Vowels: *canIPA* & *offIPA*

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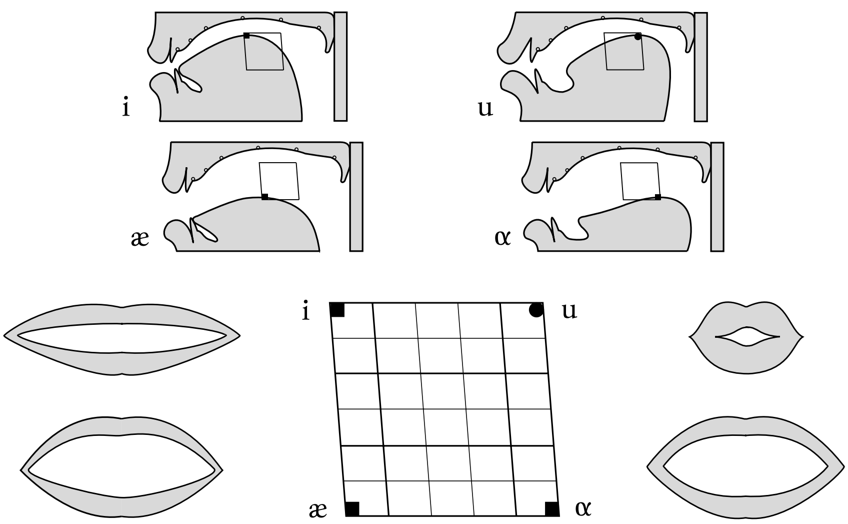
As an integration of Ꝕ 8 of our book *Natural Phonetics & Tonetics* (downloadable, in an updated version, from our *canipa.net* website), we will add something useful for a scientific way of dealing with the vowels of different languages, also in comparison with other, less useful, methods.

We have five articulatory places corresponding to the hard palate: *palatal*, *postpalatal*, *prevelar*, *provelar*, and *velar* (or *front*, *front-central*, *central*, *back-central*, and *back*). Vertically, we have six degrees of height, as shown.

Therefore, we consider the very *same point* of our tongue, namely at the center of the mediumdorsum (*ie* the absolute center of the back of the tongue). Thus, we can form the vocogram shown in *fig* 1. Even though any diagram with sharp corners is rather unnatural, it is still helpful to make the figure as schematic and regular as possible. Although simplified in this way, the diagram retains all of its usefulness in practical contexts, as will be seen in applications to languages and dialects.

Notice that, here, not to complicate things, we will deal only with the monophthongs of 23 different languages, including English '/iː, uː/', as they are still presented, although they are clearly actual diphthongs: /ii, uu/, as shown in *fig* 18.

fig 1. Extreme articulatory space to produce vocoids.



When, a century ago, Daniel Jones elaborated the so-called 'Cardinal Vowels' system, he considered the 'highest point' of the tongue (by *x*-ray) to delimit the space in our mouth where we produce the vowels for any language (but with a series of problems). In fact, that produced a deformed trapezoid, with the upper part *fig* 2. *canIPA* vocoids (& palatograms).

	front	front-central	central	back-central	back	front rounded	front-central round.	central rounded	back-central round.	back rounded		
	i	ᵎ	ɨ	ɯ	ɯ	ɣ	y	ʉ	µ	u	high (A)	CLOSE
	ɪ	ɩ	ᵻ	ɯ	ɯ	ч	ʏ	ᵿ	ω	ʊ	lower-high (B)	
	e	э	ə	ɤ	x	ø	ø	ɵ	ɷ	o	higher-mid (C)	MID
	ᴇ	ᴈ	ɜ	ɤ	x	ꝋ	ꝋ	ɞ	ɔ	σ	lower-mid (D)	
	ɛ	ɐ	ɐ	ʌ	ʌ	œ	œ	ɞ	ɘ	ɔ	higher-low (E)	OPEN
	æ	ᴀ	a	ɑ	α	ɶ	ɶ	ɞ	ɒ	ɒ	low (F)	
	0	1	2	3	4	5	6	7	8	9		
			unrounded					*rounded*				

PALATOGRAMS

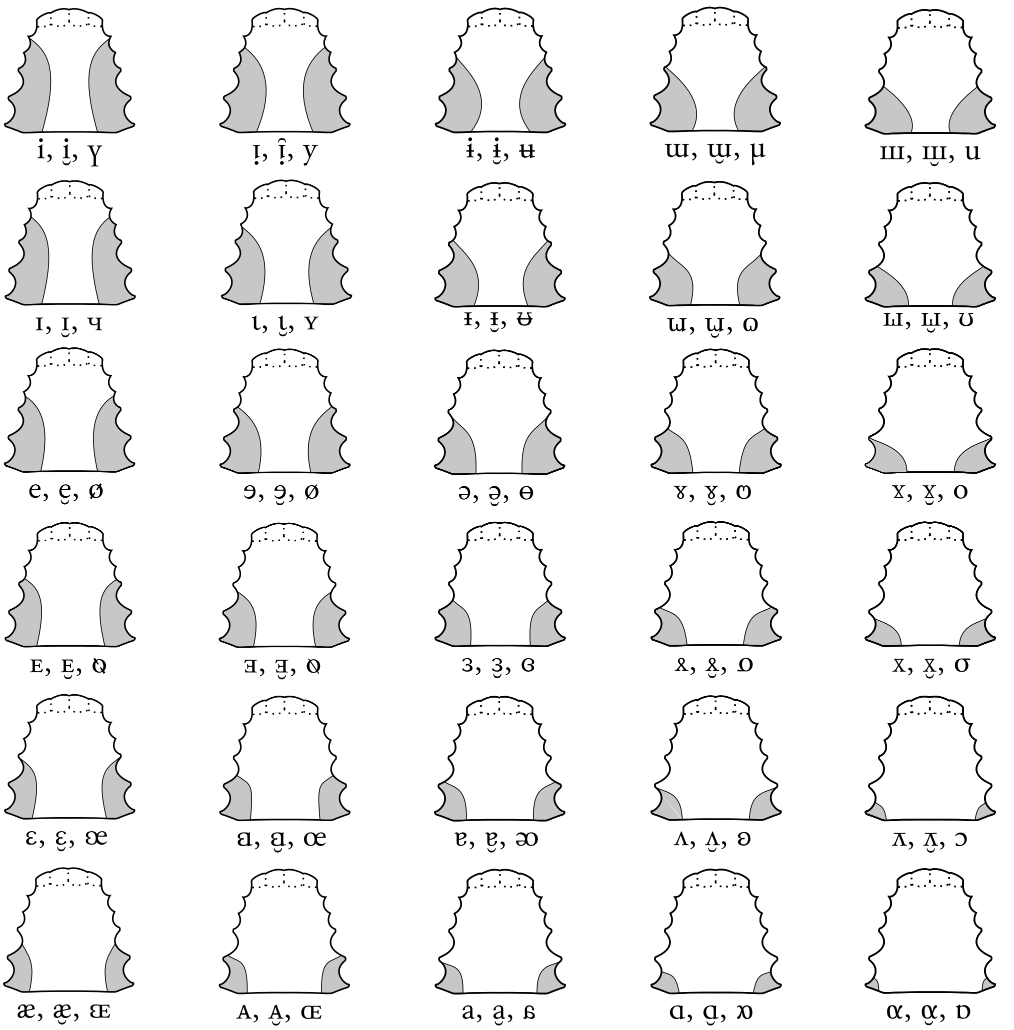


fig 3. Slit (or unrounded) *canIPA* vocoid vocograms.

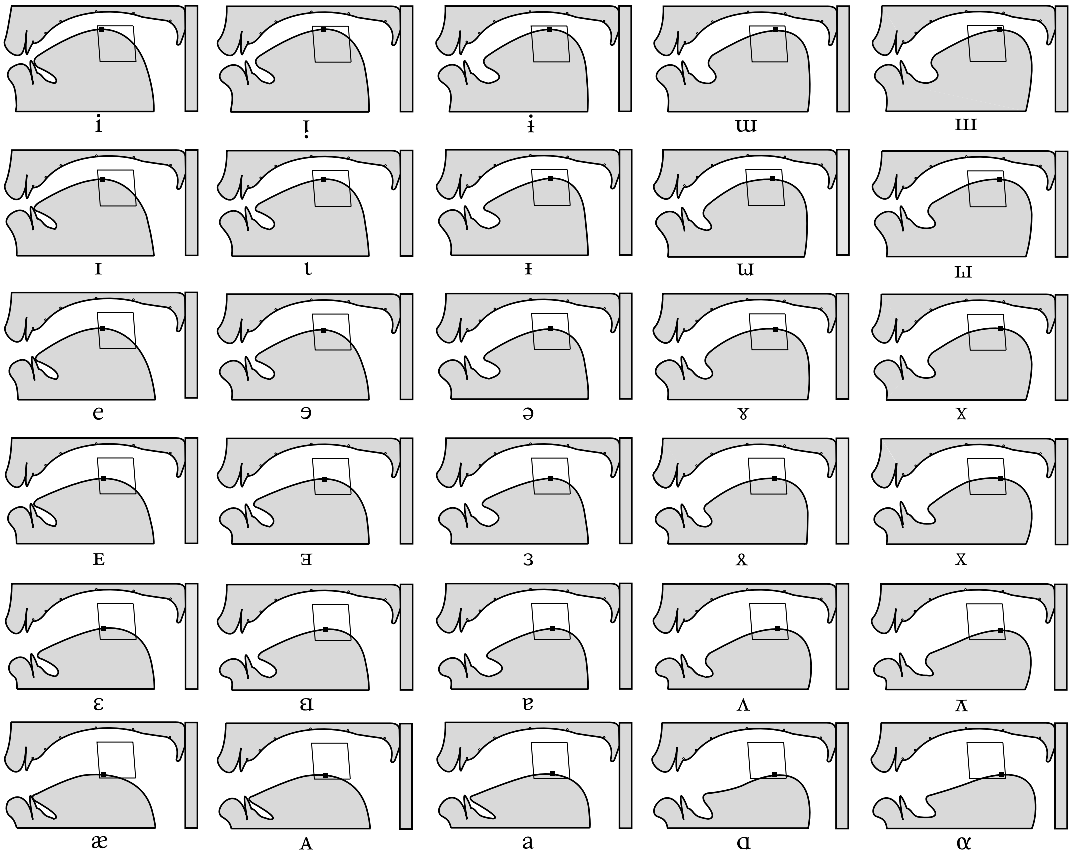


fig 4. Rounded *canIPA* vocoid vocograms.

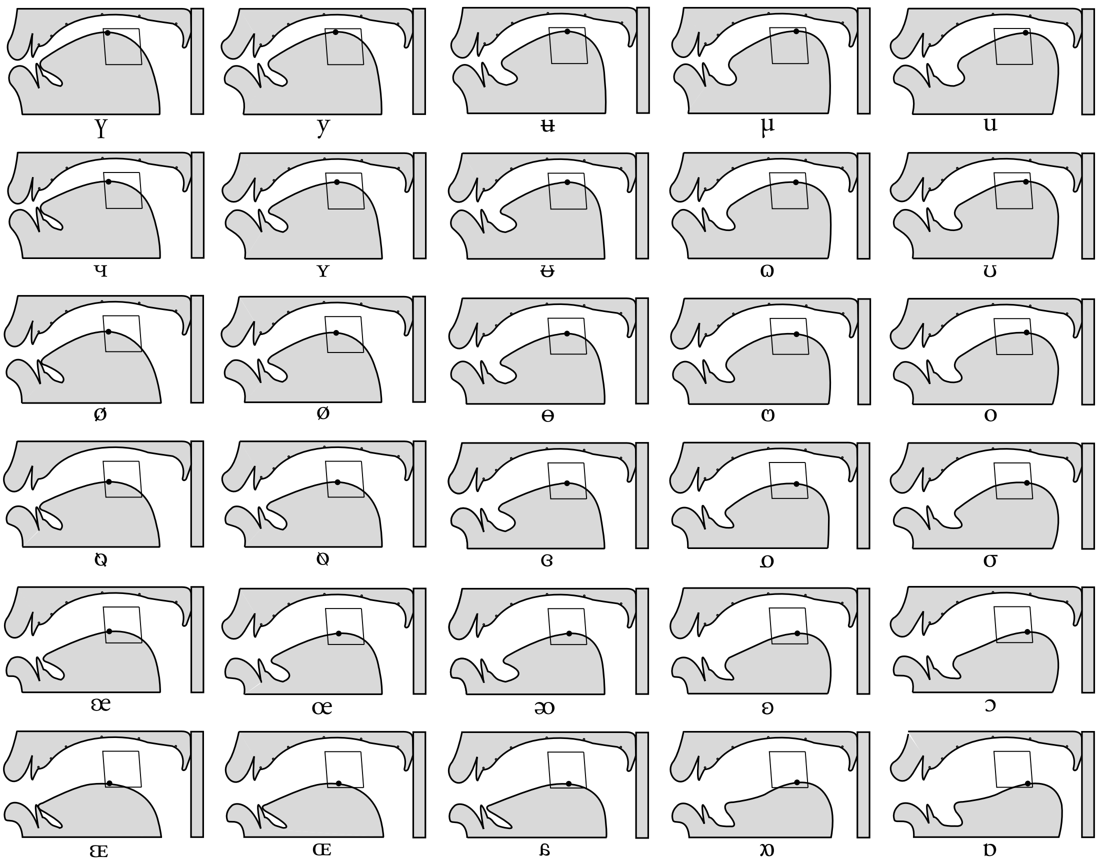


fig 5. Labiograms of *canIPA* vocoids (more specific ones will be introduced, if necessary).

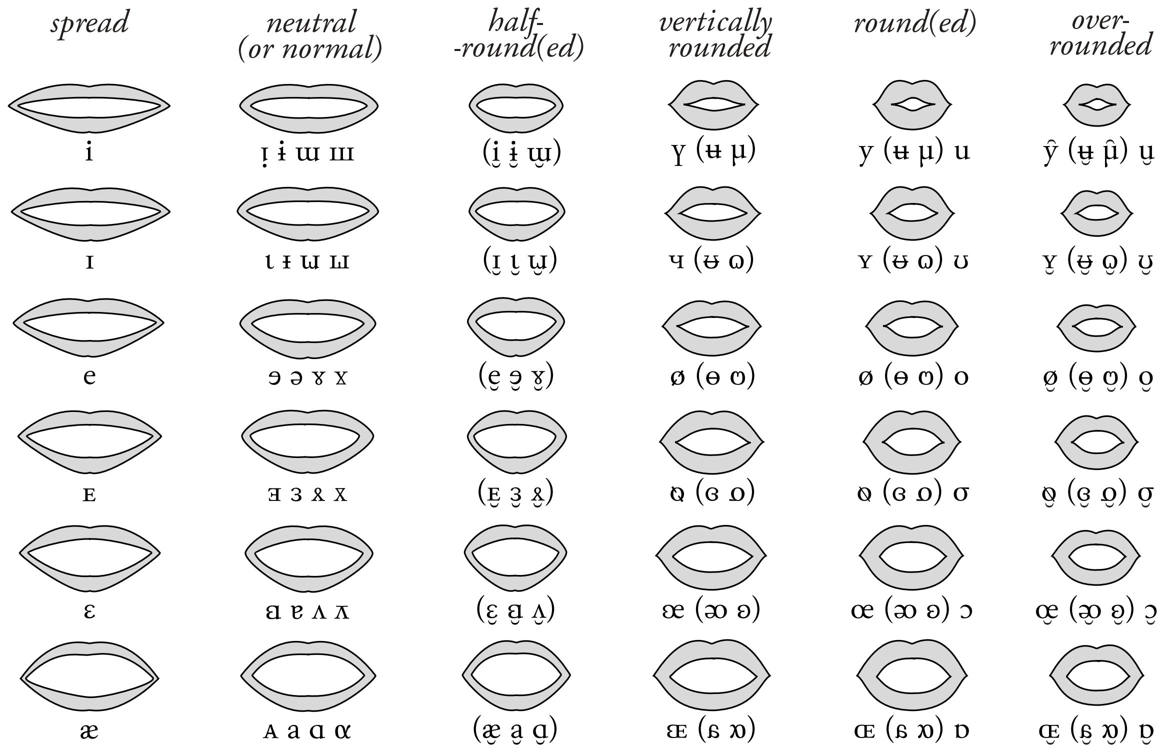


fig 6. General measures (in [mm]) for *canIPA* vocoids.

vocoids	*lips, for rounded V*	*lips, for un--rounded V*	*between the teeth*	*from palate to tongue*	*reference to the boxes*
high	4	6	4	6	5-7
lower-high	6	9	5	8	7-9
higher-mid	8	12	6	10	9-11
lower-mid	10	15	7	12	11-13
higher-low	12	18	8	14	13-15
low	14	21	9	16	15-17

much longer than the lower part, and the back part shorter than the front part. The reasons for these asymmetries lie in precise physical barriers: the tongue is in fact more mobile in the high-front area than in the low-back area.

fig 7 shows Jones's original diagram (on top) with 18 vowels, and its current shape (in its present-day *offIPA* system, on the right). However, there is the problem that those vowels are indicated by black dots, independently from the shape of the lips, while we distinguish three main lip positions (and others if necessary, to be accurate): *neutral*, *rounded*, and *half-rouded* (intermediate between the first two opposite types: [V̜]).

In addition, *fig* 8 shows those Cardinal Vowels on our vocogram: on the left, in their extreme points, but (on the right), they are placed in the more useful central positions in their boxes. However, the placement is done by using 'our' central point on the tongue.

fig 7. Jones's 18 Cardinal Vowels (on top) & 28 official *IPA vowels* (in two presentations).

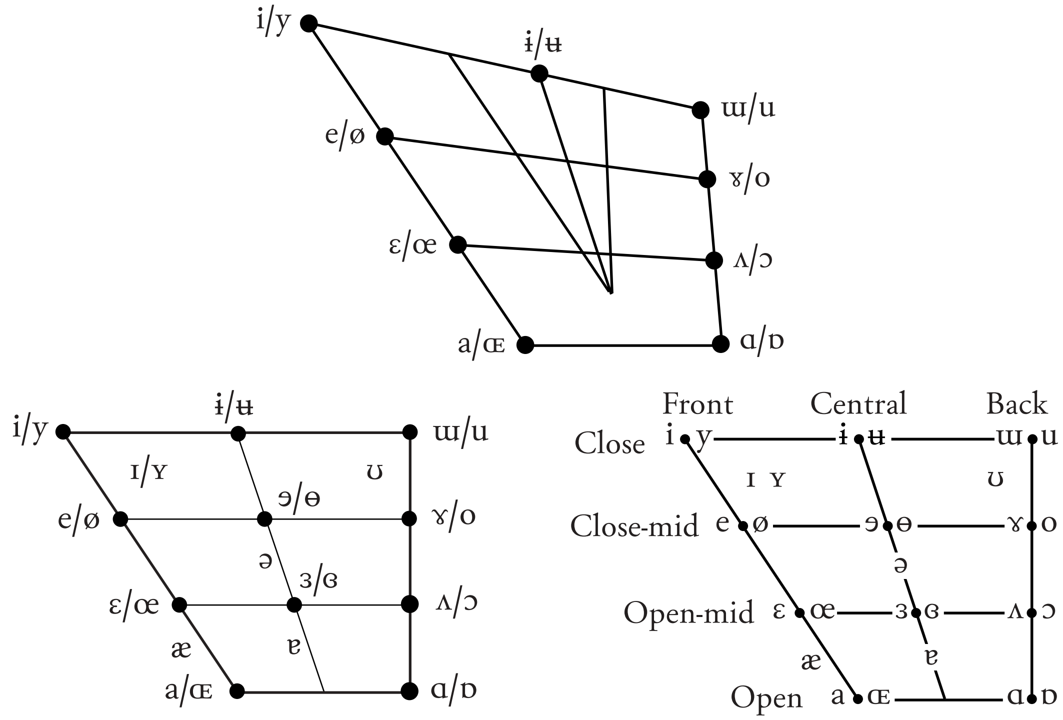
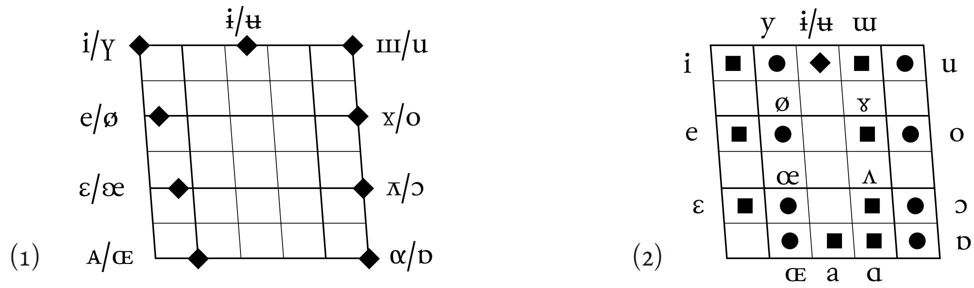


fig 8. The Cardinal Vowels on *canIPA* vocograms.



The markers placed in *fig* 8^1 are those which, in our convention, are used for representing vocoids with 'intermediate' lip position, that is, half-rounded lips. However, in this diagram, the meaning of the diamond marker is different: to indicate simultaneously the two different articulations, rounded and unrounded, which were intentionally produced in the same points.

The markers are located in the most extreme points, according to the criteria followed by Jones – in fact, their purpose was to bound the space of vocoids.

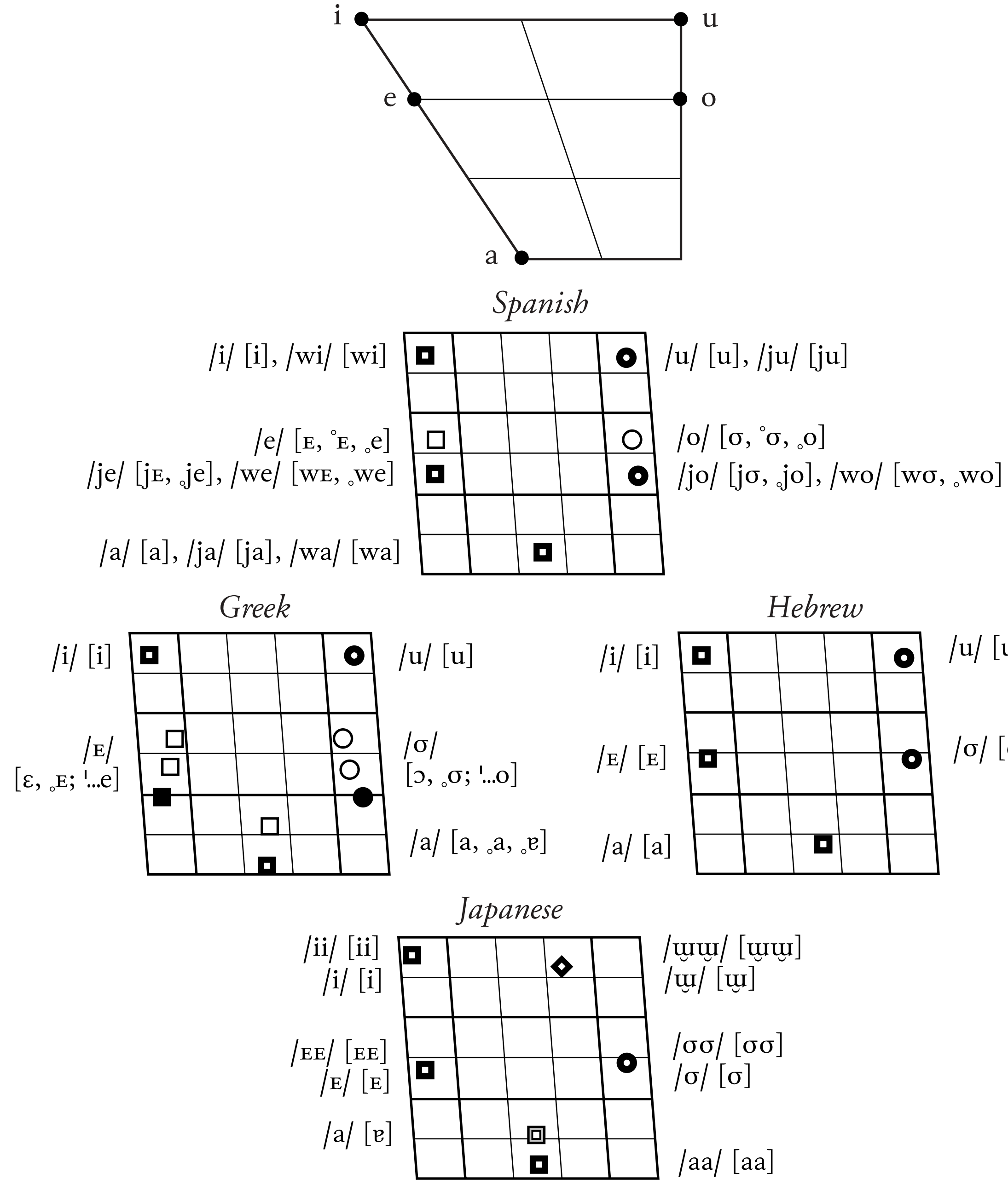
In *fig* 8^2, instead, we have placed the appropriate markers in the centers of the relevant boxes, so that they will have our canonical values. In this way, the spirit of the two approaches to the vocoids of the world's languages can be better compared.

The central location is fundamental, although it is not necessarily the most frequent or 'normal' one (just as the peripheral 'cardinal' locations of Jones were not the most common, either). The most important thing is to be able to place the markers exactly where they have to be, after having listened to them very carefully and repetedly, for the languages we want to describe.

Here are some (necessary) remarks on the way the *official* IPA Cardinal Vowels are 'used' by linguists and even 'phoneticians'. Most of them, rather than actually trying to identify the correct places corresponding to the vowels of certain languages, often choose the most simple (and familiar) symbols, perhaps not to trouble or annoy their potential readers (and spineless publishers).

However, they make another, even worse, decision in their choice of where to place the vowel markers. Probably because they are not really 'professional', they simply 'copy' the official positions corresponding to the symbols 'chosen' hurriedly and superficially. Of course, the 'poor' symbols used in such trapezoids fail to indicate exactly the actual sounds of many languages.

fig 9. A frequently used bad trapezoid with *five* markers, and the vocograms of four languages that, despite having the 'same' 5 vowel phonemes, are actually quite different.



Often, the 'description' of certain languages do not show the chroneme (/ː/), simply preferring to use different symbols, instead, as we may find for Persian, that has /iː, ɑː, uː/ (ﬁg 12) and *six* markers.

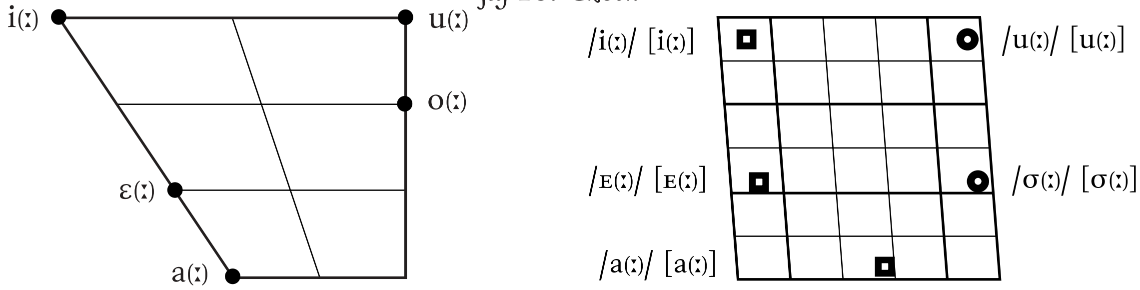
So, too frequently, they place markers exactly where they find the 'unhappy' symbols, on the official trapezoid. This is due to their clear inability to perform such a task. Too 'faithfully', they also place markers on the external and internal lines of the trapezoid. Therefore, we happen to find identical figures for different languages, as for Spanish, Greek, and Hebrew (and even Japanese, whose '/u/' phoneme is /ɯ/ [ɯ̯], including [ɯ̰], as shown in our vocogram)! See ﬁg 9.

In fact, we will present, in close proximity, the absurd trapezoids that we find too often, for comparison with our vocograms. We do not simply show the 'plain' vowel phonemes (with no taxophones), but their exact places, including taxophones (which should not be omitted, in serious books and articles).

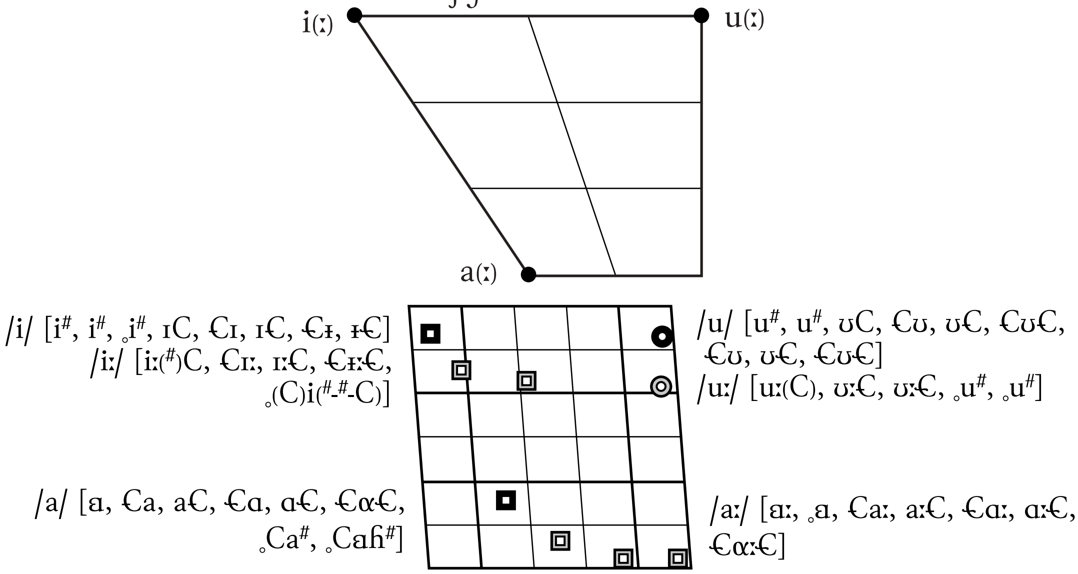
It will appear clear, at once, that such trapezoids cannot be parts of serious descriptions of languages. Indeed, such figures are only feigned phonetics, quite different from natural phonetics (allow us to say). The *non-canIPA* marker collocations that we place on *offIPA* trapezoids are among the most absurd possible ones found wasting time looking at many 'works'. It is true that some are slightly better, but others are even worse.

ﬁg 10 shows a slightly different *offIPA* trapezoid, but still with *five* markers, for

ﬁg 10. *Czech*



ﬁg 11. *Arabic*



Czech. An even simpler trapezoid is shown in fig 11, for Arabic, with just *three* markers, to be compared with ours for its taxophones.

fig 12, for Turkish, shows *five* markers for eight phonemes, although it also has the corresponding long phonemes, which should have the chroneme, /ː/.

fig 12. *Turkish*

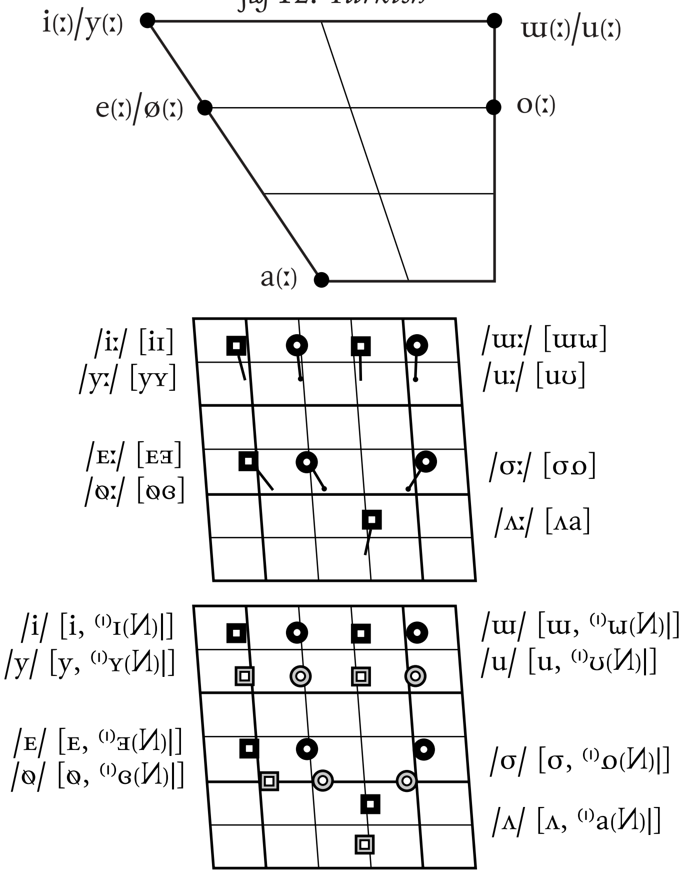
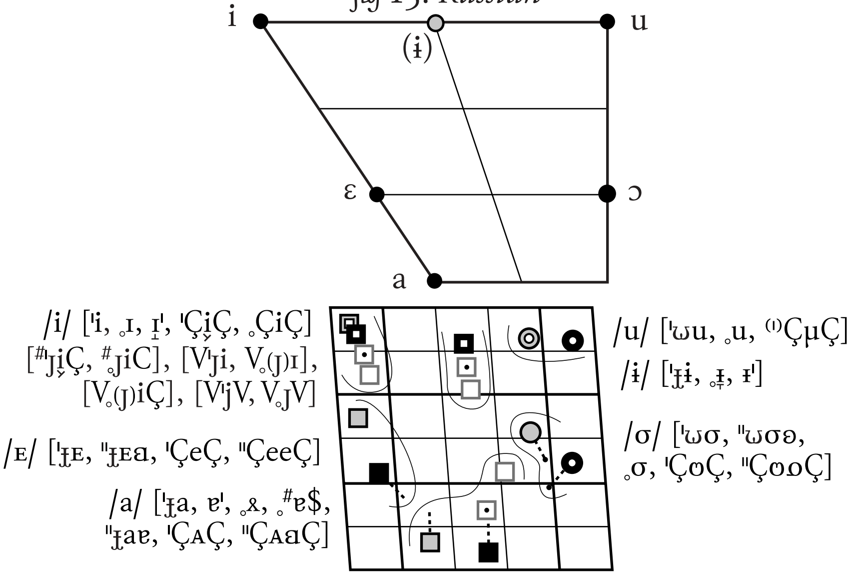


fig 13. *Russian*



Also *fig* 13, for Russian, frequently and incredibly, has only *five* markers, but let us add, at least, a *sixth* one for /ɨ/ (which is still 'Sovietly' considered a simple taxophone or /i/)! Of course, we could not help but placing /ɨ/, in grey, as everyone should frankly do.

fig 14. *Persian*

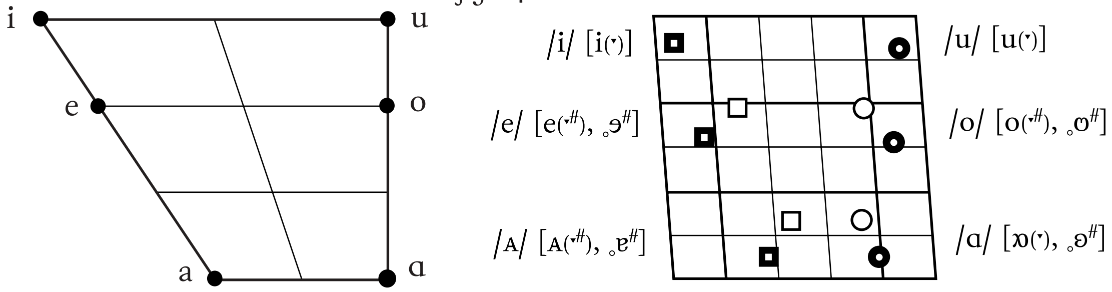


fig 15.1. *Hungarian*

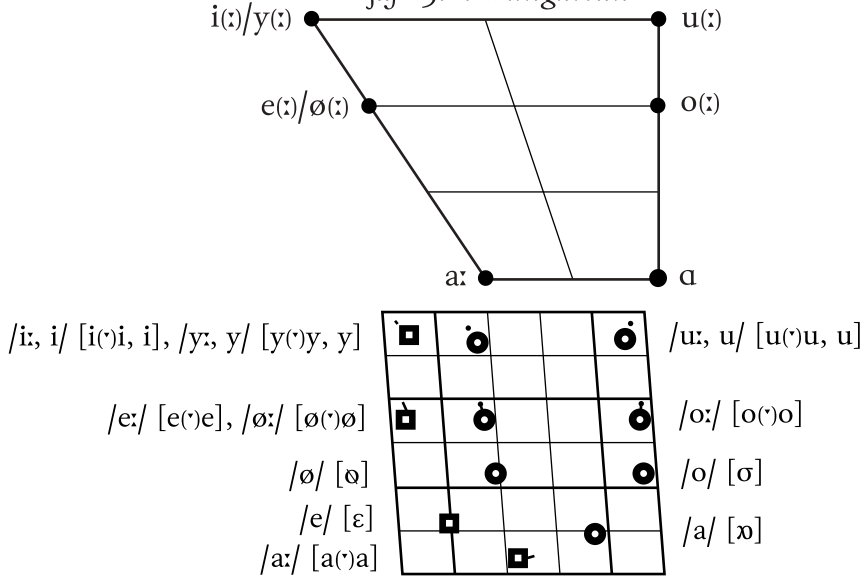


fig 15.2. *Bulgarian*

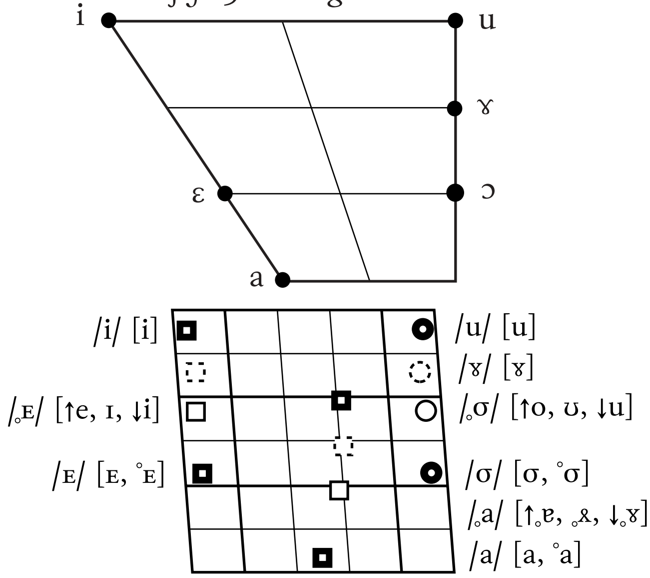


fig 15.3. *Finnish*

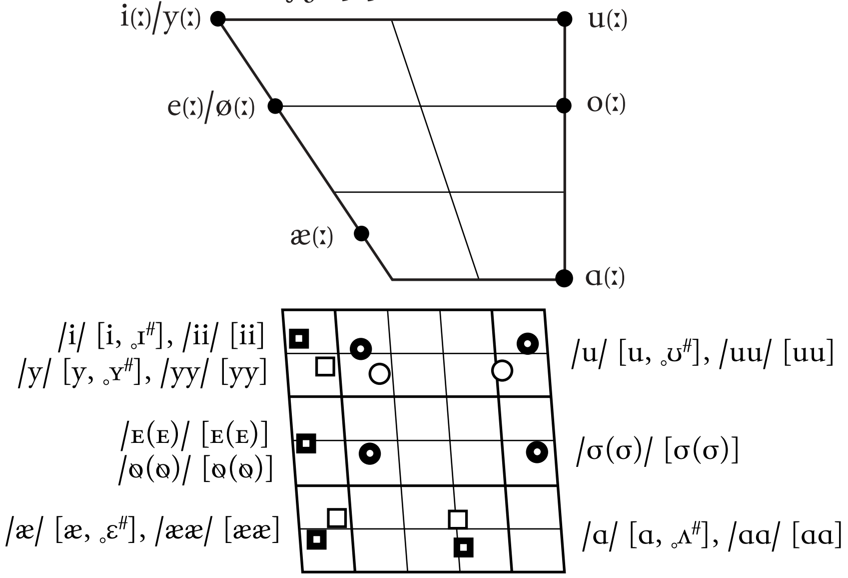
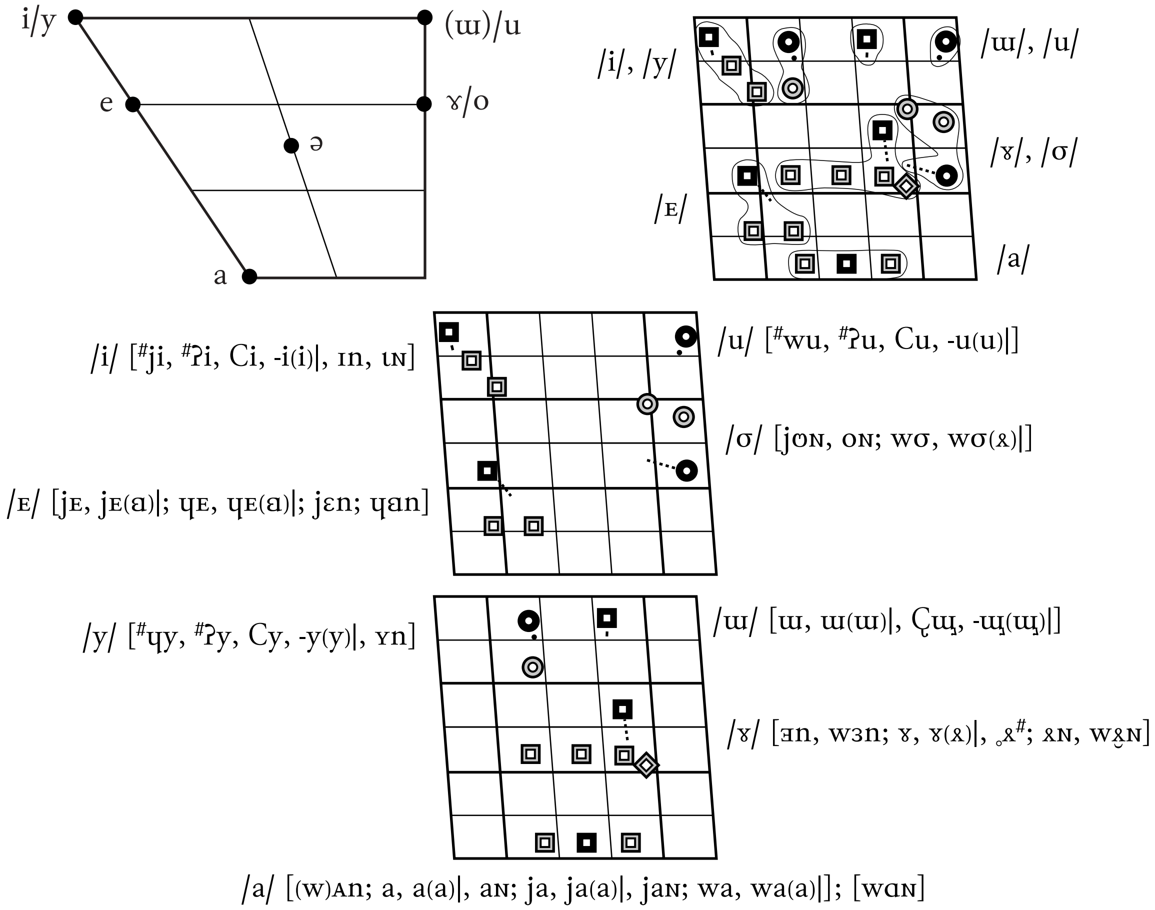


fig 15.4. *Chinese*



Other trapezoids with *six* markers, but with different phonemes are shown in fig 14, for Persian. In addition, we find fig 15, for Hungarian (1), Bulgarian (2), and Finnish (3), including Chinese (4) for which we added the necessary and inevitable /ɯ/, in brackets, although in the *offIPA* 'place', with /u/!

fig 16 shows Italian with *seven* phonemes and markers. fig 15 shows *eight* markers for Brazilian (1), German (2), Norwegian (3), and Korean (4, with chronemes). For Brazilian, we show five nasalized vowels, that are *not* real phonemes, because it is true that they are nasalized, but in sequences with nasal contoids, generically indicated by [N], which are clearly present and audible (differently from those of real French).

French is shown in fig 16, with Danish. Both have *nine* markers, but with a number of phonemes and chronemes. fig 17 shows Swedish with its *ten* markers, but a number of phonemes and chronemes.

fig 16. *Italian*

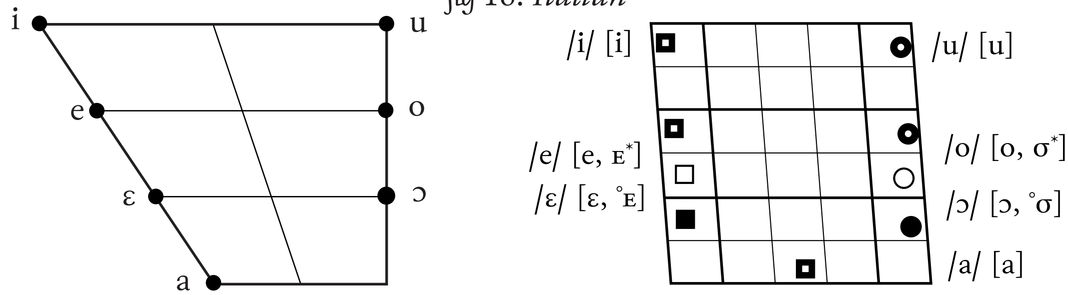
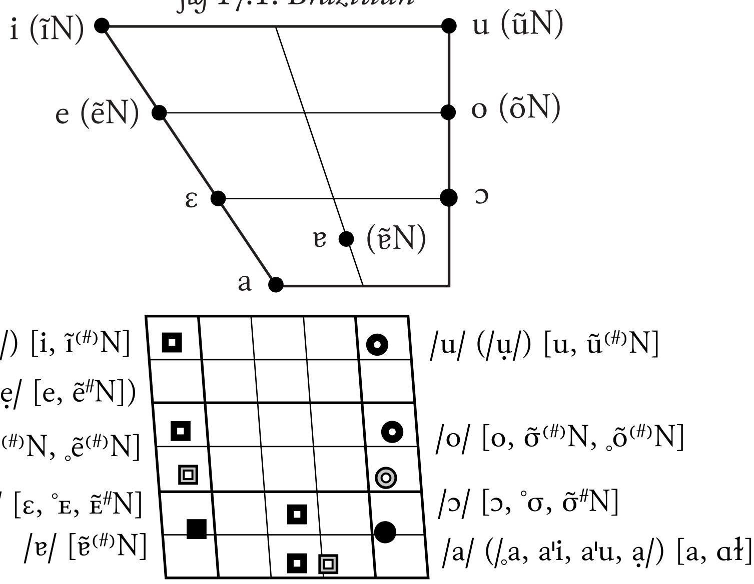


fig 17.1. *Brazilian*



Let us end with fig 18, for British English, with *twelve* markers, including two real diphthongs, [ɪi, µu] (and taxophones, in the third vocogram of ours), although incomprehensibly still 'represented' as '/iː, uː/', by practically any (even intentionally serious) book. Notice that we could not avoid indicating the numerous vocalic taxophones plus //l// (actually, semi-lateral velarized) [ɫ].

fig 17.2. *German*

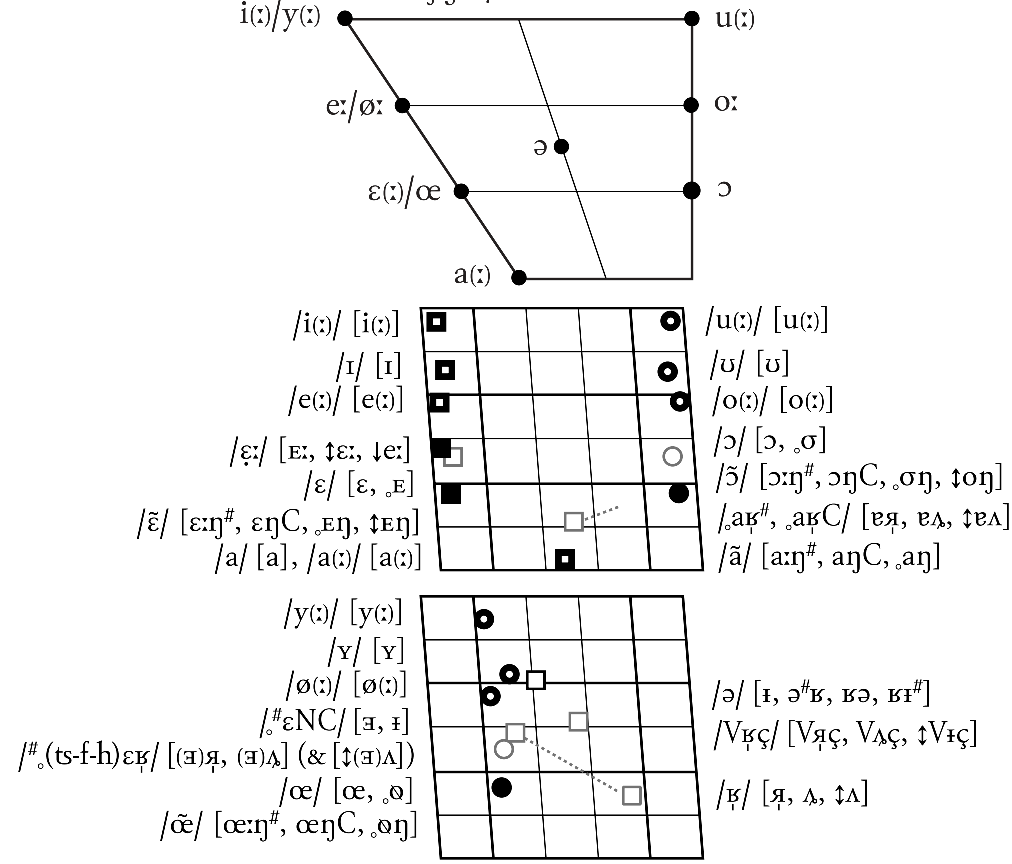


fig 17.3. *Norwegian*

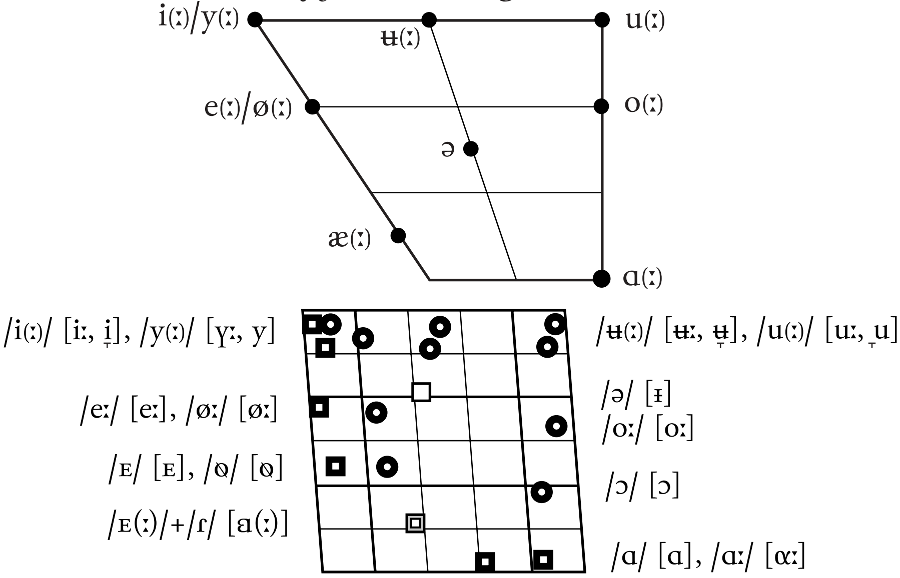


fig 17.4. *Korean*

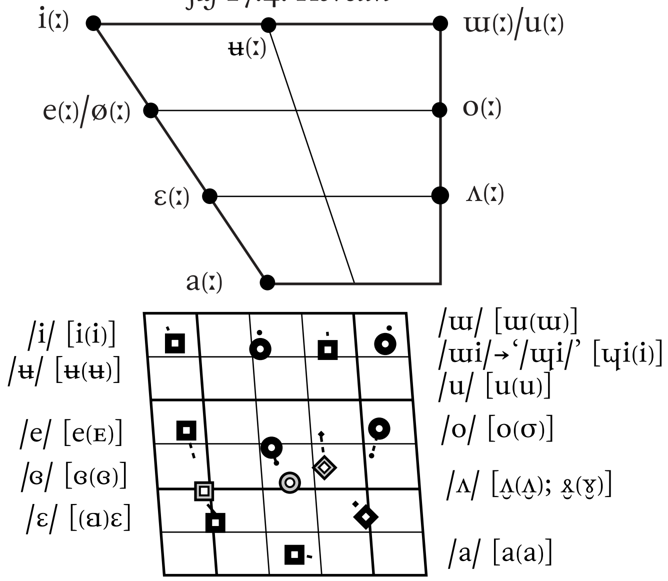


fig 18.1. *French*

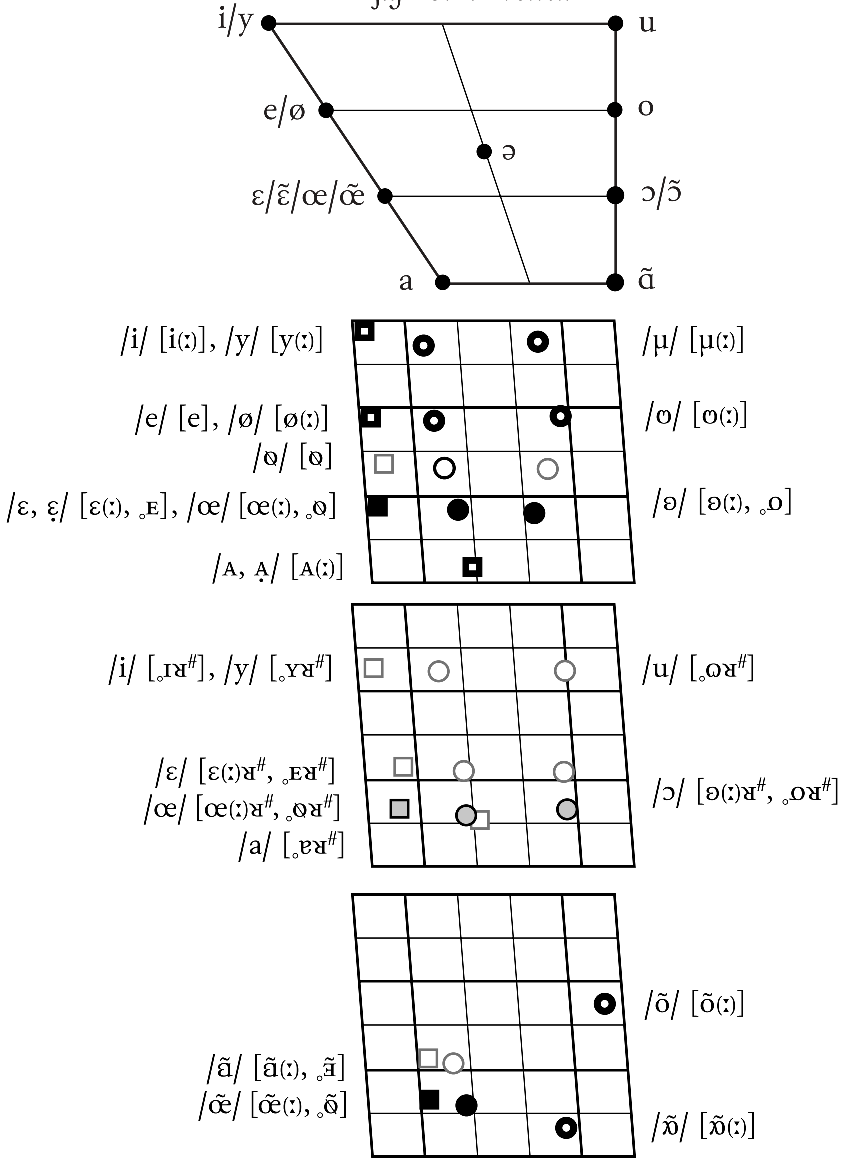


fig 18.2. *Danish*

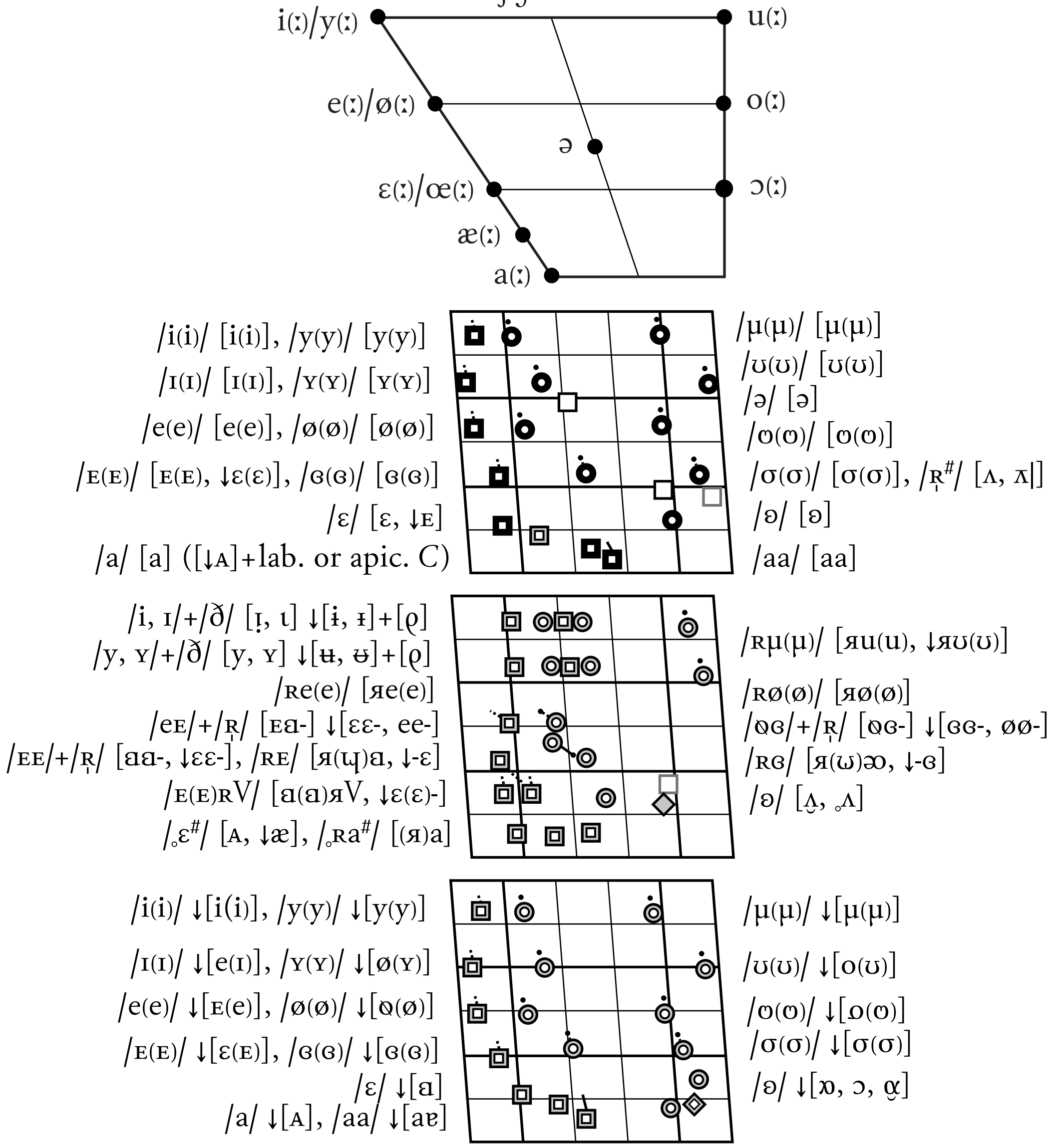


fig 19. *Swedish*

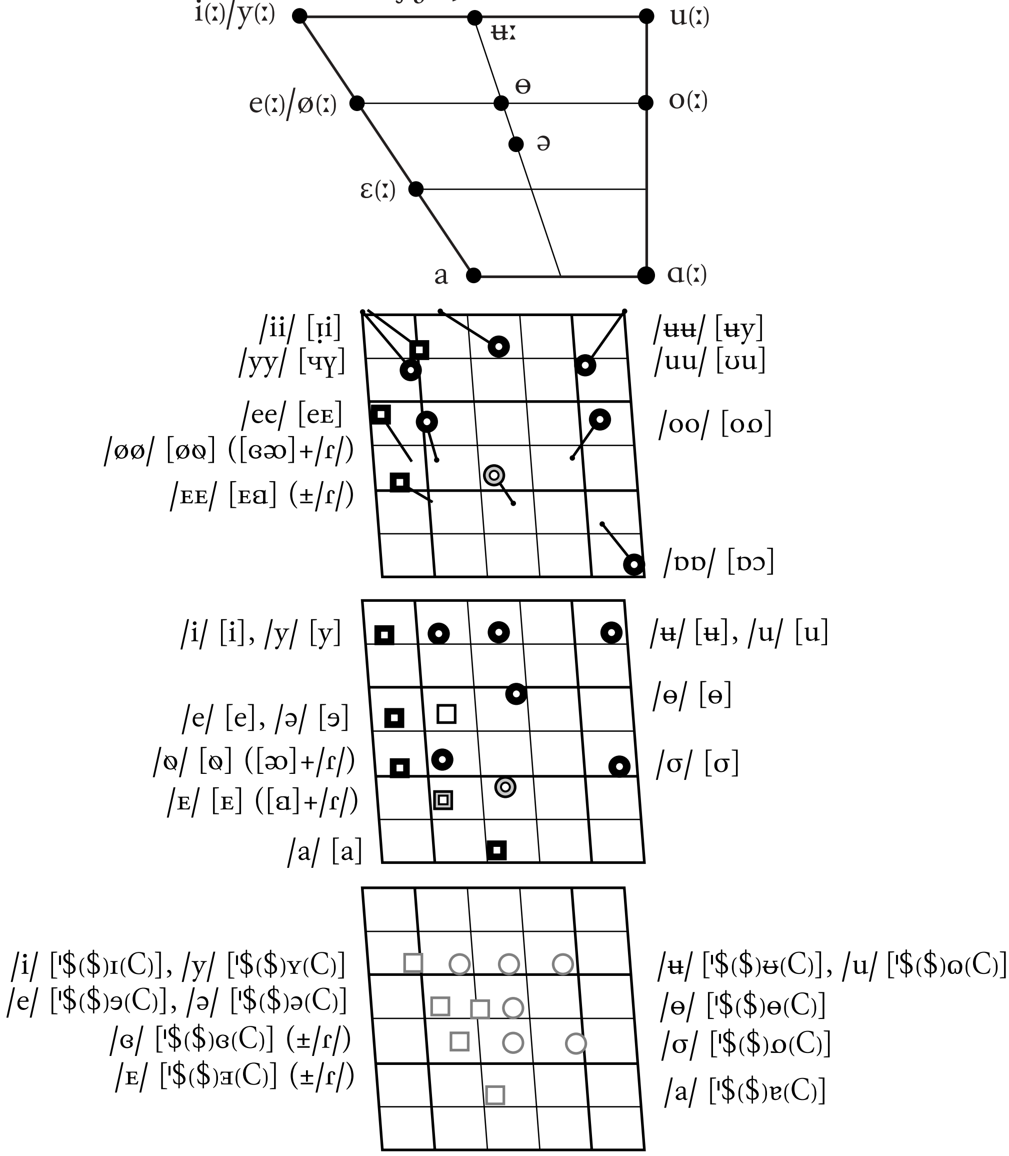
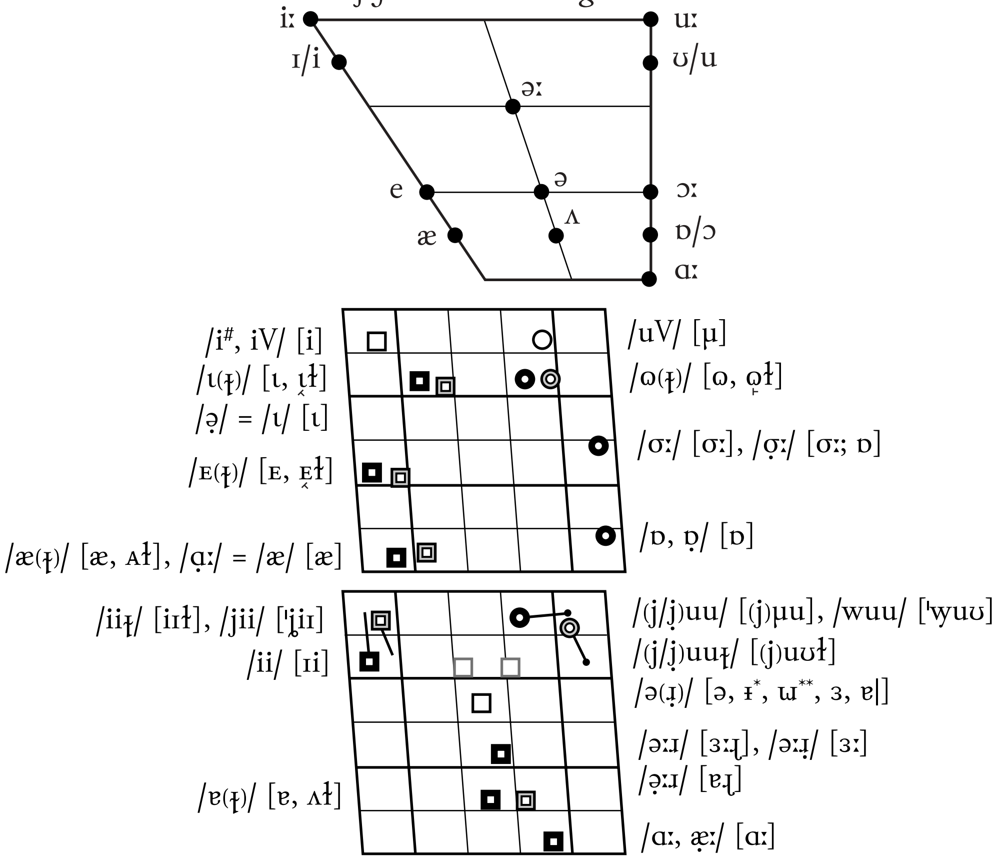


fig 20. *British English*



* *in contact with apical C,* ** *in contact with velar C*