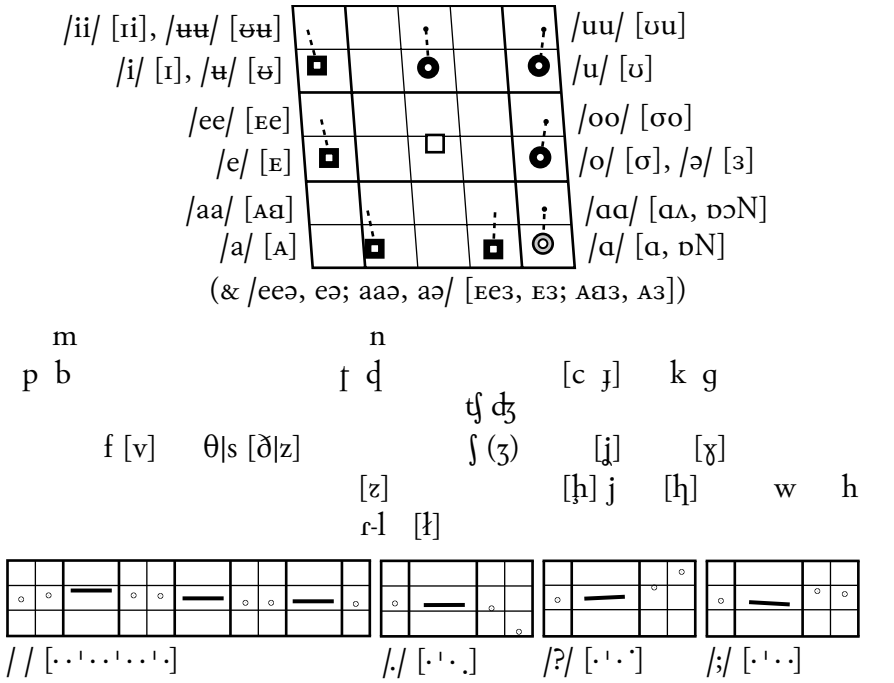
phonemic opposition between /θ, ð/ and /s, z/, as well as between /x/ [ɧ] and /h/ [ɦ]; let us also notice [n≡C].

22.19. *Proto-Germanic* (IE) had four short *V* and five long ones (*ie* monotimbric diphthongs), with different articulations, and the five diphthongs given, two of which on the way to die out (/ei, eu/ → [ii, iu]). In the *old* phase, it only had four *V* (both short and long) and the diphthongs shown; whereas in the *late* phase, it presented five *V* (both short and long) but only three diphthongs. As for *C*, it should be highlighted that /f, θ, x/, [ɸ, θ, x], had the word-internal taxophones [ß, ð, ɣ], but /x/ [x, ʱh]; let us also notice [n≡C].

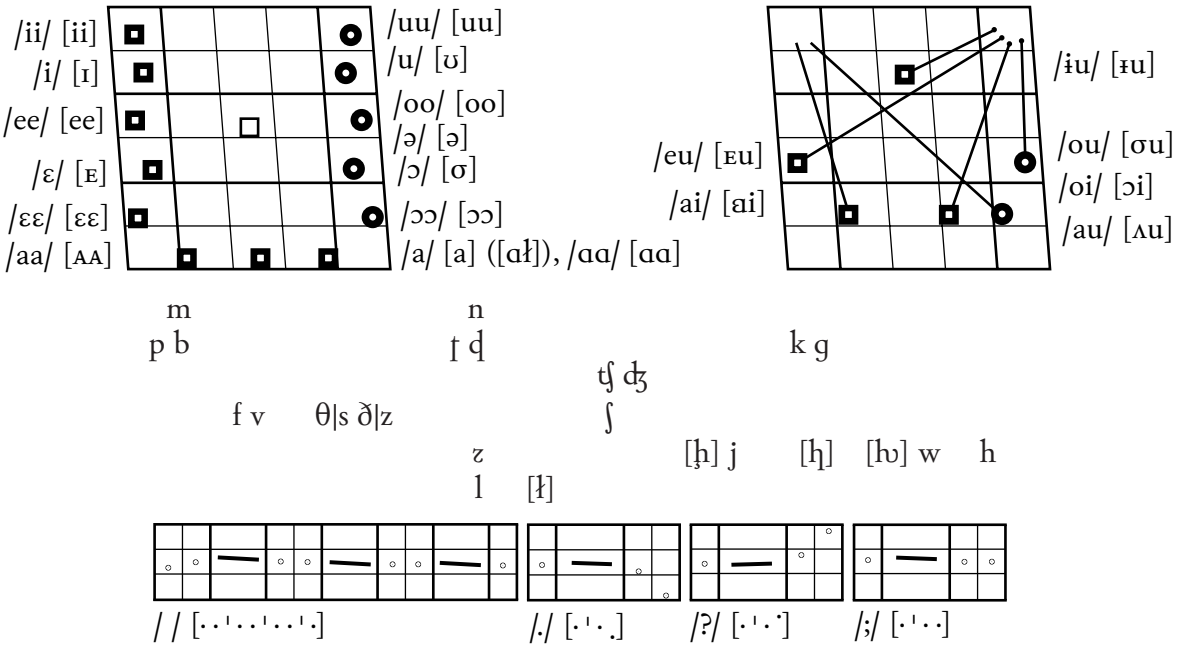


22.20. *Old English*, *Anglosaxon* (Germ., IE), had eight short and seven long *V* (the latter being narrow diphthongs), and the sequences /eə, eeə; aə, aaə/; before *N*, /ɑ, ɑɑ/ had the taxophones [ɒ, ɒɔ]. As for obstruents, in a voiced environment, the voiced taxophones given occurred; either front or back *V* affected /k, g, h/, giving [k, c; g/ɣ, ɟ/ʝ; h, ɧ, ɦ]. There was a tardy phoneme, /ʒ/. Further,

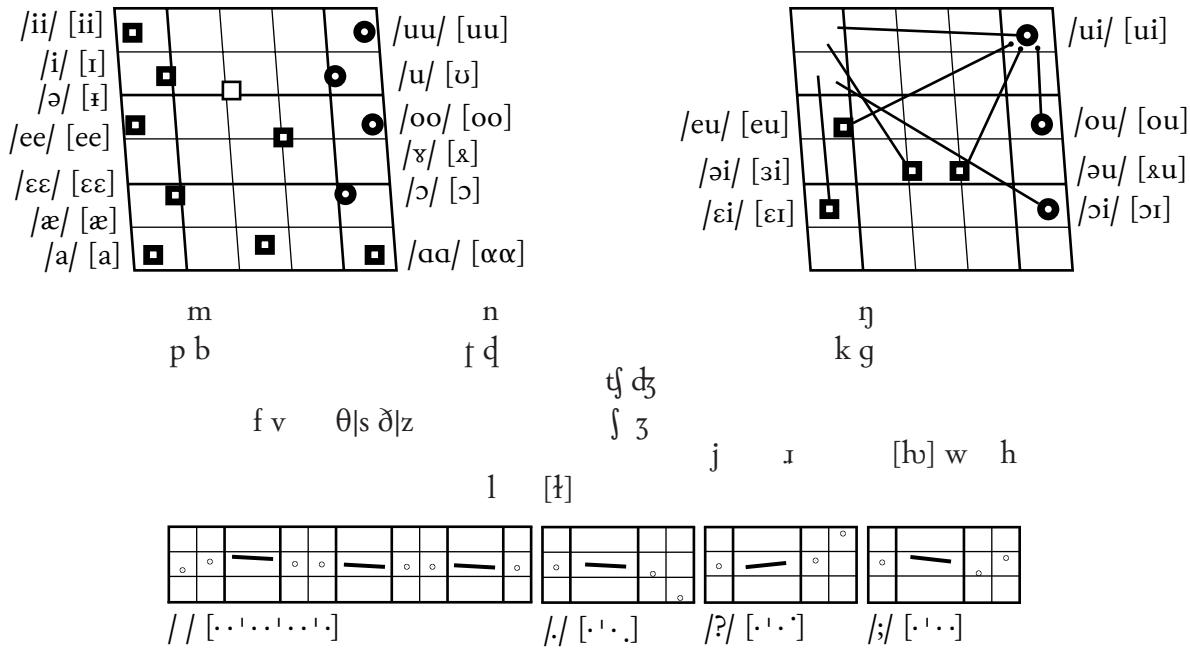
sequences of /h/ + /n, w, l, ɾ/ gave [ʰn, ʰʊ, ʰl, ʳ]; /ɾ/ [ɾV, ɾC, ɾ#]; /l/ [lV, ɬC, ɬ#]. There was opposition between *C* ≠ *CC*, and [n≡C].



22.21. *Middle English* (Germ., IE) had six short *V* (including /ə/ [ə]) and eight long *V*, with different timbres (and a retracted taxophone for /al/ [ɑɬC, ɑɬ#]), as well as the six diphthongs given. As for *C*, it had /ɾ/ (or rather /ɻ/) [ɻV, ɻC, ɻ#], /wɾ/ (or /wɻ/) [ʷɻ]; /l/ [lV, ɬC, ɬ#]; /h/ [ʰh, ˱ʂh, ˱ɳh], /hw/ [hʊ], and [n≡C].

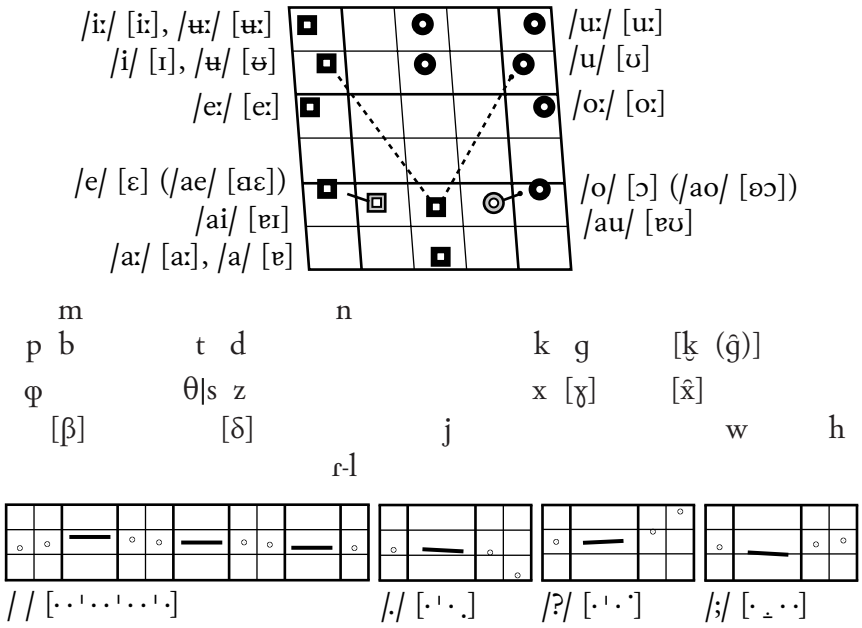


22.22. *Early Modern English* (Germ., IE) had seven short *V* (including /ə/ [ɤ]) and six long *V* (some of which had quite different timbres from those of the corresponding short ones), as well as the seven diphthongs given. As for *C*, it had /hw/ [hʊ]; /ɹ/ [ɹV, ɹC, ɹ#]; /l/ [lV, ɬC, ɬ#]; /tj, sj/ [ʧj, sj] (not [ʧ, ʃ]).



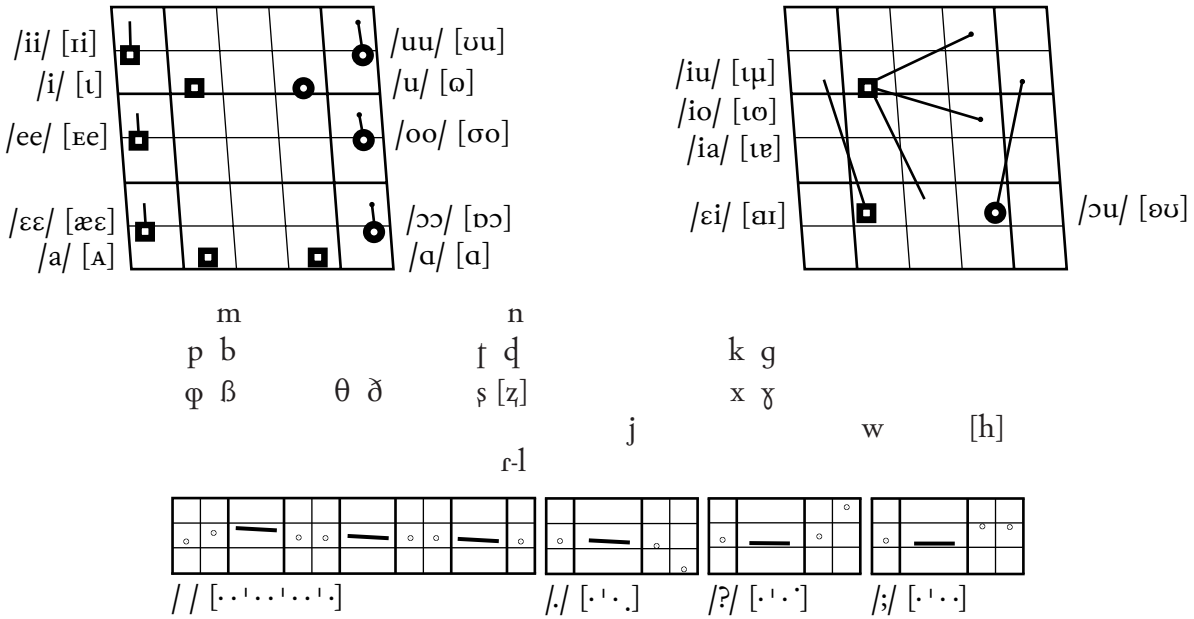
22.23. *Gothic* (Germ., IE) had six *V*, both short and long, the two series differing in timbre, as well as four diphthongs, two of which (marked in grey and shown in brackets) were on the way to die out, /ae, ao/ [ɑɛ, ɘɔ] → /e, o/ [ɛ, ɔ]. As for *C*, it had /kw, gw, xw/ [k̟, ĝ, x̂], /b, d, g/ [b, β; d, ð; g, ɣ], the continuants occurring after *V*; further, [m̩, n̩, ɾ̩, l̩], [n≡C], and limited cases of *C* ≠ *CC* oppositions, mainly for /m, n, r, l, s/.

Spelling rules: *a* /a, aː/, *ai* /ɛː/, *aí* /ɛ/, *ái* /ai/, *au* /ɔː/, *aú* /ɔ/, *áu* /au/, *e* /eː/, *ei* /iː/, *iu* /ʉː/, *o* /oː/, *u* /u, uː/, *w* /u, uː#/ (and /ʉ/, in loanwords), *f* /ɸ/, *þ* /θ/, *g* /g/ ([ŋ] + *g*, *k*, *q*; /x/ + *s*, *t*, #), *gw* /gw/ [ĝ], *hw* /xw/ [x̂], *q* /kw/ [k̟], *z* /z/.

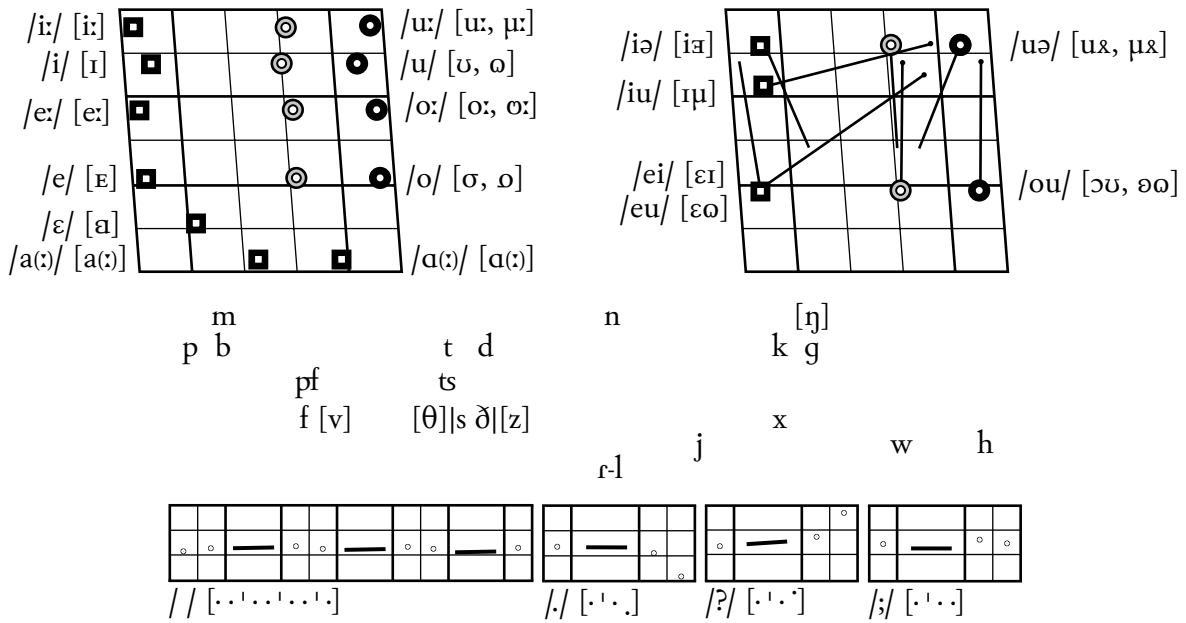


22.24. *Old Saxon*, or *Old Low German*, or ‹Altsächsisch› (Germ., IE), had four short and six long *V* (the latter being narrow diphthongs, with considerable timbre differences), as well as the five diphthongs given. It had the following taxo-

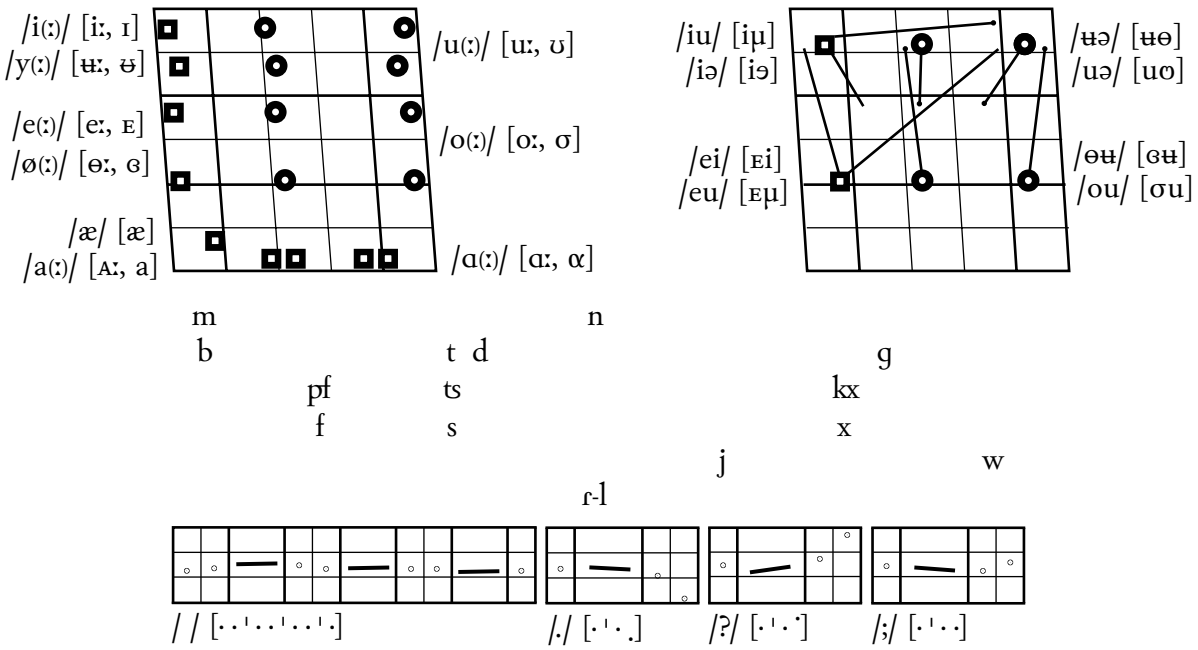
phones: /s/ [ʂ] → [ʐ] in voiced environments, /x/ [x] → [h] before *C*. In addition, it showed opposition between *C* ≠ *CC*; and [n≡C].



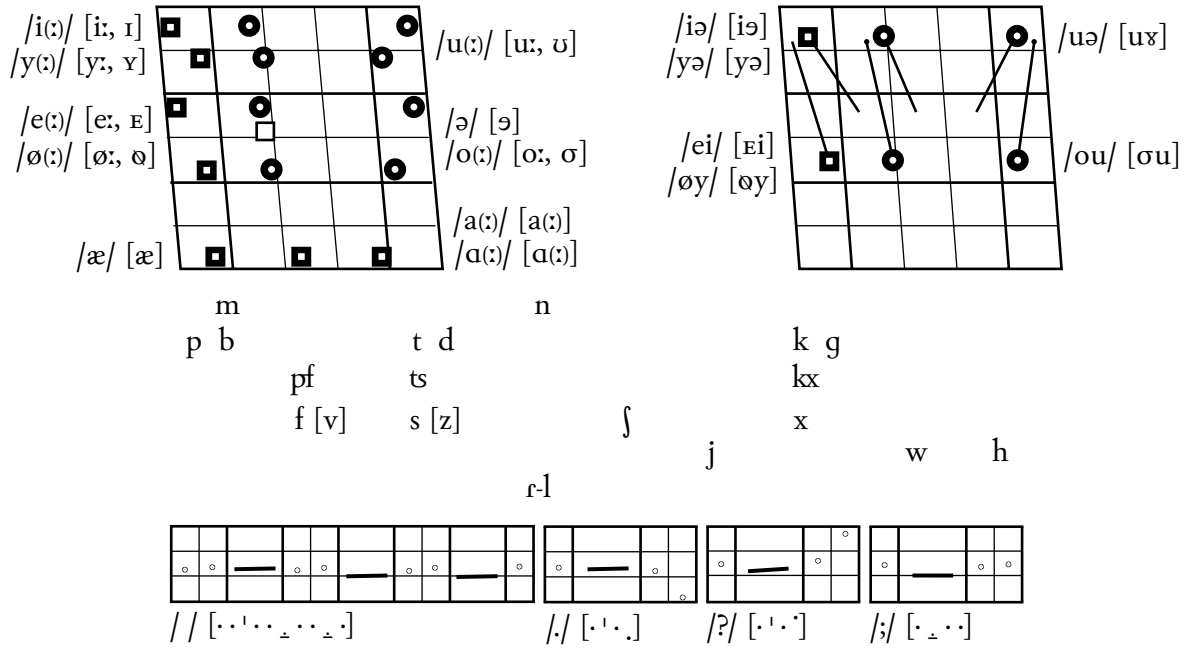
22.25. *Old Eastern Franconian* (Germ., IE) had seven short and six long *V* (with some timbre differences), as well as the six diphthongs given. It also had fronted taxophones for back *V* and diphthongs as a result of *i*-mutation. Some important consonant taxophones are given, as well.



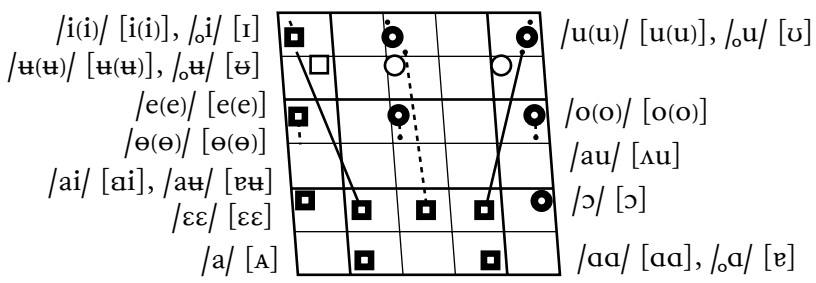
22.26. *Old High German* (Germ., IE) had nine short and eight long *V*, the two series differing in timbre, as well as the eight diphthongs given. As for *C*, there were no particular taxophones; besides, [n≡C]. Later, it also introduced /p, k; v, ʃ; h/ and [z].

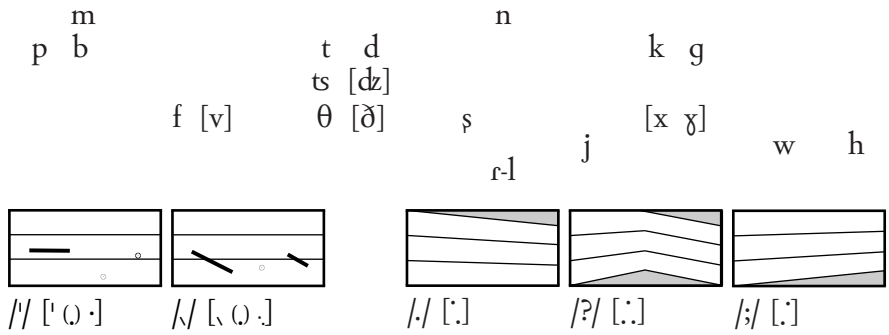


22.27. *Middle High German* (Germ., IE) had ten short *V* (with /ə/ [ə]) and eight long *V* (with some timbre differences), as well as the six diphthongs given. As for *C*, there were no particular taxophones, except for [v, z], due to voice assimilation; besides, [n≡C].



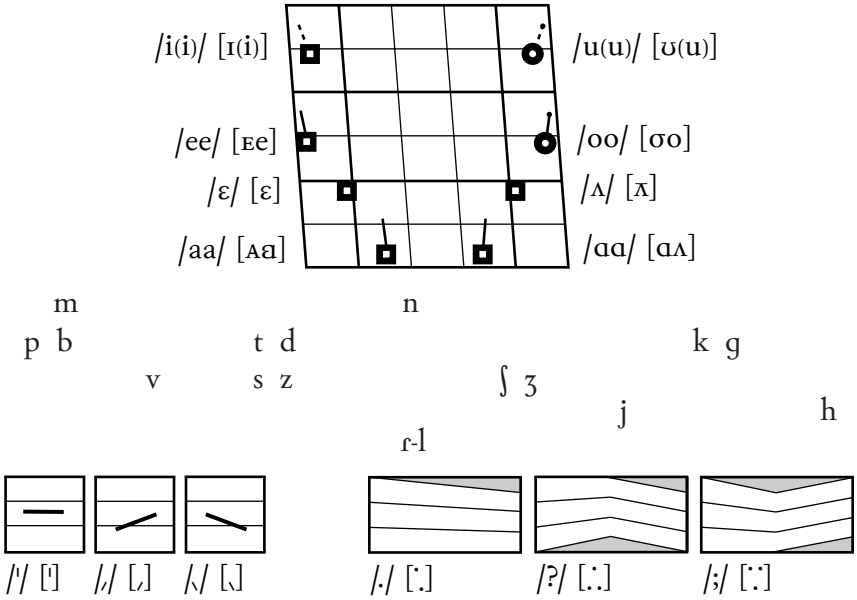
22.28. *Norse*, *Old Icelandic* (Germ., IE), had the *V* and diphthongs given (with



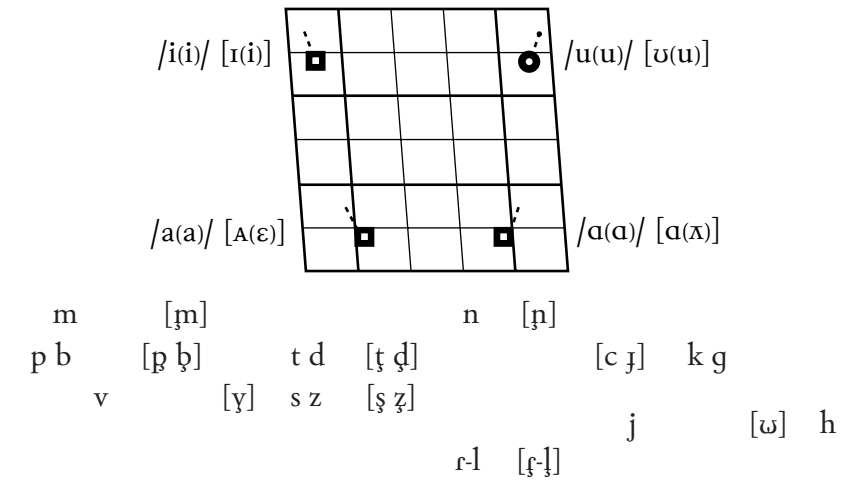


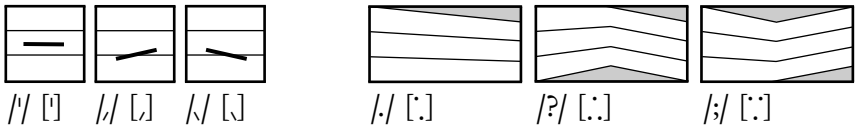
/VVN/ [ṼṼ], especially for /ii, ɑɑ/). As for *C*, noteworthy were sequences such as /hn, hɾ, hl/, and voiced prevocalical/final taxophones and constrictive voiceless ones for /pt, kt, ks/ [ft, xt, xs]. Further, the opposition between *C* ≠ *CC* was distinctive, including /ɾɾ/, and there were two word tonemes; besides, [n≡C].

22.29. *Proto-Baltic* (IE) had the *V* given, both short and long, and combinations of them plus *V* or plus /m, n, ɾ, l/. It had the three tonemes indicated and [n≡C].



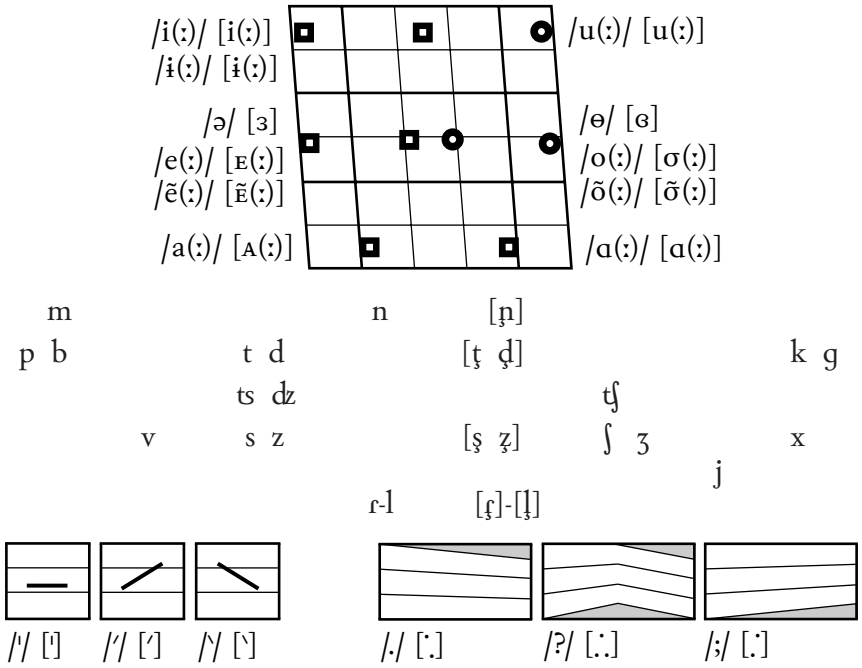
22.30. *Prussian* (Baltic, IE) had the four *V* given, short and long (the latter being narrow diphthongs), as well as *V* sequences. As for *C*, it had palatalized taxophones,



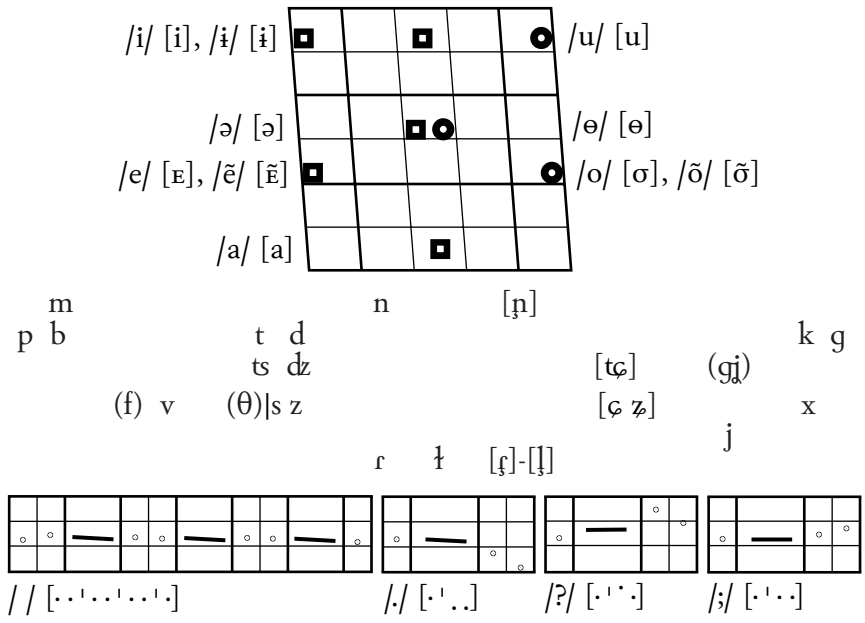


[Ç], for /Cj/ sequences, opposing /Cw/ [Cω] sequences; also, [n≡C], and three tonemes.

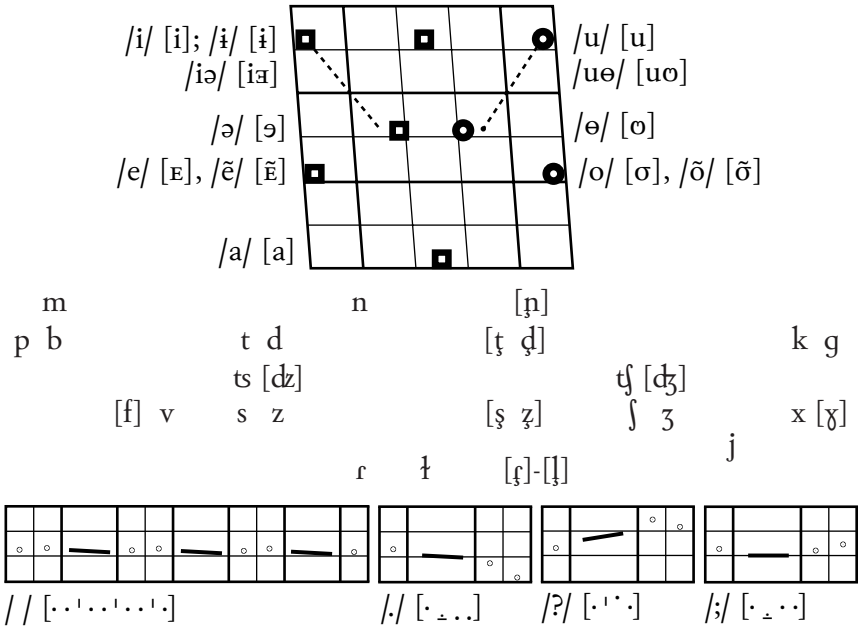
22.31. *Proto-Slavic* (IE) had seven long and nine short oral *V*, as well as two nasalized ones, both short and long. It presented seven palatalized *C* taxophones, [n≡C], and three tonemes.



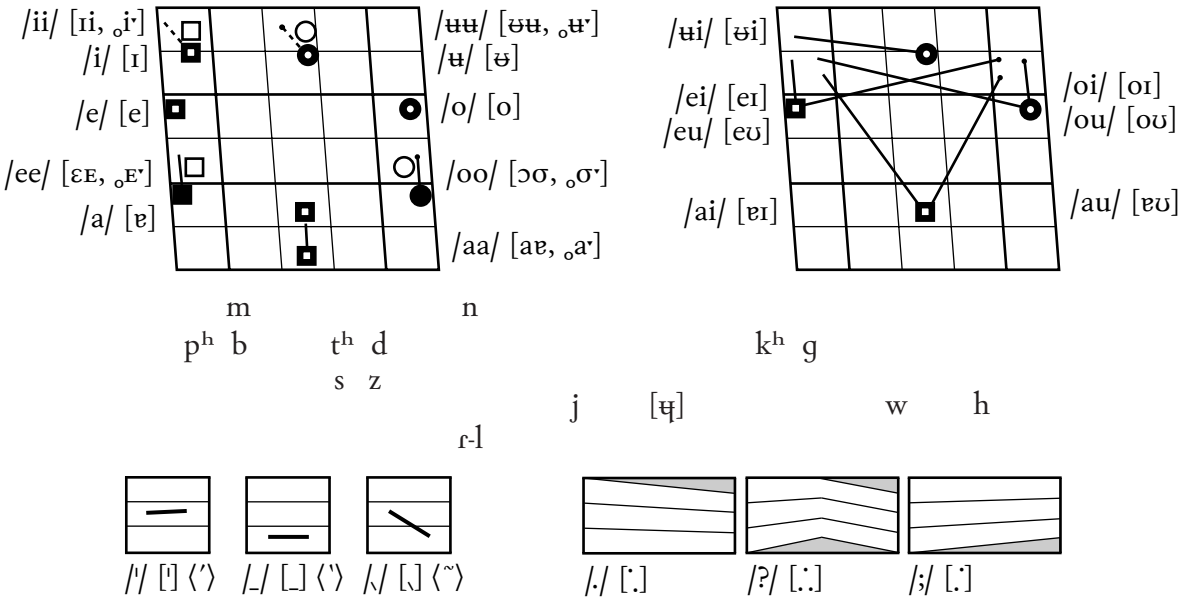
22.32. *(Old) Church Slavonic* (IE) had eight short oral *V* and two nasalized ones, besides juxtaposed *V* sequences. It also had three minority C and six palatalized taxophones; further, [ɾ̡, ɬ̡] and [n≡C].



22.33. *Old Russian* (Slavic, IE) had eight short oral *V* and two nasalized ones, as well as two centering diphthongs. As for C, it had seven palatalized taxophones and four others resulting from voicing assimilation. It also had the sequences /ʃʧʃ, ʒʤʒ/ and [n≡C].



22.34. *Ancient Greek* (Hellenic, IE), or *Classical Greek*, had five *V*, both short and long (actually narrow diphthongs), as well as the seven phonemic diphthongs given. The diphthongal quality of long *V* results from comparisons between the different (often conflicting) opinions of present-day and past scholars, as also from loanwords in Greek (and from Greek), including those from central and eastern Asia languages. Considering the importance the Greek language has had for Western culture, we present here a list of the graphemic correspondences (including their transliteration), which should be of help to those who do not know the Greek alphabet (yet). Some numbered notes follow, with explanations and some useful examples, although these phonosyntheses are quite concise.



α	*a*	[ɐ] /a/	μ	*m*	[m] /m/
	a/*ā*	[aɐ, ₒaˑ] /aa/⁰	ν	*n*	[n] /n/
ε	*e*	[e] /e/	ξ	*ks*	[ks] /k/+/s/
η	*ē*	[ɛɛ, ₒɛˑ] /ee/⁰	π	*p*	[p] /p/
ι	*i*	[ɪ] /i/	ρ	*r*	[ɾ] /r/
	i/*ī*	[ɪi, ₒiˑ] /ii/⁰	ῥ́	*hr*	[hɾ] /h/+/r/ (*rh*)
ο	*o*	[o] /o/	σ/-ς	*s*	[s] /s/ (word-finally, ς)
ω	*ō*	[ɔσ, ₒσˑ] /oo/⁰		*s*	[z] /s/ + β, γ, δ;
υ	*y*	[ʉ] /ʉ/ (← [ʊ])[1]		*s*	[s] /s/ + λ, μ, ν, ρ
	y/*ȳ*	[ʉʉ, ₒʉˑ] /ʉʉ/⁰ (← [ʊu])[1]	τ	*t*	[t] /t/
β	*b*	[b] /b/	φ	*ph*	[ph] /p/+/h/
γ	*g*	[g] /g/; *g* [ŋ] /n/ + μ, ν	χ	*kh*	[kh] /k/+/h/
		(but γν-, *gn*- [gn] /gn/);	ψ	*ps*	[ps] /p/+/s/
	n	[ŋ] /n/ + γ, ϰ, ξ, χ;	’		[Ø] / / ‹zero›
δ	*d*	[d] /d/	῾	*h*	[h] /h/
ζ	*z*	[z, VzzV] /z, zz/			
		(← [dz] ← [zd])[1]	´	´	[ˈ] /ˈ/ (mid level tone)
ϑ	*th*	[th] /t/ + /h/	`	`	[_] /_/ (low level tone)
ϰ	*k*	[k] /k/	῀	^	[˩˧] /˩˧/ (mid-to-low falling
λ	*l*	[l] /l/			tone)

V ̣	*V*ι̣	[VV][2]: ᾳ, *ā* (*āι̣*) [aɐ] /aa/ (← [aɐɪ]); ῃ, *ē* (*ēι̣*) [ɛɛ] /ee/ (← [ɛɛɪ]); ῳ, *ō* (*ōι̣*) [ɔσ] /oo/ (← [ɔσɪ])
Vι	*Vi*	[Vi, Vɪ] /Vi/: *αι*, *ai* [ɐɪ] /ai/; *οι*, *oi* [oɪ] /oi/; *υι*, *yi* [ʉi] /ʉi/; but *ει*, *ei* [eɪ] /ei/ (← [ee])[1]
Vυ	*Vu*	[Vʊ] /Vu/: *αυ*, *au* [ɐʊ] /au/; *ευ*, *eu* [eʊ] /eu/; *ᾱυ*, *āu* [aɐʊ] /aau/; *ηυ*, *ēu* [ɛɛʊ] /eeu/; *ωυ*, *ōu* [ɔσʊ] /oou/; but *ου*, *ou* [oʊ] /ou/ (← [oo])[1]

⁰ Unstressed long *V* were half-long monophthongs with the following timbres: [iˑ, ɛˑ, aˑ, σˑ, ʉˑ].

[1] At earlier times these *V* timbres and the way ζ was articulated were as indicated after ‹←›. Between *V*, ζ was geminated, [zz] /zz/. The previous intermediate stage, [dz] /dz/, from a former [zd] /zd/, originated by metathesis and made up a consistent series with [ps] /ps/ and [ks] /ks/, in spite of its being ‹intrinsically› voiced (structurally, a voiceless sequence, /ts/, would have been more plausible, much like ψ and ξ, but no reliable traces or records of it have been found).

[2] On the other hand we get: *Ἄι* (for *ᾷ*; different from *Αἷ*, *αἷ*)… in fact, ᾳ, ῃ, ῳ, had already become ‹long› vowels; and only if followed by a *V* could ‹ ̣› still stand for [j], as in: *ῥᾴων* ⟨*hrái̯ōn*⟩ [ˈhɾaɐ(j)σˑn], *κλῄω* ⟨*klēi̯ō*⟩ [ˈklɛɛ(j)σˑ], *πατρῷος* ⟨*patrōi̯os*⟩ [pɐˌtɾɔσ(j)os], *τῷ ὄντι* ⟨*tōi̯ ónti*⟩ [ˌtσˑ(j)ontɪ].

Besides, we get V*ϊ*, ⟨*Vï…*⟩ [V(-)ɪ] and V*ϋ*, ⟨*Vü…*⟩ [V(-)ʉ] with independent ι, υ (even stressable, *ἀΐσσω* ⟨*aíssō*⟩ [ɐˈɪssσˑ]): *ἱρήϊον* ⟨*hirēïon*⟩ [hɪ(i)ˈɾɛɛɪjon], *ἀϋτμή* ⟨*aytmē*⟩ [ɐʉˈmɛɛ].

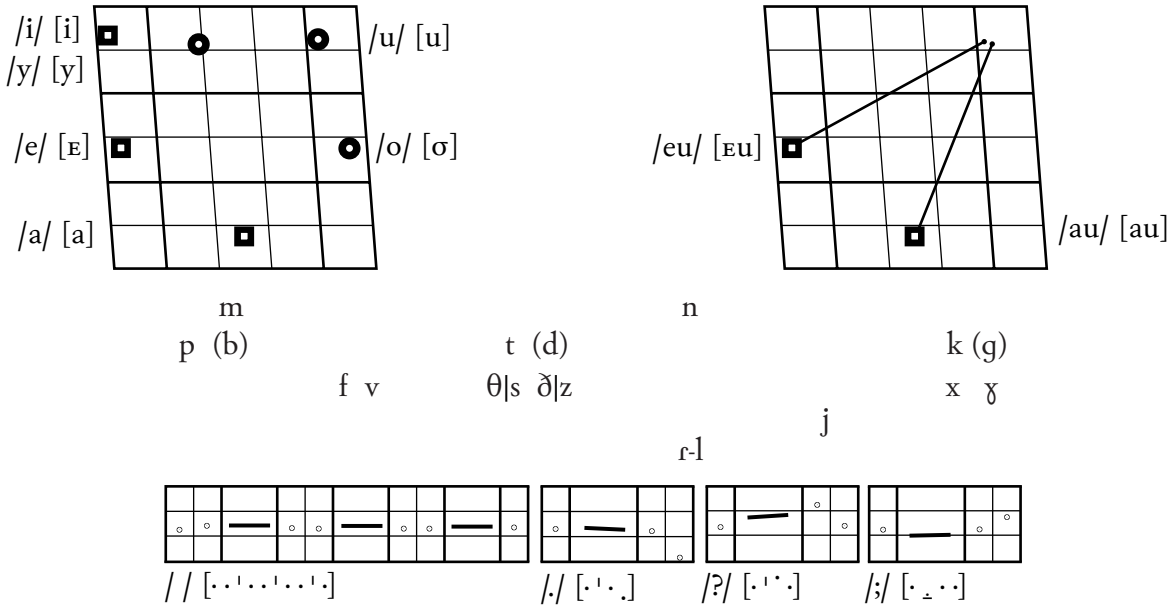
Intervocalic /i, u/ (in /Vi, Vu/ + /V/ sequences, cf the second vocogram) were: [ɪj, ʊw], ie V*ι*V ⟨*ViV*⟩ [VɪjV]: [ɐɪjV, oɪjV, ʉɪjV], even for *ει*V, ⟨*eiV*⟩ [eɪjV]: *πλεῖος* ⟨*plêios*⟩ [ˌpleɪjos]; and V*υ*V ⟨*VuV*⟩ [VʊwV]: [ɐʊwV, eʊwV, ɛɛʊwV, ɔσʊwV], even for *ου*V ⟨*ouV*⟩ [oʊwV] (← [ʊuwV]): *βουλεύω* ⟨*bouléuō*⟩ [boʊˈleʊwσˑ]. Whereas

word-initially or after *C*, unstressed (consonantal) *ι*, *υ*, *ου* were: (C)*ι*V, (C)*υ*V, (C)*ου*V ⟨(C)*iV*, (C)*yV*, (C)*ouV*⟩ [(C)jV, (C)ɥV, (C)wV]: *βιός* ⟨*biós*⟩ [ˈbjos] ‹bow (the weapon)› (cfr. *βίος* ⟨*bíos*⟩ [ˈbɪos] ‹life›).

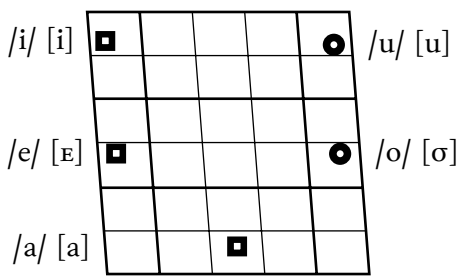
In *diphthonghs* the accent mark –much like the possible *breathing* (either ‹rough›, ʿ⟨*h*⟩ [h] /h/, or ‹smooth›, ʾ⟨ ⟩ [ø] / /)– is marked on the second element, even though it goes without saying that phono-tonetically (as in its transliterated form, as well) it is on the first one: *αἷμα* ⟨*hâima*⟩ [ˌhɐɪmɐ]. Usual spelling does not distinguish between short and long *α*, *ι*, *υ*. To end with, *ϑ*, *φ*, *χ* are voiceless ‹aspirated› stops; but when in sequence, only the second is ‹aspirated›: *δίφθογγος díphthongos* [ˈdɪpthoŋgos]. Let us also notice that, except for *γγ* ⟨*ng*⟩ [ŋg], doubled consonants were truly geminated: *βάλλω* ⟨*bállō*⟩ [ˈbɐllσˑ], *ἵππος* ⟨*híppos*⟩ [ˈhɪppos].

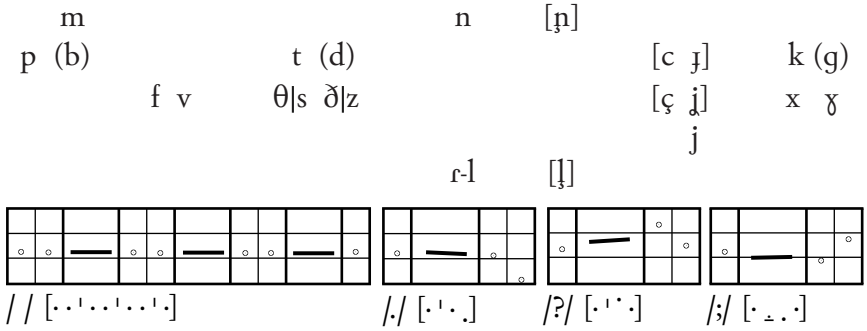
Although in this phonosynthesis *C* are treated in more detail than in others, we do not however show [ŋ], nor the explicit nature of /C, Ch/, as we follow the same criterion which is given in the introductory remarks (cf § 15).

22.35. *Hellenistic Greek* (Hellenic, IE) had six short *V* and two diphthongs (which had not become /af, av; ef, ev/ yet). It had the given xenophonemes (in round brackets) for loanwords, the sequences /ps, ts, dz, ks/, and [n≡C]. There was no prenasal voicing yet, and the (ancient) tonemes had disappeared, but the opposition *C* ≠ *CC* was preserved.



22.36. *Byzantine Greek* (Hellenic, IE) only had the five short *V* typical of present-day Greek. It preserved three xenophonemes and presented some palatalized

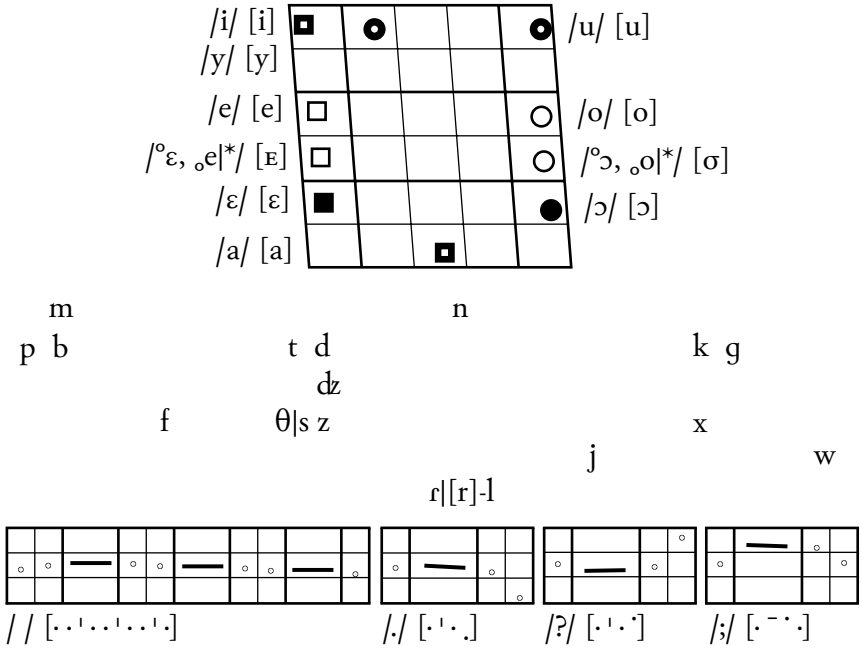




C taxophones. Consonants were already voiced after a nasal, /NÇ/ [NÇ], with [n≡C]. Consonant gemination had been lost, and *αυ*, *ευ* were already like they are in present-day Greek, *ιε* sequences of /VC/ [Vf, Vv].

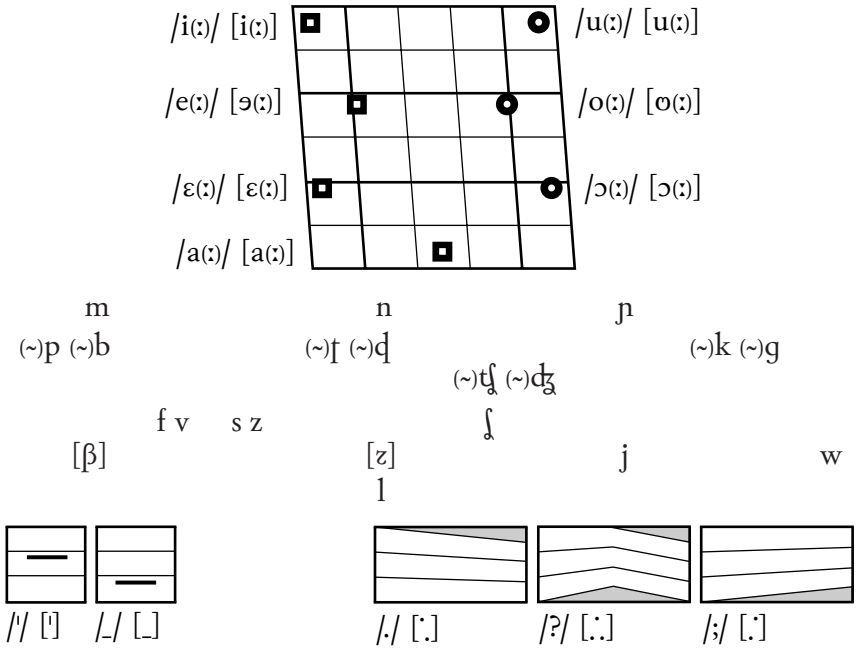
22.37. *Italian ‹Academic› Greek* (Hellenic, IE) came to have six *V* in stressed position, /i, ɛ, a, ɔ, u, y/ (invariably with /ɛ, ɔ/, even in /ɛi, ɛu, ɔi/). Apart from *ου* /u/, all other graphic diphthongs (and *V* sequences) are phonic diphthongs, too, by juxtaposition: /ai, au, yi/; *ῃ*, *ᾳ*, *ῳ* are simply /ɛ, a, ɔ/. Much like in Italian, we find /e, o/ [e, o] in unstressed syllables, with intermediate timbres, [ɛ, ɔ], because of the *V* adjustments of half-opening (for /ₒe|, ₒo|/) or half-closing (for /°ɛ, °ɔ/, *cf HPr* § 3.1.1).

Length and *V* sequences also correspond to those found in neutral Italian; *CC* are rendered as /CC/, and [n≡C]. The grapheme *σ* is invariably /VzV/, *eg βασιλεύς* [ˌbaziˈlɛˑus]; *ζ* is (self-geminating) /dʒ/ and *γ* is always /g/; *φ*, *ϑ*, *χ* are /f, θ, x/ (with [ç] before front *V*, and self-geminating [tʂ], as a common ‹easier› variant for /θ/ [θ]); *ψ*, *ξ* /ps, ks/ are preserved. A phonic zero corresponds to ‹rough breathing› (ʽ), but some people may choose to insert /h/ (or, less well, [ʔ]).

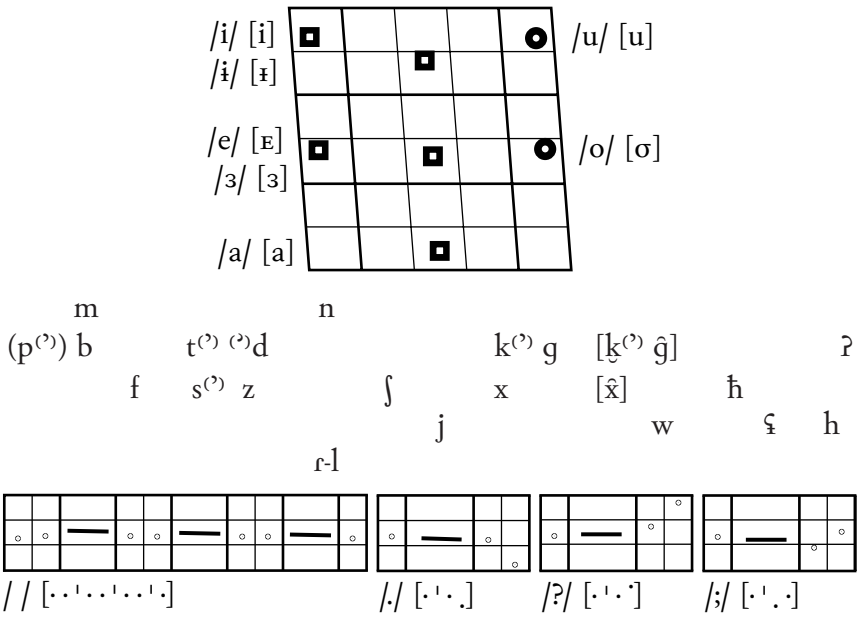


22.38. *Proto-Bantu* (Niger-Congo) had the *V* given in the vocogram, both short and long. There was opposition between plain and prenasalized (either voiced or

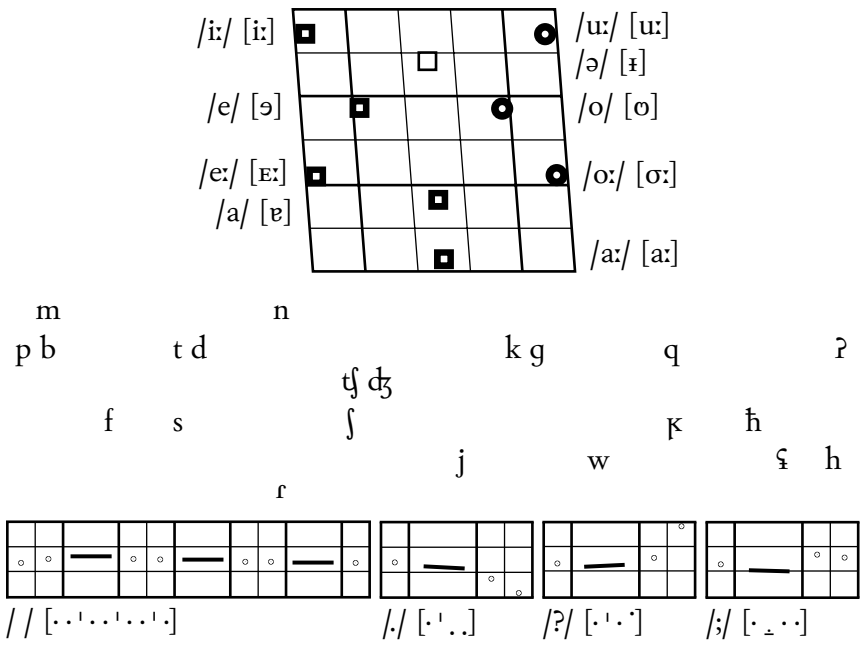
voiceless) *C*. In addition, it had both the two possible *C* variants, and the two tonemes given; and [n≡C].



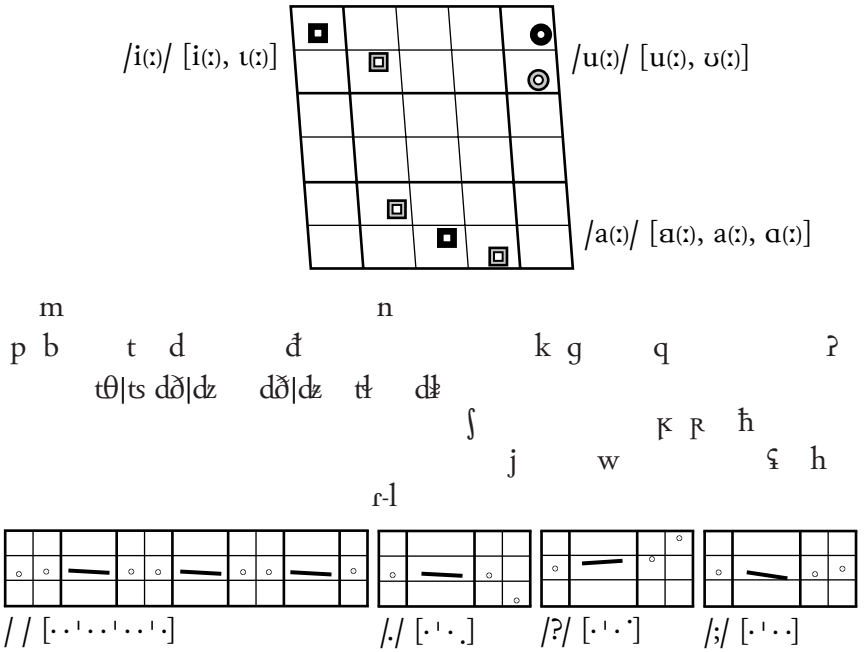
22.39. *Ge'ez* (Afro-Asiatic) had the seven *V* indicated, opposition between plain and ejective C (with marginal /p, p'/), distinction between short and long C (even for /ɬ/), /kw, gw, xw/ [k̟, ĝ, x̂], and [n≡C]. A later ‹traditional› pronunciation had: /ɬ, ʔ/ → /ø/, /ʃ/ → /s/, /'d/ → /s'/, /ħ, x/ → /h/, /x̂/ → /hʊ/.



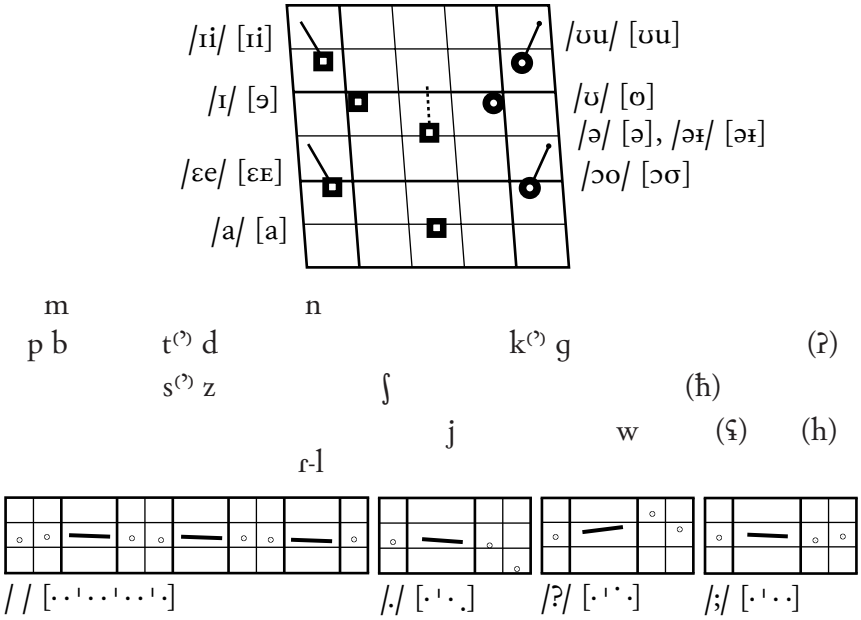
22.40. *(Ancient) Egyptian* (Afro-Asiatic) had four short *V* (including /ə/ [ɨ]) and five long *V*, differing in timbre. In addition, it had only voiceless constrictives, and [n≡C].



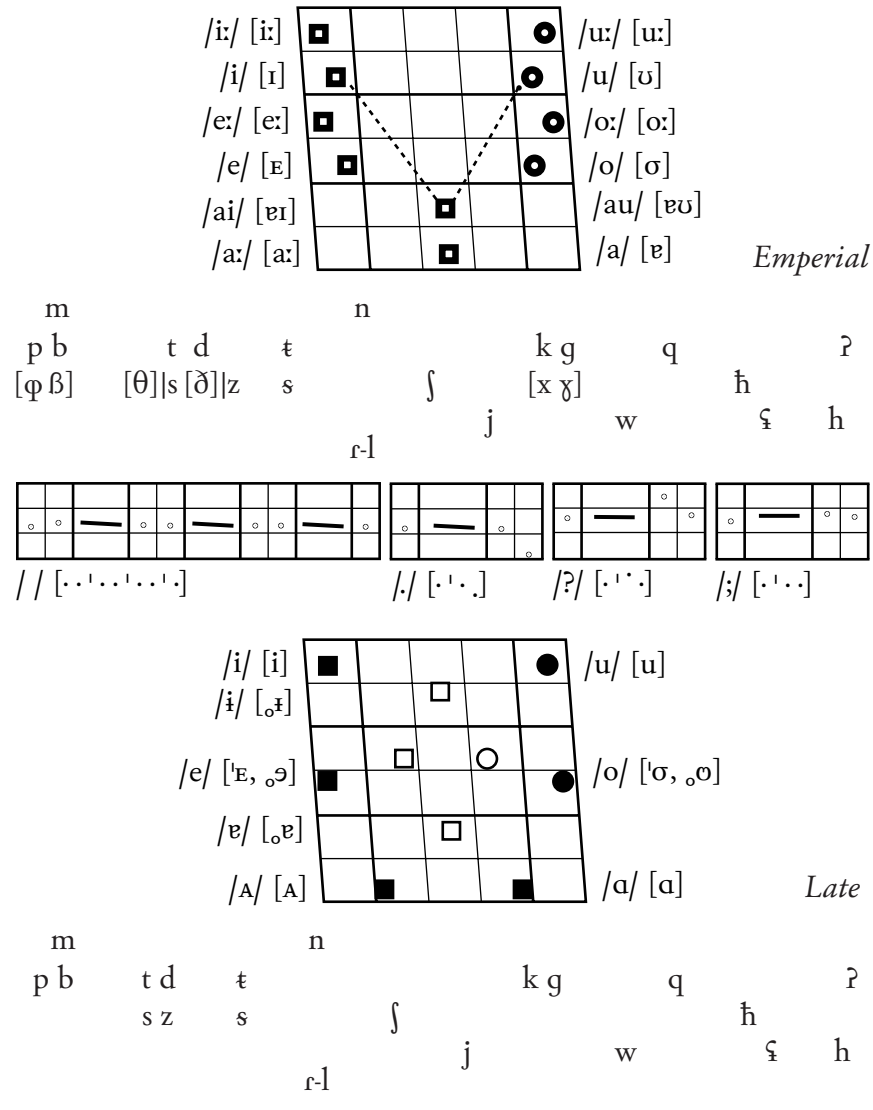
22.41. *Proto-Semitic* (Afro-Asiatic) had three *V*, both short and long, with taxophones resulting from the contact with uvular, uvularized, or pharyngeal *C* (and, in the case of /a, aː/, even from a total lack of such *C*: [ɑ, ɑː]). It had the diphthongs /ai, au/, which were also prone to the said influence. It had [n≡C] and *C* ≠ *CC*.



22.42. *Phoenician* (Afro-Asiatic) had the four short and five long *V* (narrow diphthongs) shown in the vocogram, even if [ə, əɤ] might be rather rare and almost always the result of neutralization. In addition to the *C* given, it presented three ejective obstruents in opposition; also *C* ≠ *CC* and [n≡C].

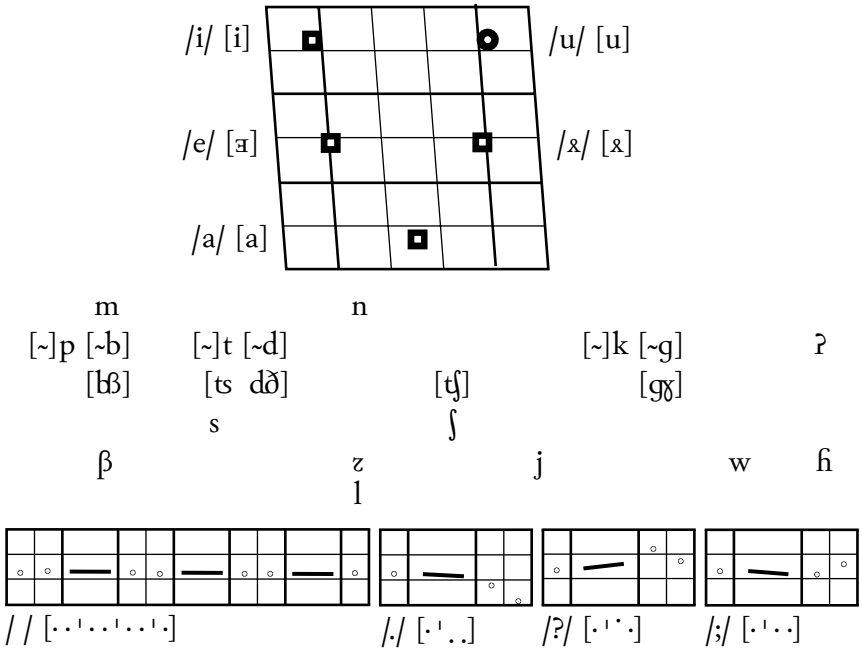


22.43. *Classical* or *Emperial Aramaic* (Afro-Asiatic) had the (both short and long) *V* and the two diphthongs given; besides, its stops were actual stops after *C* or when geminated, since it had *C* ≠ *CC*, but constrictive when prevocalic simple; also [n≡C].



Late Aramaic lost any diphthongs and vowel length, having only six short *V* and four unstressed ones; besides, its stop phonemes had no constrictive taxophones any longer.

22.44. *Elamitic* (or *Susian*, isolated), spoken in the territory of present-day southwestern Persia/Iran, had the five peculiar short *V* given in the vocogram. As for *C*, the indicated taxophones were important, as they solve many interpretation problems, including the difference between plain and prenasalized stops, in the case of ‹ambiguous› *NC* contexts.



22.45. *Sumerian* (isolated) only had the four short *V* given, but several *V* sequences were possible, which could be homochromatic, as well, such as /aa/. There was opposition between /p, t, k/ and /ph, th, kh/; the three phonemes in round brackets were marginal. It further had various *C* clusters (even of identical *C*), [n≡C] and three tonemes.