

7. The official *IPA* & other notations

Official *IPA*

7.0. We will present –for informative purposes– the official *IPA* chart (fig 7.1, which we indicate as *offIPA*), as the result of the latest reform (brought about in 1989-1993, with corrections in 1996), which –almost playfully, but not without very good reason– can be considered a reform of the past century – indeed, of the past... millennium! Again, as we have done for the preceding, introductory, part we will be using the –generic and phonological– terms *VOWEL* and *CONSONANT*, since these are still beginning, general, levels.

Of course, when we deal with phonetics in specialistic terms (from the next chapter onwards), for enthusiasts, for «experts», we will accurately distinguish, by using *VOWEL* and *CONSONANT*, at the phonemic (or graphemic) level, but *VOCOID* and *CONTOID*, at the proper phonetic level, which can satisfy real scientific and human curiosities, in order to enjoy the wonderful world of linguistic sounds, with all its variegations (which remind one of the rest of the natural world very much: zoology, botany, mineralogy, astronomy, &c).

Consonants

7.1. If we observe the official chart, we find consonants given first, although it might have been better to start from vowels. However, in the consonant table (at the beginning of fig 7.1), we immediately notice that the manners of articulation are slightly different from those presented in our early simplification (fig 6.2, and the specialist chapters: ¶ 9-10). In fact, their order is: *stops*, *nasals*, *trills*, *taps & flaps*, *fricatives*, *lateral fricatives*, *approximants*, *lateral approximants*. Instead of providing a global view, it moves along by slight internal differences, as between *stops* vs *nasals* (≡ stops with lowered velum).

The chart goes on by comparing *trills* with *taps* (including *flaps*). In our mini-table in fig 6.2, which shows the fundamental types of manners and places of articulation, flaps are not given, as seems to be more suitable for a first, high-impact, approach. Our rigorous treatment will start from ¶ 8 to ¶ 14, although symbols like [ɾ] have already been used right from the start. However, attentive and keen readers of a book such as this should first go through the content and index pages and the various figures, in order to understand their way around the book, which will make future reference to specific topics easier.

The official table also shows the «fricatives» (an auditory term instead of our ar-

ticulatory one, CONstrictives) vs <lateral fricatives> (for our CONstrictive LATERALS); also *approximants* (ie central approximants) vs *lateral approximants* (or simply *laterals* – since even *nasals*, strictly speaking, are *nasal approximants*, rather than <nasal stops>, seeing that air is not completely blocked and, above all, that they are not <noisy>).

7.2. One may immediately observe that the table gives no <affricate> manner (an auditory term instead of our articulatory one, STOP-STRICTIVE). Only at the end of the <other symbols> addition, do we find that name, accompanied by the indication: <affricates and double articulations can be represented by two symbols joined by a tie bar if necessary>. And here some of the absurd notational complications arise, since symbols like [ts, tʃ] –which, before the <reform>, were highly-recommended <expert> variants (although never clearly withdrawn by the reform)– are no longer indicated. Instead, one can infer that their <normal> notation is meant to be <[ts, tʃ]>, exactly like [ts, tʃ] sequences, which actually occur in languages of the world. The <sophisticated> official alternative consists in making use of the clown-like notation <[ts, tʃ̥]> vs <[ts, tʃ]> (or <[ts, tʃ]> vs <[t-s, t-ʃ]>, respectively, or even <[t.s, t.ʃ]> for the latter, in case it coincides with syllabification). Officially, the <boat> ([⏟]) or the <umbrella> ([⌒]) are also possible for double articulations, ie with two (simultaneous) coarticulations, as for the velar and labial ones, <[k̟p, g̟b]>, corresponding to our unitary symbols [kp, gb].

7.3. We will now examine a serious problem in the official consonant table, in relation to places of articulation. First of all, it is absurd to maintain the ambiguous term <retroflex> (instead of POSTALVEOLAR), which more than a place of articulation could be a possible COARTICULATION with many fallacies. But the worst thing is the presentation of the section from DENTAL to ALVEOLAR, up to <postalveolar> (which has deceived quite a few people who try to do phonetics with no good grounding).

This inaccuracy is directly responsible for published pages <telling> that in most languages (including neutral Italian) [t, d; s, z] would be <alveolar> (instead of dental); and even English [ɹ] would be <alveolar> too! A brief moment of quiet meditation would be sufficient to realize that this (serious) mistake is brought about by that absurd presentation, with those pseudo-science subdivisions. In addition, it is seriously misleading to define [ʃ, ʒ] as <postalveolar>; again, by actually observing the real articulation of [ʃ, ʒ], and of [tʃ, dʒ] as well (cf fig 6.6), one should easily realize once and for all that we are dealing with three coarticulated places, not only one; in fact, [ʃ, ʒ; tʃ, dʒ] are POSTALVEO-PALATAL PROTRUDED contoids.

The true POSTALVEOLAR articulations are, for example, [ɹ, ɻ; ʂ, ʐ; ɻ̥] (ie <presumed> retroflex sounds). The reform has misplaced, or ignored (?), the <palato-alveolar> place, which used to indicate [ʃ, ʒ; tʃ, dʒ] slightly better, although ambiguity with <alveopalatal> was very frequent. Furthermore, up to the 1951 reform, <retroflex> rightly stood for *postalveolar*; whereas the 1979 reform added <postalveolar>, while maintaining <retroflex>. In addition, there were <palatalized palatoalveolar> sounds (ie our POSTALVEO-PALATAL, with no lip rounding), [ʃ̟, ʒ̟], which have now disappeared and officially must be rendered as <[ʃʲ, ʒʲ]>!

7.4. Let us now consider the additional symbols (and of course the articulations and, consequently, the sounds) we find in the official table by comparing them with what was used as a first impression to be developed gradually (cf fig 6.2). Nonetheless, from our own point of view, the official table is too limited to be sufficient or useful. In fact, to produce more realistic transcriptions –within the *off*IPA– one must resort to compromises, by using complicated diacritics. This is the reason why, although *off*IPA is better than any other ‘phonetic alphabet’, its limitations spontaneously call to mind the negative feelings connected to *off* in various phrases, as for instance *an off day* – quite different, of course, from *a day off*!

However, by following the official order (which is different from what we consider more logical and convenient from an articulatory point of view), for STOPS we have PALATAL <[c, ɟ]> [c, ɟ] (as in Greek *kýrios*, *anánkē* (κύριος, ἀνάγκη) [ˈciːrjɔs, aˈnaɲji]) and UVULAR [q, ɢ] (Arabic *qadiim*, *suuq* [qaˈdiːm, ˈsuːq], Persian *engeraaz* [əŋgəˈrɒːz]), and LARYNGEAL (or GLOTTAL, [ʔ], which is placed here among voiceless sounds, being correct for two thirds, since the vocal folds are not vibrating, although they are not open either, as for true voiced sounds, but rather tightly closed...).

In the table of the ‘reformed’ IPA, which is mainly PHONEMIC (although it is still called PHONETIC), among the NASALS, we also find (amazingly enough) the LABIODENTAL, [ɱ] (*envy* [ˈɛɱvi] /ˈɛnvi/), which is not phonemic in any language! As a matter of fact, also in Teke (spoken in Congo), what has been described as </ɱ/> is actually the short homorganic element of prenasalization in /-bv/ [-bv]). Besides, we find POSTALVEOLAR (<retroflex>) [ɳ] (Hindi *kaaran* [kaˈrɐɳ], Norwegian *korn* [khuːɳ]), and UVULAR [ɴ] (German *Zeitung* [ˈtʃhaetʊŋ] /-ʊŋ/; also seen in the Persian example given above, as a taxophone of /n/).

Among trills, a bilabial [ʙ] is added (as in Asua, spoken in [the D. R. of] the Congo, *bo’e* [ˌbɔʔɛ]). Then we find an alveolar tap [ɾ] (as in Italian *rifare* [riˈfare] /riˈfare/, or Spanish *cara* [ˈkaːra]), but also a postalveolar (ie <retroflex>) flap <[ɽ]>, which has a different nature (as we will see). This must be one of the reasons why too often, the terms *tap* and *flap* are dangerously mistaken or misused.

7.5. Among the CONSTRUCTIVES (<fricatives>) we find BILABIAL <[ɸ, β]> (for our [ɸ, β], whereas we prefer to use [ɸ, β] for the approximants, which occur more <normally> in the world’s languages), as in Ewe: *èvè* [e_βe] <Ewe (language)>, different from *èvè* [e_ɣe] <two> and *fú* [ˈɸu] <bone>, different from *fú* [ˈfu] <feather>. Let us briefly note the graphemes *F/f* and *F/f*, or *U/v* and *V/v*, by comparison with *F/f* and *V/v* – let us look at their shapes and *serifs*, since the lower cases are *all* different: three types of *f* and three of *v*. The <normal> or <unmarked> ones have intermediate shapes between the two extreme ones, which are used distinctively (although just two forms would suffice, as happens with upper cases).

Then we have (slit) DENTAL [θ, ð]: *this thing* [ðisˈθiŋ:], in addition to various (grooved) dental [s, z], *seizing* [ˈsiːziŋ], Latin-American Spanish *seis*, *desde* [ˈseis, ˈdesðe, -zðe], which are to be distinguished from the ALVEOLAR ones which we transcribe as [s, z] – Iberian Spanish: *seis*, *desde* [ˈseis, ˈdezðe]; Greek: *zéstē* (ζέστη) [ˈzɛʃ-]

ti]. After <postalveolar> [ʃ, ʒ] (ie our POSTALVEO-PALATAL PROTRUDED), we find <retroflex> [ʂ, ʐ] (ie just true POSTALVEOLAR), as in Swedish: *Lars* [ˈlaʂ], Mandarin Chinese: *shū* [ʂu], Vietnamese: *số* [ˈʂoo], *ru* [ʐuu]); PALATAL <[ç, ʝ]> [ç, ʝ], in Greek: *chióni*, *giágia* (χιόνι, γιάγια) [ˈçɔˈni, ˈjaˈja], German: *ich* [ˈʔiç]; VELAR <[x, χ]> [x, χ], in Greek: *láchano*, *gála* (λάχανο, γάλα) [ˈlaˌxanɔ, ˈgaˈla], in American Spanish: *jefe* [ˈxɛˈfe], general Spanish: *luego* [ˈlweˈχo]; UVULAR [χ, ʁ], in Iberian Spanish: *jefe* [ˈχɛˈfe], French: *roi* [ˈʁwa], German: *rot* [ˈʁoːt]; and voiceless PHARYNGEAL [ħ], in Arabic: *hubbi*, *fahḥaaʃ* [ħubbi, faħˈhaːʃ].

Unfortunately, in this row (of <fricatives>) we also find some articulations which are evidently approximant. The first is the voiced pharyngeal <[ʕ]> (Arabic: *baʕda*, *salʕ* [ˈbaʕda, ˈsalʕ]). But we prefer to subdivide more clearly and exchange symbols: PREPHARYNGEAL (<pharyngeal>) [ʕ] and PHARYNGEAL (<epiglottal>) [ʁ] (in any case, always approximant!).

The other two pseudo-constrictives –<fricatives>– are (voiceless and voiced) LARYNGEAL [h, ɦ] (*hat*, *behave* [hæt, buˈheɪv, bə-, -h-]; Hindi: *bahut* [beˈɦut]), which are decidedly approximant! Thus they are a diphonic pair, although both of them are lenis (or lenited) since the aretynoids are drawn away (cf fig 4.4).

The CONSTRUCTIVES (<fricatives>) seen up to now are all normal, or CENTRAL, ie produced with no deviations from the most common articulations along the central part of the ARTICULATORY CHANNEL. The table then introduces a <lateral constrictive> articulation, ie CONSTRUCTIVE LATERAL, <[ɬ, ɮ]> (a diphonic pair; although we prefer the symbols [ɬ, ɮ], which are more harmonious and coherent, for whole series, as we will see), with friction noise produced at one side of the tongue, where air is forced; otherwise the result would be a normal lateral approximant, as in: *lily* [ˈliɬ].

7.6. Moving to APPROXIMANTS, we see that in the official table they are all voiced (although, of course, many of them are voiceless, as we can ascertain below, § 9.19-20 & § 10.6 & fig 10.5). This fact of (diphonic) pairs is undoubtedly responsible for the mistaken placing of <[ɰ, h, ɦ]> –ie our own [ɰ, h, ɦ]– among the constrictives. However, we find a LABIODENTAL [ʋ] (as in a typical variant of /ɪ/ in mediatic British English, often colorfully called <Estuary English>: *very* [ˈvɛʋɪ] /ˈvɛɪi/, corresponding to normal [ˈvɛɪi], or to American English [ˈvɛɪi]).

This last example also introduces the <dental/alveolar/postalveolar> general factotum, <[ɹ]>, in actual fact, in our classification, in a more objective and normal way, apart from the dental one, we have three primary types: alveolar [ɹ], PREVELO-POSTALVEOLAR ROUNDED [ɹ̠] (for neutral American pronunciation /ɹ/), and <retroflex>, actually POSTALVEOLAR ROUNDED [ɹ̠] (for neutral British pronunciation). They represent three different articulatory types, for different places of articulation.

We shall return to [ɹ, ɹ̠], illustrated above in contrast with [ʋ], in order to explain quite a fair few things. For now, however, we limit ourselves to relate the official situation, with <official transcriptions>, but adding our own transcriptions, to avoid further distortions and misbeliefs: for instance, for *rat* –according to the official version– we would have <[ɹæt]> in British English, and <[ɹ̠æt]> in American En-

glish. However, if one does phonetics –and transcribes– seriously, by relying on actual articulations, the two symbols must be exchanged, writing [ʔæʔ, ʔæʔ], respectively. This means that (besides the important addition of stress, since a word has to be inserted in a sentence, where even among monosyllables there may be stressed or unstressed syllables) the neutral British sound is postalveolar (‹retroflex›) [ɭ], better still POSTALVEOLAR ROUNDED, since the lips are involved too, whereas the neutral American sound is POSTALVEOLARIZED PREVELAR ROUNDED [ɭ̠].

Among LATERALS, we find POSTALVEOLAR (‹retroflex›) [ɭ], in addition to velar (‹ɭ›) (for us, [L], as already said).

7.7. Obviously, since the official symbols are too few indeed, it is necessary to add the ‹other symbols› appendix, with: a voiceless ‹labial-velar fricative› –or velar-labial– ‹[ɱ]› (better defined as VELAR ROUNDED APPROXIMANT and represented by [ʰ]), both to make handwriting easier and –above all– for its link with other similar sounds – which will be revealed in the more scientific part, ¶ 9-10), and the corresponding voiced sound [w] (Scottish English: *which* [ʰwɪʔ], New Zealand English: *which* [ʰwɪʔʃ, ʰw-], British and American English: *which* and *witch* [wɪʔʃ]). There is also a ‹labial-palatal› approximant (more precisely POSTPALATAL ROUNDED) [ɥ] (French: *lui* [lɥi]).

Next, we find ‹fictional› phonetics, too, with three ‹epiglottal› sounds, ie indicated with the name of the supposed ‹lower› articulator; in fact, instead of referring to the –legitimate– ‹upper› part, constituted by the roof of the mouth and its extensions (in the labial, pharyngeal, and laryngeal cavities), reference is made to an area of the gregarious part. It would be like calling [c, ɟ; k, g; q, ɢ], or [p, ɸ, ɓ], or [ç, ʝ; x, ɣ; χ, ʁ] simply ‹dorsal› articulations; in fact, ‹epiglottal› sounds correspond to our own PHARYNGEAL, whereas official ‹pharyngeal› ones correspond to our PREPHARYNGEAL.

Again, under ‹other symbols› we find the ‹alveopalatal fricative› pair [ç, ʝ] (BILABIALIZED PREPALATAL), which turn up like... a bad penny, in that –given the severe deficiency of official symbols– several authors use these two symbols as if they were a jack of all trades; namely when a sound is neither [s, z] nor [ʃ, ʒ], it is ‹magically› transcribed as ‹[ç, ʝ]›, to render an all-embracing otherness, to the detriment of accuracy... And to think that, sometimes, our own symbols (which will be seen later on, ¶ 10) may seem to be insufficient for any decently reliable rendering!

Then comes an alveolar lateral ‹flap› ‹[ɭ]› (actually a lateralized tap: [ɭ̠]) probably drawn in a hasty way, by simply overturning an old symbol, as when it was impossible to redraw symbols using a computer. The ‹free gifts› end with another monstrosity: ‹[ɧ]› for simultaneous [x, ʃ] (wrongly drawn from laryngeal [ħ]!), instead of a pre-reformed ‹[ɧ̠]›, corresponding to our [ɧ̠] (VELARIZED POSTALVEOLAR PROTRUDED, which can be seen among the orograms in fig 10.5.3, obviously in its second part, since it has a back component).

7.8. Thus far all consonants have been PULMONIC, ie produced using only expiratory air. There is a box for NON-PULMONIC consonants – ‹clicks, voiced implo-

sives, and ejectives». The *clicks* (or DEJECTIVES, cf § 11.13-16) appear in five places: bilabial, dental, (post)alveolar, «palatoalveolar» (inadvertently maintaining the name of a place abolished by the «reform»), and alveolar lateral. Here we limit ourselves to report the «symbols» judged to be «fundamental» (in fact we reserve their scientific treatment, with our symbols, for some later sections, cf § 11.15-16): «[ɔ, ɮ, ɬ, ɮ̥, ɮ̥̥]» (which from the cross-eyed point of view of the reform, are accompanied by another [velar or uvular] symbol, instead of using a normal consonantal symbol preceded by a special diacritic to indicate the dejective mechanism).

For *implosives* (or INJECTIVES) the five following places appear: bilabial, dental/alveolar, palatal, velar, uvular: «[ɓ, ɗ, ɟ, ɠ, ɠ̥]»; for EJECTIVES we find four examples: [p', t', k', s']. This treatment is also reserved for the specialistic part (from 8 onwards), since –apart from the neophytes' curiosities– their natural place (with a «European» slant) is there.

Vowels

7.9. In the official chart (cf fig 7.1), there are 28 vowels, placed in a trapezium, or trapezoid, resulting from a partially wrong initial approach, although within the brilliant idea of analyzing the positions of the tongue dorsum through x-rays, as we will see (8). Here we also accept the trapezium-shaped diagram as a precious device, since as regards the usual chaos, it is decidedly at a fundamental stage. However, we have already seen fig 6.1, which meets phonetic requirements better.

The vowel space is slightly subdivided, but without the advantage of real boundaries, into four heights (of the dorsum, placed in three superimposed bands): *close*, *close-mid*, *open-mid*, *open*; but, of course, they are not sufficient, so other intermediate positions have to be added. As far as forward and backward movements of the dorsum are concerned, three classifications are given, in two irregularly shaped areas (which should have been more realistic, according to physiology): *front*, *central*, *back*. Unfortunately, official markers –used to indicate the placement of vowels– are always big black dots; therefore the opportunity of showing lip positions too is lost (whereas our markers have two basic shapes: round and square).

Consequently, looking at the trapezium from top to bottom and from left to right (keeping in mind that when symbols appear in pairs, the one to the right represents a rounded vowel, including isolated [ʊ]), we find: [i, y; ɨ, ʉ; ɯ, u], [ɪ, ʏ; ʊ], [e, ø; ɘ, ɵ; ɤ, ɔ], [ə], [ɛ, œ; ɜ, ɞ; ʌ, ɔ], [æ; ɐ], [a, ɶ; ɑ, ɒ]. Note the «reformed» shape of «[ɣ]» (for our own –and pre-reform– [ɣ]), which was meant to be useful to avoid authors, editors, and publishers confusing [ɣ] with [χ] (officially, «[χ]»); but nothing has improved...

7.10. Let us maintain that the official trapezium is mainly theoretical, since it tries not to neglect any possibilities. But the actual result is a forced reality, due to lack of practice and direct experience with at least dozens of structurally very different languages. In default of this, people may labor under the illusion that they know the real value of vowels, but will inevitably be bound to the vowels of

their own personal pronunciation of their mother tongue. What is even worse is that they will be limited by what they think their realizations are and by what they presume the <cardinal> values of the official vowels are... Actually too many English-speaking phoneticians, instead of cardinal [u], instead produce (almost) [ʊ].

On the basis of the degrees of proximity to cardinal (and additional) vowels, phoneticians are supposed to place markers, to which the articulations of a given language ought to correspond. Too often, though (and unfortunately even in publications!), it is possible to find trapeziums with markers that seem placed at random and hastily. At other times, the markers roughly coincide with the points placed on the official trapezium (as if they really might correspond to the theoretical positions). This mainly happens according to the particular symbol in question (be it right or wrong!), used mechanically, without realizing the importance of the vocogram. Instead, lengthy work ought to be done, by attentively and patiently listening to many recordings, in order to compile an average of samples, excluding inadequate and occasional performances, but showing even two or more placements, provided they represent actual contextual, geographical, social, generational, or individual variations... It is absurd to place the /ɔ/ phon(em)es of different languages such as French, German, Portuguese, Italian, and many more, exactly on the official point. However, those who do so, inevitably lose the incredible and useful resources of the trapezium.

7.11. Let us now see the approximate values of the 28 official vowels, whereas exact values (with our 52 vocoids) will be given in the vocograms used in the phonosyntheses of 350 languages (including variants, § 16-23, and also in *HPr*, which is dedicated to 12 languages dealt with systematically and with variants). Only by doing this, is it possible to prepare complete transcriptions and descriptions, which actually show the structure of languages, for *descriptive* and *teaching purposes*.

The observations made about the eleven vowels introduced in § 6.1.1-2 must be kept in mind; here we will give only some examples, as can be found in texts and dictionaries, making only few comments. Again a scientific treatment is postponed to the specialistic part of this handbook, although it should not be so, since it would better to start well, and to go on even better... However, we thought that some help might be useful, to avoid discouraging people, especially those who are beginning phonetics reluctantly and more as somebody else's <wish> than to meet their own needs. Even those who might fall within this last category could find this part anything but useless...

7.12. Therefore, omitting the vowels already seen in fig 6.1, we have – Russian: *ty* (мы) [tɨi], Norwegian: *null* [nʉl], Mandarin Chinese: *zì* [tswɿ], German: *litt* [lɪt], *Stück* [ʃtyk], *rund* [ʁʊnt], English: *light* [lʰaɪt], Dutch: *bus* [bʊs], Mandarin Chinese: *gé* [kɤ] (<[ɤ]>), British English: *bird* [bɜːd], New Zealand English *bird* [bɜːd], Swedish: *höra* [ˈhø̌rɑ], English: *hat* [hæt], British English: *hut* [hʌt], American English: *hut* [hʌt], American English: *hot* [hɑt], British English: *hot*

[hɔʔ], non-neutral Canadian French: *preuve* [pʁœʔ].

Let us only observe that the official chart continues to consider ⟨[ə]⟩ as something undefined, to oppose more precise timbres; something with a kind of intrinsic theoretical statute, more with a phonemic value than as an actual sound. In fact, unfortunately it is used as a jack of all trades (cf § 8.16 – with a range of possibilities which is even bigger than those assigned to the ⟨jack-of-all-trades consonants⟩ [ç, ʒ], seen above, § 7.7).

Also for [a], completely without foundation, the chart continues to make people believe that it is actually articulated in a full front position, that is as if it corresponded to what, objectively (even according to acoustic analyses) is [æ]; whereas the chart continues to ⟨insert⟩ ⟨[æ]⟩ (in the trapezium), putting it *above* ⟨[a]⟩.

In addition, as will appear obvious due to the scarceness of official symbols, each one of them must assume very broad and different values (from language to language), which may not correspond to an actual phonetic value to be used positively. At a phonemic level, things can be (almost) satisfactory; mainly if we limit it to one or few languages, ie for INTERPHONEMIC indications. However, as soon as we try to do something INTRALINGUISTIC, according to the criteria of INTERPHONEMICS (cf § 1.9-10, and ¶ 16-21), we immediately feel severe limitations, which prevent actual and useful comparisons between different languages. Indeed, we do not want to render the pronunciation of some languages poorly, as they would be inevitably flattened into something barely decent (when someone uselessly tries to indicate many different phones, by using only few symbols [as the official ones]). On the contrary, we prefer to be able to choose among many phonemic and phonetic symbols, in order to manage to –accurately– potentially render all languages, and dialects (including variants not yet described). On the other hand, even the few official symbols are a problem to people who are no good at phonemics and phonetics, and practice them reluctantly, by using symbols in a ridiculous and unsatisfactory way (considering them to be real... enemies).

Prosodic indications & diacritics

7.13. The official chart has a tiny section on TONES (which meant to be illustrative, but many have taken as the complete ⟨revealed truth⟩), and another one on suprasegmentals: primary and secondary STRESS, indications on LENGTH, and structural boundaries; but it is better to look directly at the whole chart. The same holds true of the DIACRITICS which from the ⟨reform⟩ point of view ought to be used to indicate modifications of ⟨cardinal⟩ values, in the hope of achieving a certain descriptive accuracy. On the other hand, INTONATION is completely missing, so much so that whoever tries to transcribe it within *offIPA*, according to the chart, is obliged to use the ⟨difficultly delivered⟩ notation for tones. Before the ⟨reform⟩, there was an official notation system for ton(em)es which was more nimble and flexible and (almost) seemed appropriate to mark intonation too. From the pre-reform system, with adjustments and necessary expansions, we have derived the system we use in the true scientific parts of this *NPT/HPh* (¶ 8-23, and in *HPr*, as

well as in *M^aPI* and *DⁱPI*, and in the various books in progress too).

Before preparing these sections, we had thought of leaving the readers with the task of evaluate what the official chart may offer. As the saying goes: *enough is as good as a feast* – but science is quite another thing... In addition, at many readers of *M^aPI*'s insistence, we re-propose for reflection ¶ 19 of the second edition of *M^aPI* –¿to IPA or not to IPA?– which shows the problems and limitations of *offIPA* and other widely used phonetic alphabets, with respect to *canIPA*. Some observations might sound repetitive –but are certainly not useless. As the ancient Romans wisely said: *repetita iuvant...*

How come the IPA is not used by everyone?

7.14. The International Phonetic Alphabet, officially born in 1888, is the most widely used system of transcription all over the world. Indeed, it has high inherent qualities of clarity, rigor, and non-provincialism, in spite of varied and colored resistance, in almost every Country, where anachronistically people continue to use heterogeneously several different notation systems, which are often contradictory and strangely mixed. All this happens more out of laziness and unwillingness to accept <innovations> than for respect of <traditions>.

However, the IPA is based on phonological principles, rather than phonetic ones, especially after the latest reform, of 1989 (<de-worsened> in 1993 & 1996) – thus it would be more appropriate to call it the <International PhonEMic Alphabet>, as we will see below. Nevertheless, besides providing a certain number of symbols and diacritics, it allows everybody the necessary freedom of expanding the number of diacritics and symbols, to satisfy various needs, as we have done in *NPT/HP_b* (and in *HPr*), with the *canIPA* symbols.

7.15. The first perfectly evident weakness of most phonetic alphabets resides in being devised by considering pronunciation as a by-product of writing, instead of vice versa, as it is obvious and evident: pronunciation precedes writing, all the more so that the latter, for many languages and mainly for most traditional dialects, does not exist yet or is not coherently standardized. ¿How many people in the whole world then can not read or write, although they speak their tongue as <perfect natives>?

All other phonetic alphabets are <provincial> since they stem from a very limited number of *letters*, which are generally those of an official orthography, with some additions or modifications. In order to increase, as is necessary and unavoidable, the number of <sounds> to be represented, several diacritics are introduced, which are often used in various orthographies, as well: accents, strokes, dots, dashes, &c, often in combinations of two, three, and even more. This inevitably makes writing, and especially printing, heavier; it also complicates reading, which sometimes becomes real deciphering, and not always with successful results. As a matter of fact, several authors, and also several editors and publishers, mix and confuse not only diacritics, but also basic symbols.

Furthermore, another basic criterion is that *every* symbol represents *one* of these sounds, without needing to use diacritics, in order both not to have second-class symbols (and sounds!), and to make them readable –and writable– without problems or complex calculations to achieve the awaited values of symbols with one or more diacritics.

The (official) *IPA* then has [e, ε; o, ɔ], which can be shown as nasalized, for instance, without problems, indeed with definite advantages: [ẽ, ẽ̃; õ, õ̃]. On the other hand, when a vocoid is to be indicated which is neither [e] nor [ε] (or neither [o] nor [ɔ]), but intermediate between the two of them, the *offIPA* has two possibilities: either to ignore the difference (which is what other so-called phonetic alphabets, more often, do), but arbitrarily choosing between [e, ε], [o, ɔ]; or to resort to a diacritic such as [ɿ] for lowering, or [ʊ] for raising, with respect to (the position

of) the tongue dorsum. These (small-sized) diacritics can be put *under* or *over* a symbol (however, complicating writing, and especially printing), or *after* it (further complicating reading, though). The latter possibility is mainly practicable when one wants to precise a timbre in isolation [e_τ, ε_±, o_τ, ɔ_±], avoiding computer acrobatics.

7.17. However, it is much better to have unitary symbols as [ɛ, σ], without having to renounce precision. These symbols belong to the expanded version of the IPA known as *canIPA*, which is rich of <necessary> symbols, both for precision and not to belittle a part of them, so as to make them <secondary>, or restricted, ie <diacriticized>.

On the other hand, resorting to [e_τ, ε_±, o_τ, ɔ_±] for [ɛ, σ] further reduces the potential and precision of diacritics, which may be necessary indeed for meticulous and competent phoneticians. In fact, it is often important to show, in addition to a mean value of [ɛ] or [σ] (ie the <normal> or <central> value), also a closer ([ɛ_±, σ_±]) or opener ([e_τ, σ_τ]) articulation, or a fronter ([ɛ_±, σ_±]) or backer ([e_τ, σ_τ]) one; or even both closer and fronter ([ɛ_±, σ_±]) or backer ([e_τ, σ_τ]) ones, or both opener and fronter ([e_τ, σ_τ]) or backer ([e_τ, σ_τ]). Incidentally, those who know the strange official use of [±, ±] (for advanced/retracted <tongue root>, instead of a more logical [±, -]) will surely note their greater coherence and completeness.

Thus nine (9) –non-negligible– nuances are available for each vowel phone; besides, on quadrilaterals (ie vocograms) precision can be even greater. As a matter of fact, a *canIPA* vocogram contains 30 boxes (less four extreme peripheral ones, which are not usable, as will be seen below, § 7.18-9 & fig 7.2) which are doubled in number by possible additional lip rounding, for the amount of 52 vocoids, organized in 6 degrees of mouth opening (ie *high*, *lower-high*, *higher-mid*, *lower-mid*, *higher-low*, *low*) and 5 places of articulation (*front*, *front-central*, *central*, *back-central*, *back*) or 10 places if we separate rounded vocoids.

Instead, for the same articulatory space, the *offIPA* has only 28 vocoids, with 4 opening degrees (<close, close-mid, open-mid, open>) and 3 places (<front, central, back>); a kind of remedy for this deficiency has been the insertion of [ɻ], and quite messily also <[ɪ]> = [ɪ] and <[ʊ]> = [ʊ] (in addition to <[æ]>) and the *jack-of-all-trades* <[ə]>, which is being used –with considerable practical disadvantages– for (both primary and contextual) phones such as [ɪ, ə, ɜ, ɐ; ʊ, ʏ, ʌ, ʎ; ə, ɐ], and even [ə, ʌ, ɐ] as well!

Obviously, also for consonantal phones, the *canIPA* version –in comparison to the *offIPA*– has many symbols more. But this, of course, is just a *possibility*, not an *obligation* at all. However, when people realize that it is possible and easy to be more precise, they are induced to precision, as a categorical imperative. The IPA has three ways of transcribing stopstrictives (ie <affricates>): a <monograph> ([ts], the best and smartest, the most respectful of the articulatory reality, and *canIPA*), a <digraph> ([ts], ambiguous and risky), and the use of a <bow> (together with a digraph: [ts̩, ts̩], oppressive and complicated). But, strangely enough, the monograph has been... <left out> from the *offIPA* chart.

Quick comparison between *offIPA* & *canIPA*

7.18. By taking the most official symbols and adapting them in a special table (fairly impoverished though, compared to the general one of the *canIPA* version), we will indicate in *italics* both the official symbols that would receive further values and the symbols and terms which are hardly recommendable (and which are worthwhile changing with some more rigorous and satisfying ones, given in the corresponding *canIPA* table, cf fig 7.3). However, at the beginning of this chapter we have already seen the *offIPA* table (fig 7.1), with the original terms and symbols, which are criticized in § 7.22-9, as is the missed reform of the *IPA*.

fig 7.2. Vowoid table.

front front-central central back-central back										front rounded front-cent. round. central rounded back-cent. round. back rounded				
i	ɪ	ɨ	ɯ		<i>canIPA</i>	high (A)	ɥ	y	ɥ	ɯ	u			
ɪ	ɪ	ɨ	ɯ		lower-high (B)		ɣ	ɣ	ɥ	ɯ	ɯ			
e	ə	ə	ɤ		higher-mid (C)			ø	ø	ø	o			
ɛ	ɛ	ɜ	ɤ		lower-mid (D)			ø	ø	ø	o			
ɛ	ɛ	ɛ	ɛ		higher-low(E)			œ	œ	œ	ɔ			
æ	ʌ	a	ɑ	ɑ	low (F)			œ	œ	œ	ɔ			
0	1	2	3	4			5	6	7	8	9			

i		ɨ	ɯ		high (A)			y	ɥ		u
ɪ					lower-high (B)			ɣ			ɯ
e	ə	ə	ɤ		higher-mid (C)			ø	ø		o
		ɜ			lower-mid (D)				ø		
ɛ		ɛ	ɛ		higher-low(E)			œ			ɔ
æ		a	ɑ		low (F)			œ			ɔ
					<i>offIPA</i>						

7.19. As for the vowel quadrilateral «corresponding» to the *offIPA* position (fig 7.2), there are some empty boxes in the cases where one of two near official symbols ought perforce to be chosen (at considerable personal discretion to «decide» between one or the other).

The grey boxes indicate unused articulations in the different languages and dialects, since they would be ergonomically useless: in fact, they would produce a hardly evident auditory impression, in spite of an unnatural articulatory effort to combine on the one hand lip rounding with the highest degree of non-high advancement of the tongue, and on the other hand unrounding with the highest degree of non-low tongue retraction.

For the vocoid in 5-C the result would be a value which could be placed at the junction between [ɣ~ø~ø~ɥ], for 5-D [ø~ø~ø~ø], for 5-E [ø~œ~œ~ø], for 5-F [œ~œ~œ~œ]; for 4-A [ɯ~ɯ~ɨ~ɨ], for 4-B [ɯ~ɤ~ə~ɨ], for 4-C [ɤ~ɤ~ɜ~ə], for 4-D [ɤ~ɛ~ɜ~ɛ]. Despite this, the *offIPA* continues to make people think that [ɯ ɤ ɛ ɑ]

correspond to column 4, and [y, ø, œ, æ] to column 5, and also that [æ] is closer than o-F (<zero>-F), where it persists in placing <[a]> = [A].

Obviously [a], which is the most widespread and frequent vocoid in the world's languages and dialects (irrespective of specific orthographies), is 2-F, and with good

fig 7.3. Partial table of IPA contoids for comparison.

<i>canIPA</i>	Bila- bial	Labio- dental	Den- tal	Alveo- lar	Postal- veolar	Postal- veo- dorsal	Pala- tal	Velar	Uvu- lar	Pharyn- geal	Laryn- geal
Nasal	m	ɱ	(n)	n	ɳ	ɲ	ɲ	ŋ	ɴ		
Stop	p b		t d	ʈ ɖ	ʈ ɖ		c ɟ	k ɡ	q ɢ		ʔ
Stop-strictive		ɸβ					k͡c ɡ͡ɟ				
Grooved st-st.			ts dz			t͡ʃ d͡ʒ					
Constrictive		f v	θ ð				ç ʝ	x ɣ	χ ʁ	ħ	
Grooved cons.			s z	ʃ ʒ	ʃ ʒ	ʃ ʒ					
Approximant	ɸ β	ʋ	ʋ̹ ɖ̹	ɹ			ɸ j	ɸ ɰ	ʁ	ʕ	h ɦ
Rounded app.					ɻ	(ɻ)	ɸ ɰ	ɸ w			
Trill	ʙ			r					ʀ		
Tap & flap				ɾ	ɽ						
Lateral			(l)	l	ɭ	ɭ	ʎ	ʟ			
Constr. later.				ɭ ɭ̥							

<i>offIPA</i>	Bila- bial	Labio- dental	Den- tal	Alveo- lar	Retro- flex	Postal- veolar	Pala- tal	Velar	Uvu- lar	Pharyn- geal	Glott- al
Nasal	m	ɱ	(n)	n	ɳ	n/ɲ	ɲ	ŋ	ɴ		
Stop	p b		t d	t̪ d̪	ʈ ɖ		c ɟ	k ɡ	q ɢ		ʔ
Affricate		ɸ̪β̪					c̪ ɟ̪				
Grooved aff.			ts̪ dz̪			t͡ʃ̪ d͡ʒ̪					
Fricative	ɸ β	f v	θ ð				ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Grooved fric.			s̪ z̪	s̪ z̪	ʃ̪ ʒ̪	ʃ̪ ʒ̪					
Approximant	ʋ	ʋ̹ ɖ̹	ɹ			ɸ j	ɸ ɰ	ʁ
Labialized app.					ɻ	(ɻ)	ɸ ɰ	ɸ w			
Trill	ʙ			r					ʀ		
Tap & flap				ɾ	ɽ						
Lateral			(l)	l	ɭ	ɭ/ʎ	ʎ	ʟ			
Fricative later.				ɭ ɭ̥							

reason indeed! It may be interesting to note that the rounded version of [a], that is [ɶ] (7-F), is instead the least used vocoid of all, together with [æ] (6-F); they both mainly remain as almost theoretical elements, since they are hardly distinguishable from [A, a], especially if we consider the significant influence of coarticulation.

7.20. As for the tables of consonants (fig 7.3), it can be noticed that in the *IPA* one, again, terms and symbols in italics are less recommendable and often they must forcibly be used for different phones, for want of more precise symbols (to compare with those given in the *canIPA* table). But most of all we have to consider that in spite of the analyses (acoustic ones too) of many languages and the recognition of the difference between constrictives (‹fricatives›) and approximants, the *offIPA* continues to (let one) believe that [ɸ, β, ɣ, h, ɦ], which are real approximants indeed, are instead constrictives (as [ħ] actually is, though)!

Owing to the preservation of the inappropriate term ‹retroflex›, teamed with a good deal of hasty superficiality (which makes people still accept old descriptions based on outdated articulatory concepts with no objective verification or validity), the symbol [ɻ], at last officially accepted, is however assigned to the articulation of American English *r*, instead of more correctly to the British one. On the contrary, the latter is linked to the traditional symbol [ɹ], used for the alveolar place of articulation too (ie [ɹ]), whereas it would seem to be clearly evident and useful to use it for the most widespread and frequent articulation of American English *r*, which is a lateralized prevelar rounded approximant, although in the reduced and limited *canIPA* table we had to resort to a terminological device for the ‹postalveodorsal› column, which in this way also includes the most widespread (rounded or unrounded) postalveopalatal places of articulation.

7.21. Outside the official table there are some of the rarest consonantal symbols; although the voiced bilabial trill [B] is certainly not frequent either! On the other hand, even [q, ɢ, ŋ] do not enjoy widespread use, except –relatively– [q]... But, again, the boxes were available. It is true, though, that in the official table there is no room for [w], even if this sound is really one of the most widely used in the world's languages. In the reduced *canIPA* version given in fig 7.3, in a convenient way, we have indicated both [w] and [ɥ] (and even [h]). This last symbol is older and officially withdrawn, but we have retrieved it because it is much more suitable and in harmony with the series of approximants (as can be seen in the integrated table) than the official [ʌ] which also poses big problems of confusion with handwritten [m, u], &c.

Again, outside the official table a pair of jack-of-all-trades consonants has been introduced –officially– which brings to minds the rough use of [ə] (cf § 7.17) from a phonetic point of view (not from a phonemic one). In fact, given the excessive scarceness of symbols for lingual constrictives, all those who must indicate some articulations, which do not fall within [s, z; ʃ, ʒ], believe they are ‹solving› the problem by resorting to [ç, ʝ], which are actually bilabialized grooved prepalatal articulations (although they have something in common, of course). In this way, according to different languages, variants, and dialects described, various authors

make [ç, ʒ] <correspond> to [ʃ, ʒ; ʃ̥, ʒ̥; ʒ̥, ʒ̥, ʒ̥, ʒ̥] (sometimes even to [ʃ, ʒ]!), in addition to sequences such as [ʃj, ʃj, ʃj, ʃj, ʒj; ʒj, ʒj, ʒj, ʒj, ʒj] &c. The same holds true of the corresponding stopstrictives (<affricates>). After, a *canIPA* table is given (fig 7.4), although limited to the phones considered here. By careful observation, it will be apparent that its arrangement is more logical and rigorous (although the tables previously seen, fig 7.3, may look more familiar, since they have been around longer), in particular as far as the indication of voicing, or <voice>, is concerned; and with [ʔ] which can not be voiced nor voiceless indeed, as (since the vocal folds are in contact) no air passes through the glottis.

fig 7.4. Reduced table of *canIPA* contoids.

Bilabial Labiodental Dental Alveolar (Apico)Postalveolar (Post)alveo-dorsal Palatal Velar Uvular Pharyngeal Glottal/laryngeal VOICE											
m	ɱ	(n)	n	ɳ	ɲ	ɳ	ɳ	ɳ	ɳ	ɳ	ɳ
p		t	ɸ	ɸ		c	k	q		ʔ	+
b		d	ɸ	ɸ		ɟ	g	ɢ			+
	pf					kç					-
						gɟ					+
		ts			ɸ						-
		ɸ			ɸ						+
	f	θ				ç	x	χ	ħ		-
	v	ð				ɟ	ɣ	ʁ			+
		s	ʃ	ʃ	ʃ						-
		z	ʒ	ʒ	ʒ						+
ɸ		ʊ				h	h	ʁ	ħ		-
β	u	ɔ	ɪ			j	ɥ	ʁ	ɦ		+
						ɥ	ɥ				-
				ɹ	ɹ	ɹ	w				+
B			r					R			+
			ɹ	ɹ							+
		(l)	l	l	l	l	l				+
			ɸ								-
			ɸ								+

The official revision of the IPA (1989-96): A missed reform

7.22. In these sections we will try to explain, with as much objectiveness as is humanly possible (since there is a limit to everything), the present situation of the International Phonetic Alphabet. Firstly, we can not help recalling once again that the most fitting formulation which, strictly speaking, correspond to reality should (and it is hoped will continue to) be the <International Phonemic Alphabet>. In fact, as it is now, it does not manage to objectively render the necessary phones

even for just one given language. Should knowledge really be only theoretical, that is abstract, this alphabet would be more than enough! But, seeing that many people can appreciate and use the advantages of practical articulatory phonetics (obviously not separated from theory, provided it is realistic, without frills or glottosophisms), it is clear right from the start that it is necessary to resort to something more systematic and rigorous (and not just vaguely <sufficient>). As a matter of fact, we are talking about the most <natural> *artistic science*, or about the most <general> *scientific art*.

7.23. Enough has been said in the previous sections about the evident vocalic deficiencies of the *offIPA*. Let us merely report one curiosity: during the spread of the reform, in 1989 and 1993, the vocoid [ə] always appeared as [ø]; only in the additions of 1996 the much awaited and required correction was finally made! As far as consonants are concerned, we have already managed to insert a few more with respect to the original setting. Again, we add some further ones in a slightly recast table presented in fig 7.3 (that are those put in a sort of <other-symbol> appendix there). In the overall treatment we will use our own more rigorous terminology: so we have the pair of bilabialized grooved prepalatal constrictives [ɸ, ɹ̥], the grooved velarized postalveolar constrictive [ʃ̥] (which, less intuitively, the *IPA* used to symbolize with [ʃ], or with the highly ambiguous present-day [h]), which is clearly hastily drawn by some designer who knew nothing about phonetics), the voiced alveolar lateral flap [ɭ], but represented with <[ɭ]>, by awkwardly overturning [ɾ], which used to indicate the voiced alveolar slit constrictive [ɻ] (found for Czech ř, or for Sicilian r-).

However, with an incredibly lively imagination, now some <epiglottal> consonants appear: <[ɧ, ʕ; ʔ]>, respectively: voiced and voiceless constrictives, and voiceless stop, which are actually just the <old> pharyngeal [ħ, ʕ] (in *canIPA*, more coherently they are rendered as [ħ, ʕ]: the former is a voiceless constrictive, whereas the latter is a voiced approximant, although in the official table it is still placed and defined as a constrictive). The corresponding stop is added too, [ʔ] (but, in point of fact, five further ones could be added: a voiced stop [ɗ̥], the *true* voiced constrictive [ɦ], a voiceless approximant [ɗ̥], and the corresponding trills [ɕ, ɕ̥]!). While, without bothering the epiglottis (which is there for different bio-physiological purposes), it is possible to add some rarer <prepharyngeal> constrictives and approximants, respectively –and more usefully– represented by [ɧ, ʕ] and [ɗ̥, ʕ] (by paying attention to the true value of *canIPA* [ɧ, ʕ], although this is definitely a kind of secondary articulatory area).

As an addition to the official table, we find the funny and awkward way of showing complex articulations by putting bows above (or even under, in the extra reform of 1996): [͡, ͡]: thus a voiceless dental stopstrictive [t͡s] more <officially> would be [t͡s], which goes canoeing, &c, and a velar-bilabial (or bilabial-velar) stop [k͡p] officially would be the heliophobous (or pluviophobous) [k͡p], &c.

7.24. In an added inset we find ejective contoids, marked (this time, by mutual consent) with an apostrophe, [ʔ], after the appropriate symbols of (voiceless)

stops, stopstrictives, and constrictives: [p', t', k', ts', s']. Surprisingly, voiced injectives (‹implosives›, or ‹preglottalized› contoids) have undergone the unwelcome influence of the (more or less official) orthographies of some African languages, which have in turn derived from old and inconvenient symbols. Thus [b, d, f, g, ɠ] would represent [ʼb, ʼd, ʼɟ/ɟɟ, ʼg, ʼɠ] (more often, [f] would stand for a postal-veopalatal rounded stopstrictive [ʼɟɟ], instead of a palatal stop [ʼj]).

It must be noted that, in our system, while ejectives are *followed* by an apostrophe: [C'], injectives are *preceded* by a (vertically) flipped apostrophe: [ʼC]; these are two ways not to confuse the two diacritics and their functions (which do not indicate articulations, but phono-articulatory *types*; thus it is legitimate indeed, in this case, to use actual diacritics): iconically [ʼ] also helps to remind one that with injectives the larynx lowers, whereas it raises, [ʹ], with ejectives.

In 1989, the burning enthusiasm for exotic novelties on the one hand overlooked some surely more useful and necessary things, on the other hand it showed off –not in an appendix, but within the table– a whole absurd series of voiceless injective (‹implosive›) consonants, even with special symbols: [ɸ, ɸ̥, ɸ̥̥, k̥, q̥], which luckily had been definitely concealed as early as in 1993!

The same inset ‹presents› us with the colorful symbols for dejective contoids (or ‹clicks›) which are typical of some South African languages: [ɔ̥, |, !, ‡, ||]; again, these are drawn from makeshift devices to typewrite some of those languages, but completely losing the articulatory link of phonetic reality, which is respected instead by the *canIPA* symbols: [ʼp, ʼt̠, ʼt̡, ʼt̢, ʼṭ], since their value can be easily inferred, even without technically defining them.

Official diacritics

7.25. Now we will give an exemplified account of the *offIPA* diacritics. As can be seen, a number of them are decidedly needless, since they are better represented by using symbols of the same rank, instead of ‹conditioned symbols› (by absolutely impracticable small marks above *or* underneath, which are very complicated to combine and print). We have already seen that English itself, the most transcribed language (mainly due to the considerable separation of its present-day orthography from actual pronunciation), arbitrarily has to resort either to [e] or [ɛ], to indicate [ɛ] which is an intermediate vocoid between the values of the two given symbols.

Thus, as we have generously said in previous sections of this chapter too, it seems quite obvious that it is more practical (and more effective for teaching purposes, and more appropriate for descriptions) to have a satisfactorily greater number of ‹basic symbols›, which may be on a par with the others, so that no one of them may be regarded as secondary or inferior because of the diacritics.

We will quickly present them, with indicative comments, for less experienced people. We will also consider (with better general adjustments) the *offIPA* table, already given in fig 7.1, to clearly show its inadequacy and various limitations and serious drawbacks.

Segmental diacritics

7.26. *Voiceless* (or rather *devoiced*) [̥], [̜, ̝] (which is necessary); *voiced* (or rather with added *voicing*): [̬], [̭, ̮] (more advisably substituted with more realistic notations such as [z̥, d̥] or, if necessary, [z, d], &c); *breathy voiced*: [̤], [̦, ̧]; *creaky voiced*: [̰], [̱, ̲] ([̱, ̲] are much better, since [̰] brings [ʔ] to mind and thus the participation of the glottis, with irregular vibrations); *aspirated*: [ʰ], [tʰ, dʰ] (in case [tʰ, dʰ], but better still [tʰ, dʰ] and other more precise possibilities for different degrees of <aspiration> strength).

Besides, *more rounded*: [̞], [̟] (various *canIPA* vocoids settle the question better); *less rounded*: [̠], [̡] (various *canIPA* vocoids settle this question better as well); *advanced tongue root*: [̠], [̡] and *retracted tongue root*: [̡], [̠] (again, various *canIPA* vocoids settle the question better, and also restoring to these two diacritics the values they very often had earlier [and still have for many non-dominated authors], that is those of the two following signs, in perfect parallel with the further two given soon after), *advanced*: [̠], [̡] (rather [̠], [̡]); *retracted*: [̠], [̡] (which seems to be underlined, so [̠], [̡] is much better); *raised*: [̠], [̡, ̢]; *lowered*: [̠], [̡, ̢]; *centralized*: [̠], [̡]; *mid-centralized*: [̠], [̡] (that is diagonally centralized in the quadrilateral). As we have already said a few times, the richer number of the *canIPA* vowels seems to be more appropriate than the use of these last diacritics.

Furthermore: *syllabic* (or, better, *intense*): [̠], [̡] (very important); *non-syllabic*: [̠], [̡] (which is of very little account once we accept a truly phonic conception of syllables, ie phono-syllables, and not morphological-etymological, with grapho-syllables). Then, *linguolabial*: [̠], [̡, ̢] (but [̠, ̢] seem decidedly less odd and less bat-like); *rotacized*: [̠], [̡, ̢] (but the *canIPA* system has no such vowels, which are better treated as intense laterally contracted approximants, or as sequences of vowels plus such [intense or normal] approximants which are about ten); *labialized*: [̠], [̡, ̢] ([̠], [̡, ̢] are much better); *palatalized*: [̠], [̡, ̢] (again, [̠], [̡, ̢] are much better, even compared to the old [̠], which was still better than the new official <solution>); *velarized*: [̠], [̡, ̢] (if anything, [̠], [̡, ̢], for homogeneity and coherence, but [̠], [̡, ̢] are decidedly much better still); *pharyngealized*: [̠], [̡, ̢] (but more often, instead, they are *uvularized*, so generally [̠], [̡, ̢] are sufficient); a velarized *l* is then [̠] (but for a uvularized *l*, which is darker to the ear, it is convenient to use [̠]); *nasalized*: [̠], [̡] (very important).

Furthermore, *dental*: [̠], [̡, ̢] (but, [̠, ̢] are realistically and statistically much more appropriate); *apical*: [̠], [̡, ̢] (much better [̠, ̢], &c); *laminal*: [̠], [̡, ̢] (according to cases, [̠, ̢; ̠, ̢; ̠, ̢; ̠, ̢], or something else); among the various *canIPA* symbols there are more satisfying answers (even if we are not considering here all possible cases). Lastly, *nasally released*: [̠], [̡, ̢] (which is better not to use, but to explain clearly); *inaudibly released*: [̠], [̡, ̢] (which could conveniently be used for the previous two cases, to insist on the important difference with *canIPA* [̠], [̡, ̢] = *audibly released*).

to the <official> chart. Too many books and articles have been published where Italian (and many other languages) would have <alveolar> [t, d; ts, dz; s, z] (ie [t̪, d̪; t̪s, d̪z; s̪, z̪]) and <postalveolar> [tʃ, dʒ; ʃ, ʒ] (ie [t̠, d̠; t̠ʃ, d̠ʒ; ʃ̠, ʒ̠]), since the unfortunate official table of consonants under *dental* seems to locate only [θ, ð]. Even [æ, a] are misleadingly placed, as we have already said, but many people continue to believe that statements such as those are true (while they are clearly not so), although it would be quite easy to settle the matter once and for all, by simply doing some actual articulatory and auditory phonetics, which cannot be substituted by acoustic phonetics, since all the most sophisticated instruments of this world cannot do anything at all, especially if the only possible references are based on <deskwork phonetics>! However, even acoustic analyses have demonstrated that [æ] is really low front.

To finish, after well-pondered reflection, we decided to provide an almost complete table of the *can*IPA contours, fig 10.1 (while vocoids are also given in fig 7.2). This has been done both in order to encourage (perhaps even to reward – why not?) the most interested people, and to discourage (and to caution in time) the *less* interested –and above all the *non*-interested– people. In fact, nobody obliges us to study these things in depth, except for a real personal, social, professional, and cultural interest (and more still).

Although these symbols are undoubtedly many, they have the clear advantage that, once one has entered the spirit of *natural phonetics* (ie articulatory, auditory and functional), the value of each symbol is easy to ascertain, according to its position in the table and to the values of nearby symbols, although they do not include the whole of our articulatory figures (ie orograms) for every symbol (but in G 10 they are all shown). It is obvious, however, that a keen interest is necessary, together with sheer perseverance and systematic personal, articulatory and auditory training, also using a (good) taperecorder with earphones.

About non-IPA alphabets

7.30. Moving back to provincial alphabets, which as we have said <disseminate> many diacritics to indicate timbres, which would be more logically expressed with unitary and <primary> symbols: none of them would be a second-class symbol. Let us make an extreme case to show their limitations: IPA [œ] is generally rendered as \ddot{o} , and [œ̃] = $\tilde{\ddot{o}}$, often [œ̃] = $\acute{\ddot{o}}$, and consequently [œ̃] = $\acute{\ddot{o}}$, and [œ̃:] = $\acute{\ddot{o}}!$ The IPA convention of putting ['] before a whole stressed syllable has the obvious advantage of not making notations heavier while simplifying reading; it also shows (phono)syllabic boundaries, which is often of fundamental importance both for pronunciation and actual understanding of transcriptions.

Let us pass over the various traditional terminologies, which are often pure fantasy or based on unscientific misbeliefs (cf the observation at § 1.7). Certainly, they do not make comparisons between different alphabets easy. Indeed, in the case of these alphabets it would not be useful to present vocalic and consonantal tables, like those we have seen for the IPA, since they are even poorer and more arbitrary.

Therefore, we will just give some lists of correspondences, to help the readers; but we must make it clear at once that often symbols and diacritics are used with little skill and even less attention (not only by typesetters).

In order to do this, and just this once, we will adapt ourselves to misleading graphemic criteria; as a matter of fact, those who consider phonetic symbols like alphabetic letters are doomed to failure, since they remain bound to the values each letter has in their own language. For all these, phonetic (and even phonemic) transcriptions are an awful nuisance they would be glad to avoid. Indeed, sometimes this is preferable, since when they find they have to make a transcription, the results are, to say the least, picturesque. In this way, monumental errors are spread, and incredible phonic beliefs arise which are often groundless but spread as widely as epidemics, and afterwards are difficult to fight and correct.

Let us give a notorious example: Mandarin Chinese phonology has been undermined for practically a century by a very strange belief about two alleged <apical vowels> which Karlgren in 1915 represented as ɿ and ʅ, referring to our [ɯ, ʨ]; the former is a high back-central (unrounded) vocoid, whereas the latter is an intense postalveolar approximant. Even *Pinyin* (the official romanized spelling for Mandarin) has been misled, and in fact uses *i* for [i, ɯ, ʨ], because they are all interpreted as belonging to one phoneme /i/, so that [ɯ] occurs after /ts, tsh, s/, [ʨ] after /tʂ, tʂh, ʂ, ʃ/, and [i] after any other consonant, including </tʂ, tʂh, ʂ/>. In our analysis (cf § 11 of *HP*) we have /ts, tsh, s/+ɯ/ [ɯ], /tʂ, tʂh, ʂ, ʃ/+ʃ/ [ʨ], and (for any other C) /C/+i/ [i] (including /ts, tsh, s/ → [tʂ, tʂh, ʂ], by assimilation). Regardless of the particular phonological interpretations chosen, the actual phonetic facts are that we have [i, ɯ, ʨ], as acoustic analyses also show. Instead, most descriptions are still based on Karlgren beliefs and have to force the facts to match the position according to which *i* /i/ would have the variants ɿ and ʅ (even placed on actual trapeziums near /i, y/, as if they really were <apicalized> and <retroflexed> [i]!). In an article unfortunately published in the *Journal of the International Phonetic Association* (2003), they are both transcribed as <[ɿ]> and described as <(apico-)laminal denti-alveolar> (where no groove is mentioned, of course) and <apical post-alveolar> approximants respectively. The latter is correctly described (ie ^{can}[ʨ]), while the former is still not (ie ^{can}[δ]); there is a great (articulatory, auditory, and acoustic) difference between [δ] and [ɯ].

7.31. Scholars and students of linguistic subjects, such as language history, philology, dialectology, glottology and linguistics (and further subdivisions) ought to be able to skillfully use different phonetic alphabets, managing to pass from one to another without big problems, except for the ambiguities inevitably caused by the lack of scientific bases of many of these alphabets. Even mental idleness, which make people stick to questionable definitions and representations, does not seem to be justifiable at all. Actually, even those who are mainly interested in linguistic evolution, lexicology or lexicography (perhaps of dialects), or morphosyntax, or other linguistic aspects, should not ignore phonetic notation and its careful uses.

It might seem logical and necessary to think that <intellectuals> in general, and especially those who devote themselves to linguistic subjects, first of all should care

—with loving conviction— for the phonic aspect of their own language (and even of others). Unfortunately, reality is gloomier: the implacable enemies of language are often exactly those people who unashamedly (or even unawarely) misrepresent it. And what to say about transcriptions using capital letters at the beginning of sentences or for names?! Still such mistakes are found even in linguistics books and grammars written by university <experts> —not by novices!— and not only in the first printing of the first edition...

While even children, whether they are exposed to phonetics or not, know that <sounds can not be upper-case, so much so that there is no difference between *frank* and *Frank*, or *smith* and *Smith*, which are /fɾæŋk/ and /smitθ/ in any case> (leaving aside... *randy* and *Randy*), certain books <present> things such as */^hHu: ɪz 'Kert/, instead of /^hhu:z 'kɛɪt/ (or at least /^hhu: ɪz 'kɛɪt/) *Who is Kate?*

Comparison with the main non-IPA symbols used in Romance studies

7.32. Since there are so many different symbols, in different publications, often

<i>a</i>	[a]	<i>h, χ</i>	[ç]	<i>r</i>	[r/ɾ]
<i>ä</i>	[æ/ʌ]	<i>i</i>	[i/ɪ/ɪ̃]	<i>ɾ</i>	[ɹ, ɹ̥] **
<i>å</i>	[ɑ/ɐ/ʌ]	<i>î</i>	[i/ɪ̃]	<i>ʀ</i>	[R/ʁ/ʀ]
<i>â, ã</i>	[ã]...	<i>ï</i>	[ɪ/ɪ̃]	<i>s</i>	[s/s̥]
<i>ā, a/</i>	[aː]...	<i>ȳ</i>	[j(V), (V)i]	<i>ś</i>	[ʃ/ʂ, z/z̥]
<i>b</i>	[b]	<i>ȳ</i>	[w/w̥]	<i>š</i>	[ʃ̣/ʂ̣, ʃ̣]
<i>ɸ, ɸ, β</i>	[β]	<i>j</i>	[j/ɟ/gɟ]	<i>ʒ, ʒ</i>	[ʒ]
<i>č, č, ĉ</i>	[tʃ/tʃ̥]	<i>k</i>	[k]	<i>ʒ̣</i>	[ʒ̣/ʒ̣̥]
<i>č̣</i>	[kç/c]	<i>l</i>	[l]	<i>ʒ̣̣</i>	[ʒ̣̣/ʒ̣̣̥]
<i>ė</i>	[V̥V] *	<i>ł</i>	[ɫ]	<i>t</i>	[t/t̥/t̥̥]
<i>d</i>	[d/d̥/d̥̥]	<i>ł̣, ł̣̣</i>	[ɫ̣/ɫ̣̣]	<i>ṭ</i>	[ṭ/ṭ]
<i>ḏ, ḏ, δ</i>	[ð/ð̥]	<i>t</i>	[ṭ, ɫ̣]	<i>ṭ̣, ṭ̣̣</i>	[ṭ̣/ṭ̣̣]
<i>ḏ̣</i>	[ḍ/ḍ̥]	<i>m</i>	[m]	<i>ṭ̣</i>	[ṭ̣/c]
<i>e</i>	[e/E]	<i>n</i>	[n]	<i>u</i>	[u/u̥/ω/μ]
<i>ẹ</i>	[e]	<i>ṇ</i>	[ṇ]	<i>ụ</i>	[ụ/μ̣]
<i>ē</i>	[ɛ/E]	<i>ṇ̣, ṇ̣̃</i>	[ɲ/ɲ̣]	<i>ụ̣</i>	[ụ̣/ω̣̣]
<i>ẹ̄</i>	[ɪ/I]	<i>ṇ̣̣, ṇ̣̣̣</i>	[ɲ̣̣̣]	<i>ụ̣̣</i>	[w(V), (V)u]
<i>ẹ̣̄</i>	[æ/ʌ/ɛ]	<i>o</i>	[o/σ]	<i>ü</i>	[y/Y]
<i>ẹ̣̣̄</i>	[ɤ/ʌ/ʌ̣]	<i>ọ</i>	[ọ]	<i>ÿ</i>	[y/Y̥]
<i>ë, ə</i>	[ə/ɜ/ɪ̃]	<i>ọ̣</i>	[ɔ/σ]	<i>ỵ̈</i>	[ỵ/ɸ̣]
<i>f</i>	[f]	<i>ọ̣̣</i>	[ɔ̣/σ̣]	<i>v</i>	[v]
<i>g, ġ, ġ̣</i>	[g]	<i>ọ̣̣̣</i>	[ɔ̣̣̣̣]	<i>z</i>	[ts/ts̥]
<i>ğ, ġ̣, ẓ̌</i>	[dʒ/dʒ̥]	<i>ö</i>	[ø/ø̥/œ]	<i>ẓ</i>	[θ/tθ]
<i>ğ̣, ġ̣̣</i>	[g̣/ɟ̣]	<i>ọ̈</i>	[ø̣]	<i>ž</i>	[ʒ]
<i>g̣̣, g̣̣̣, γ</i>	[ɣ/ɦ]	<i>ọ̣̈</i>	[œ/ø̣̣]	<i>ẓ̌, ẓ̣̌, ẓ̣̣̌</i>	[dʒ/dʒ̥]
<i>ḡ</i>	[ṾṾ] *	<i>ṗ</i>	[p]	<i>ẓ̣̣̣̌</i>	[ð/dð]
<i>h, ħ</i>	[x/h]	<i>p̣, p̣̣, p̣̣̣</i>	[p̣]		

* Often used for Tuscan, as if they were different from short *š, ž*! ** Traditionally used for Sicilian <ɾ>, instead of [ɹ]! (and *ṭ̣, ḏ̣̣̣*, [ṭ̣̣, ḍ̣̣] as well, as if they really were [ṭ̣̣, ḍ̣̣], <ṭ̣̣̣, ḏ̣̣̣̣>!

symbols are *offIPA* (and also *canIPA*) symbols, those in italics (in the second list, ie from *IPA* to the others, § 7.33) also include some of their previous versions and several taken from non-*IPA* alphabets (as they are often mixed).

Let us then carry on this pathetic operation (square brackets contain *offIPA* or *canIPA* symbols. Symbols are <rigorously given in alphabetical order>, mixing vowels and consonants, and with no distinction among manners of articulation. Of course, here we are doing this to demonstrate how a graphic-mnemonic approach to phonetic symbols is difficult and unfruitful. In fact, the most profitable way obviously is *from sounds to symbols* (using the more appropriate ones).

From a couple of *IPA*'s to many different non-*IPA*'s

7.33. We will provide here (on the next page) the variants of some phonetic symbols, starting from the (*can*)*IPA* values to reach several different alphabets, among the most widely used ones. It is important to note that there is no necessary correspondence with those just seen. As a further <sadistic> contrast, we will continue according to scientific categories, within the basic subdivision between vowels and consonants. Thus, we will first give the (*can*)*IPA* symbols – roman and in brackets, a byword for a scientific method, in contrast with those who go as far as to put graphemes between slashes, as if they were phonemes, in a false attempt to be scientific!

The phonetic alphabet of the *Atlante Linguistico Italiano* (<Italian Linguistic Atlas>): Another example not to follow!

7.34. With the publication of the second volume of the *Atlante Linguistico Italiano* (1996), the list of the symbols used is provided, at last. In the first volume (1995) nothing of the kind was given, although a certain number of symbols had changed in comparison with bulletins previously issued. Such a list is very concise: a 38 × 50 cm wall sheet (plus margins) with medium-to-small-sized typefaces. But most disappointingly, they are not explained; they are just listed in a kind of alphabetical order. Sometimes we find indications corresponding to *Tuscan*, *Italian*, *Spanish*...; at other times some explanations are attempted, but often they are confused and very approximate, so that they give rise to more doubts than answers (to trained phoneticians as well).

In short, it is a <phonetic> alphabet which does not consider phonetic types, but rather graphic types to be artificially distinguished by unlawfully using disorganic and scrappy diacritics and graphemes, which have not been expressly devised. Even vowels are severely <writing addicted>, which is the major drawback of these phonetic pseudo-alphabets and shows the absurdity and incongruity of representations (and equalizations) such as (where slashes separate unstressed from stressed ones): *o/ó, o/ó, o/o', o/ò, o/ò!*

But is this algebra or phonetics? It would have been more logical to have *o/ó, o/ó, o/ó, o/ó, o/ó*; or, better still, even simplifying both composition and the sign in-

ventory: $\underset{\cdot}{o}/\underset{\cdot}{o}$, $\underset{\cdot}{o}/\underset{\cdot}{o}$, $\underset{\cdot}{o}/\underset{\cdot}{o}$, $\underset{\cdot}{o}/\underset{\cdot}{o}$, $\underset{\cdot}{o}/\underset{\cdot}{o}$. So why do we not remove all those troublesome diacritics (which certainly do not facilitate either reading or composition)? These five blocks ought to be distinguished according to closing/opening degrees. On the other hand, how open can *a*-sounds be? According to certain false interpretations, they could indeed be well over the actual vowel space in the vocogram!

7.35. Unfortunately, these possibilities are not generally applied according to phonetic criteria (relating to the articulatory space in the vocogram), but rather by progressively drifting away from what subjectively is thought to be more common, more normal, more familiar. When some difference is perceived, a diacritic is searched with the aim of indicating it, while remaining linked to graphemes, on affinity grounds, or even because dominated by etymology! So it could happen to find $\underset{\cdot}{u}$ when there is a <wish> for a given *u* to be very open, but $\underset{\cdot}{o}$ when the <wish> is to have a very closed *o* sound; but in all likelihood there may be just one phone (or the two are very similar) to be represented with the same symbol. As a matter of fact, this phonetic alphabet <would provide for> even 85 vowel *phones* (against the 52 of *canIPA*, that some think are too many!). But that is not enough: in fact, the *symbols* are $85 \times 2 = 170$ (!), counting the awkward and troublesome accents *over* the vowels too. Of these 170 symbols, only 10 are free from diacritics, whereas 14 other <symbols> have three diacritics (3!); all the other have one or two! Is this not <diacritico-crazy>...?

Seven vowels, which were probably considered to be primary, are not explained at all: *i*, *e*, *ä*, *à*, *a*, *o*, *u*. According to phonetics' logic and articulatory possibilities, they have the indicative value of [i, e, æ, a, ɑ, σ, u]. Seven further vowels, *y*, *ə*, *ë*, *ü*, *ö*, *ù*, *ó*, are absurdly and uselessly <explained>. Their values ought to be: [i, ə, ɤ, y, ɔ, ʉ, ɐ]. Furthermore, we find three <velarized> vowels, *ε*, *α*, *ω*, which could correspond to [ɛ, ɐ, ʌ]. Each one of these 17 vowels, as we have seen, can be modified by diacritics five times, plus five more, due to the possible addition of accents!

7.36. As far as the consonants of the ALI are concerned, the situation is even worse. There is a limited number of graphemes, mostly from the Latin alphabet, with some stylistic variations, and a few Greek ones; they are often exemplified, whereas in other cases the readers are lost, faced with fictitious definitions, which are more confusing than indicative. Besides, not rarely there are symbols or, more often, combinations of symbols, sometimes as superscript characters, or with various diacritics which are not specific but <recycled>, for about 90 phonetic values.

However, a number of these combinations also indicate (true or presumed) fluctuations between other articulations, which are then generally wild and indecipherable.

Finally, let us draw a veil over all this by exemplifying an emblematic case: [s, ʃ] are represented by <*s*, *š* (Italian *sale*, *scena*)>; then several combinations with diacritics are presented, and *ś*, *ś* are among these. The funny thing is that one is <explained> through the other which, obviously, is as cryptically <explained> by referring to the previous one! In fact, we are told that *ś* is <between *s* and *ś*> and that *ś* is <between *ś* and *š*>; it is likely that they are [ʃ, ʃ] respectively. But why not say that

in a clear and firm way? On the other hand, several further cases are even more ambiguous. After some more diacritics, we also find some sounds used to spur or call animals. We have isolated the clicks (or dejectives): < >p'<, >z'<, >tl'<, >k'< > = [p, tʰ, tɬ, t̪].

Furthermore, in the volumes containing the survey proceedings there are dozens and dozens (and dozens) of further symbol combinations (even reduced and superimposed) and further diacritics, which are generally not explained at all!

7.37. By now, it should be a known fact that the only clear and valid way to make the values of sounds understood is to show their articulations, by means of appropriate *figures* (orograms, rigorously drawn, but without useless frills), connected with *symbols* (not graphemes made up with some disturbing diacritics). Whenever it is possible, it is useful to add some references to well-known languages, but with no fear to introduce less-known ones too. As a matter of fact, when a correct *example* has been given, comparisons and verifications are always possible. Instead, with no example, there is little left to do...

Without all this everything is vague and unclear. This situation is congenial only to those who content themselves with superficiality.

Observations on the (non) <respect> of symbols

7.38. Too many printers, editors and publishers (even important ones) seem happy with symbolic approximation, either because they do not know, or cannot appreciate, what rigor and internal harmony there is in the symbol inventory. Even authors are often not sufficiently informed *or* refined; or else they are subjected to typesetting limitations. Even without moving away from *offIPA*, and even in Great Britain where the *IPA* is more used than ever, we too often find cases such as those which follow.

The most serious, and too frequent, is the confusion and exchange of symbols with completely different values, even vocoids vs contoids, as (the problem is within pairs – the first symbol is the correct one): [ɣ, ɣ], [θ, ɵ], [ə, ə], [ʊ, ʊ], [ɬ, ɬ], [x, χ], [ɲ, ɳ], [ŋ, ŋ].

7.39. Then we find undue substitutions with <normal> letters (or <special> ones for computers): [ʃ, /], [ʒ, /], [ʒ, 3], [ʒ, ʒ], [g, g], [ɪ, 1], [ɪ, ɪ], [ɲ, ñ], [β, ʙ], [ʀ, R], [ɪ, I], [ʊ, U], [ɣ, Y], [ɢ, G], [χ, X], [ʔ, ?], [ː, :], [ˈ, '] (or [ˈ, ']) and [ˌ] rendered as [ˌ]. And it is a hard task indeed to try to make typesetters notice the (obvious) difference, especially when lower-case signs are concerned! Try it and see... Some even put a space after [ː] and [ˌ] (which they use for [ː] and [ˌ]); others on the contrary (especially in the English-speaking countries) do not take the trouble to put the legitimate space after commas separating symbols, so they are able to produce strings like </ɪ,ɛ,æ,ʌ,ɑː,ɒ,ɔː,ʊ,ɜː,ə/> (for the most readable and legitimate sequence /ɪ, ɛ, æ, ʌ, ɑː, ɒ, ɔː, ʊ, ɜː, ə/) even for *all* the phonemes of a given language (30 or 40 elements, and even more!).

We also find the absurdity of ligatures used with phonetic symbols: [fi, fi], [fl, fl], [ff, ff], [ffi, ffi], [ffl, ffl], and the opposite absurdity is found too (ie ‘false ligatures’ for phonetic ligatures or *monographs*): [ts, ts], [dz, dz], [tʃ, tʃ], [dʒ, dʒ] (and even [tʃ, tʃ], [dʒ]).

7.40. Then come substitutions with Greek letters: [λ, λ], [ϕ, ϕ], [ϕ, ϕ], [β, β], [χ, χ], [θ, θ], [ð, ð], [η, η], [υ, υ], [ɲ, ɲ], [α, α], [ɪ, ɪ], or Cyrillic ones: [ϕ, ϕ], [k, k], [ɣ, ɣ], [υ, υ], [ε, ε], [з, з] (there is an actual difference even between the last two signs). In addition, we find that the ‘phonic zero’ – /ø/, [ø] – can be represented with the symbol of the vocoid [ø], instead –at least– of ‘diameter’, ‘ø’, which at times is used for /ø/, [ø] instead.

Lastly, we also find symbols not drawn by phoneticians, but by some inaccurate persons (of no scruples or principles), which are purchased by linguists and phoneticians too! It is sad to see that even the *Journal of the International Phonetic Association* uses them (although years ago it used to use some absolutely despicable ones!): [ɹ, ɹ], [ɹ, ɹ], [ɹ, ɹ], [ɹ, ɹ], [ɹ, ɹ], [ɹ, ɹ], [ɹ, ɹ]. A rather weird idea was the substitution of [ɹ] with [ɹ], to –pointlessly– try to avoid it being confused with [ɹ] (which, as is apparent in the official version, ie [ɹ], dangerously has too small a loop). In fact, again, even in the *Journal of the International Phonetic Association* [ɹ] has been used in place of [ɹ] (2003, 33/2, p. 262)!

7.41. Not to mention then the undue and undesired substitutions that, too frequently, are to be found even in serious texts... The use of mixed symbols is particularly insulting: </bɛl/ or </bɛl/ (obviously for /bɛl/); or <[bɛl]; or else </bɛl/, </bɛl/. Besides, today, it is a mark of great and guilty slovenliness to publish transcriptions such as those just indicated. There are computer programs (although it is true that not all of them are really good), which enable phoneticians to produce all the symbols they need, by really making them as they should be done (so to say... ‘as Phone commands’).

7.42. Since the *offIPA* has told the world about its (sham) reform, the authors of linguistics books feel obliged to insert an appendix with the chart of the *IPA*. However, this ‘fashion’ is (almost) always *old*, since the version of the inserted chart is (almost) never the latest one, even for books appearing many years after the latest revision. This does not happen only in the ‘colonies’, but also in Great Britain and North America, where novelties arrive first, since they are generally produced there. There are new books that still appear with the chart revised in 1993, instead of 1996 (or partially so, in 1989), or even in 1979, or in 1951 too!

Above all, many people are not even able to make the necessary corrections of misprinted symbols, on the contrary they often add some new (even serious and embarrassing) ones. For instance, in 2002 in Italy a book bearing the title of *Linguistica elementare* (‘Elementary Linguistics’) appeared; it is a second edition (although it is defined as the *ninth* one... – the first one was dated 1998!) and it reproduces the chart of 1989! Among the mistakes it contains, and excluding here foreign languages, we cannot help pointing out the highly misleading ones referring to the Italian lan-

guage and some dialects: according to this book, Italian has only [r] (whereas most often it has [r]), and palatal stops *[c, ɟ] before front vowels (whereas they are normal prevelar ones, [k, g], [k̟, g̟]); besides ⟨[tʃ, dʒ; ʃ]⟩ are variously defined as ⟨palatoalveolar⟩, ⟨prepalatal⟩, or ⟨palatal⟩ (ie [tʃ, dʒ; ʃ], which are postalveopalatal protruded). But, the most surprising fanta-phonetic inventions regard dialects: in Rome, according to this source, they have a uvular *[ŋ] (for [ŋ]) of the example given), in Naples, again, uvular *[q, ɢ] (for normal [k, g]). And, again according to this source, in Sicily they have a retroflex sequence *[ɬɬ] (for the alveolar slit stopstricative, [tɬ]), but someone else has had a finger in this pie for more than a century. Thus we can balance this by adding a further ⟨authentic⟩ invention: ⟨[ɭ]⟩ (ie [ɭ]) would be the impossible ⟨flapped lateral *click*⟩... It goes without saying that such errors are very misleading. And the author of that book had been... Minister of Education (although for a very short while); but for many people Phonetics is not ⟨education⟩.

7.43. Our conclusion is quite obvious: ¿why should people want to deal with what they do not know? Regrettably, this way of thinking is still widely prevailing in the academia, in particular for linguistic and glottological studies. Fantastic stories are told about the fact that one should deal with all linguistic aspects, just to demonstrate how to ⟨fully master⟩ the whole subject. What *is* demonstrated, instead, is only (blind and uncritical) superficiality and presumption, which still undermine true qualification and competency. Inevitably, qualification and competency must be specialistic (as far as books to be written), but not limited (as far as books to be read).

Hypostatization & ⟨IPastatization⟩

7.44. Writing –we will never tire of repeating it– is nothing but a (very deficient and defective [even hysterical]) means of representing the absolute reality of the signifier of a given language or dialect (obviously in order to convey the signified).

It is necessary to consider writing simply in this way, although it is true that it is often based on a phonemic criterion, sometimes even without the inventor's full awareness. This mostly happens to new orthographies, if they are prepared calmly and after long reflection, by operating ⟨from inside the language⟩, through a symbiotic relationship produced by a deep interest in the language and the need/necessity to represent it.

Instead, when people try to adapt the orthography of another language (even if it is a cognate language they known well), real problems arise owing to the interference from the native tongue, which inevitably prevails and leads to bad ⟨choices⟩. In addition, if people try to do this with no phonological or phonetic bases, although with the best intentions, they are likely to fail.

However, also those who approach the different orthographies as if they were something absolute, almost divine, are likely to do worse things. Let us give some practical examples: to consider *j* as if it actually were /j/ [j] clearly means to hypostatize (or ⟨IPastatize⟩) the few and poor orthographic signs available to ordinary

mortals. The same is true of $n = /n/$ [n], whereas it is natural that, before consonants, it usually assimilates by place of articulation. Thus, although orthographies may give *aj*, *nk*, there is no good reason to consider those written sequences as corresponding to [aj, nk]; it is more likely that they stand for [ai, ŋk], even if in phonemic transcriptions we can actually find /aj, nk/.

7.45. Another connected problem, but even more serious, regards the stopstricative (‹affricate›) articulation as too often wrongly described in so many books (even good ones). The use of more appropriate symbols, such as /tʃ, dʒ; tʃ̥, dʒ̥/, would make people realize that we are not at all dealing with /t+s, d+z; t+ʃ, d+ʒ/, as the most widely used *IPA* way of transcribing –ie /tʃ, dʒ; tʃ̥, dʒ̥/– would allow one to think at first. Nevertheless, even in influential books, we too often happen to read that such ‹affricates are formed by apical [t, d] followed by [s, z; ʃ, ʒ]›. Three mistakes are quite evident here: the articulations are not presented (as they actually are) as homorganic, unitary (although not simple), and lasting as any other consonant (not as two).

8. Vowels & vocoids

October 2013 *Canepari's* updating of *canIPA* vocoids in *Natural Phonetics & Tonetics*

8.1. In this chapter, we will explain –in depth– the articulations of vowels. We refer to vowels as VOCOIDS, or *vowel phones*, when looking at them from an exclusively phonetic point of view. Instead, when we speak of their distinctive role in a particular language, we will call them VOWELS, or *vowel phonemes*. In the case of graphic symbols, we will again speak of VOWELS, or of *vowel graphemes*. It should be clear, in the first place, that the *matter* (ie SOUNDS) and *substance* (ie PHONES) must be fully grasped, given that these elements constitute the essence of vowel articulations. Everything else is necessarily secondary, including the *form* (ie the phonemes of a given language).

The characteristic quality of vocoids depends on the shape assumed by the ARTICULATORY CHANNEL while they are being formed. Specifically, we mean their *position*, determined by the raising and forward–backward movement of the back of the tongue, as well as by the shape imparted to the *lips*. Acoustic and radiographic phoneticians give too much importance to the inevitable and objective fact that the pharyngeal cavity is wider with front vocoids, since the tongue mass has been moved forwards. As vocoids move farther and farther back, the dimensions of the pharyngeal cavity automatically become smaller, all the way to the point of true back vocoids.

It is true that this change implies a difference in the shape of the ‘articulatory channel’, and that this difference, in turn, produces alterations in the physical (but not physiological) processes which affect the sound wave. The result is a change in the acoustic measurements; but all this has little relevance to the actual articulatory intentions, as should be quite clear.

Thus the production of vocoids has three fundamental components, not counting the expiratory air which makes them possible and gives them VOICING, by vibrating the vocal folds (at least in the case of the more common vocoids). As a matter of fact, it will be seen later that further modifications of vocoids are possible, potentially regarding articulation *or* phonation, particularly in certain specific languages.

For now, however, we will discuss the *three* fundamental components of vocoids (naturally returning to other topics which have already been mentioned): *vertical* RAISING of the back of the tongue (in cooperation with movements of the jaw), in the direction HIGH–LOW; *horizontal* FORWARDS–BACKWARDS MOVEMENT along the FRONT–BACK direction: and finally, *lip* ROUNDING, according to the alternation ROUND–SPREAD. Therefore, the components can be summarized in TONGUE POSITION (both vertical and horizontal, of the back of the tongue), and LIP SHAPE.

8.2. The older, prescientific method of describing the ‘vowels’ of a foreign language typically involved making vague references to the sounds ‘hypothesized’ for

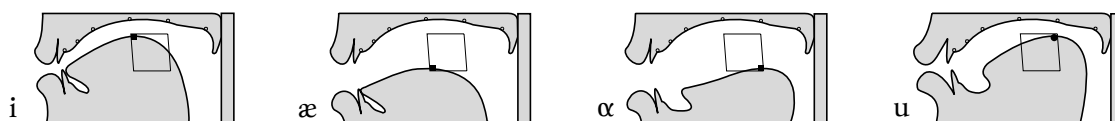
one's own language, together with occasional comparisons with some other 'better-known' widely-spoken European languages, for significantly different sounds. It was not realized that the vocoid systems of two languages never correspond satisfactorily. Also neglected was another point which is clear to us today: that no two people speak the same language in exactly the same way, since there are individual, regional, and sociocultural differences of pronunciation which are often quite notable.

It is therefore necessary to analyze the vocoids of a language by following a scientific approach, working independently of any particular language while nonetheless making solid connections to the precise inventories of a great number of natural languages. This approach is called the **PHONETIC METHOD**. The first step in the method involves understanding the vocoids of one's mother tongue (which does not necessarily coincide with the national or official language). With this beginning, it is then possible to move on to pronouncing any vocoid in any language.

8.3. **VOCOIDS** are by nature in opposition to the other category of segmental sounds, the *contoids*. In fact, vocoids are distinguished particularly by being (relatively) **STATIC**, by a fair amount of **DISTANCE** between the articulators, and also by having their articulation restricted to a **LIMITED** physical area within the oral space (constituted effectively by the area ranging from the zone of the **PREVELUM** to the boundaries of the palate and the velum, as can be seen in fig 5.1 and fig 8.1). Their static nature, articulatory distance, and limited range, are in contrast to the *movement*, articulatory *proximity*, and *extended* range of articulations characteristic of the *contoids*. In fact, these last can be produced in every possible articulatory zone, including very peripheral ones, such as the lips, the teeth, the pharynx, the larynx, &c.

For vocoids, the *position* (or *shape*) imparted to the **LIPS** is also essential (as already stated above). This component of the articulation is independent and non-contiguous with respect to that of the back of the tongue. Moreover, the involvement of the glottis is usually assumed to be part of the articulation, and the result is **VOICING**. Voicing gives greater substance and resonance to vocoids, thereby making them easier to distinguish and recognize in their particular timbres, 52 in all, together with further nuances which are equally perceptible and recognizable, and reproducible as well. On the other hand, voiceless vocoids are also possible, even though here the individuality of the particular timbres is naturally diminished. Voiceless vocoids can even be used distinctively as phonemes in certain languages, opposing the more 'normal' voiced phonemes (cf § 11.18).

fig 8.1. Articulatory space for vocoids.



8.4. Therefore, **VOCOIDS** are phones in which the expiratory air passes freely out of the mouth, moving along the middle part of the back of the tongue. The tongue position is (relatively) rather stable throughout the duration of the phone. More-

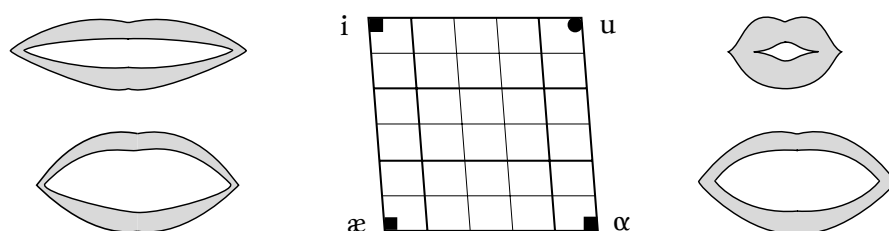
over, the opening of the jaw (and naturally, also the space between the back of the tongue and the palate) is never less than that found in dorsal approximants, such as [j, ɥ; ɥ, w]. As was seen in § 5.5-6, this last group is characterized by a less stable and quicker articulation than the corresponding vocoids, [i, y; ʊ, u]. For the various positions of the back of the tongue and of the lips, in the course of vocoid articulations, cf fig 8.6-9.

There exist vocoids with greater jaw opening as well, passing through intermediate stages until reaching the level of true open vocoids. It will be immediately seen that it is helpful to classify the different vocoids in six degrees of jaw opening, organized into three groups. We see now –once again– that vocoids have a limited zone of production, in terms of the height of the tongue and the jaw. The mouth must be appropriately open, but not too much, so that a natural articulation which combines fluidly vocoids and contoids is possible. The opening should not be overly narrow either, since otherwise unhelpful friction and noises would be produced (which would also be annoying while communicating with others).

Moreover, there needs to be enough space between the OPEN and CLOSE degrees to make it possible to distinguish cleanly the intermediate levels, which are variously used by the different languages. Therefore, for purposes of classification, this space is subdivided into three horizontal zones: CLOSE, MID, and OPEN. Each one of these is in turn subdivided into an upper or lower part, thereby allowing further internal distinctions.

In this manner, one obtains the following six –successively greater– degrees of tongue/jaw opening for vocoids: HIGH, LOWER-HIGH; HIGHER-MID, LOWER-MID; HIGHER-LOW, LOW; whose existence can also be demonstrated experimentally with, for example, x-ray photographs or films.

fig 8.2. Vocograms and labiograms of vocoids in the extreme positions.



8.5. In order to investigate the natural limits of the area of vocoid articulations, the author used x-rays and a small metal chain, with a coated lead ball in the center. The chain was then extended along the longitudinal groove of the tongue so that the lead ball would coincide in position with the center of the back of the tongue (the position of the lead ball is shown in fig 8.1, where it is magnified so as to be more evident, and it is furthermore represented with a *square* marker, but a *round* one for [u]). In this way, it is possible to detect the horizontal and vertical movement of the tongue, together with its shape with respect to various fixed points on the palatal vault, while various vocoids are being articulated. In order to ensure that the articulations were natural, photographs of speech made with and without the chain were compared (as well as the corresponding magnetic or electronic recordings).

The essential point, therefore, is to succeed in identifying accurately the full range of (horizontal and vertical) movement of the lead ball, during the articulation of the most extreme possible vocoids, uttered in a natural way. One such result is that the highest and frontest possible vocoid is [i] (fig 8.1, where we give precisely those points on the vocogram which are most extreme and peripheral). Raising the tongue further, we inevitably pass (through the palatal approximant [j], fig 5.1 & fig 10.6.1, towards the end of the first part of the figure) to a point where friction is produced, resulting thereby in the voiced palatal constrictive contoid, [ɟ] (fig 10.5.1, at the beginning of the last but three row). Moving the tongue forward, as well, the quality of vocoids would be lost, resulting in a timbre more like that of a contoid.

[Especially non-phoneticians will frown on this (perfectly grammatical superlative) *the frontest*, preferring 'the most forward', or even 'the most front'. The same holds true of *the backest*, in comparison with 'the most retracted/back', and of the corresponding comparatives: *fronter*, *backer*.]

The highest and backest vocoid possible is [u] (fig 8.1). Raising the tongue further, the resulting phone passes through the velar rounded [w] (fig 5.1 & fig 10.6.1, at the beginning of the last but two row), before yielding the voiced velar (rounded) constrictive [ɣ] (fig 10.5.1, third orogram in the last but two row); while moving the tongue farther back, the result would be the uvular rounded constrictive, [ʁ] (fig 10.5.1, the first in the last but one row).

The lowest and backest vocoid possible is [ɑ] (fig 8.1). Moving the tongue farther back, the result would be the prepharyngeal approximant contoid, [ɶ] (fig 10.6.1, the first in the last row), and moving still farther, we encounter the prepharyngeal constrictive, [ɦ] (fig 10.5.1, the last one in the last row), where both of these are voiced.

Combining the level of jaw opening characteristic of [ɑ] and the forward position of the tongue found in [i], we come to the lowest and frontest possible vocoid, [æ] (fig 8.1), which constitutes the articulation most different from that of the contoids, with which it in fact has no natural connection or similarity (unlike in the other cases mentioned here). We (the author and many others) have already explained that [æ] is actually a *low* front vocoid (even though the *offIPA* continues to describe this vowel as higher than it actually is), as the acoustic analyses themselves clearly demonstrate.

8.6. Joining together these four points, in a schematic way in order to be more practical, and enlarging the figure, we arrive at the vocoidal quadrilateral, or VOCOGRAM (fig 8.2), into which all vocoid phones possible in any language can be placed. (Concerning possible modifications of these, cf § 11.17-19.)

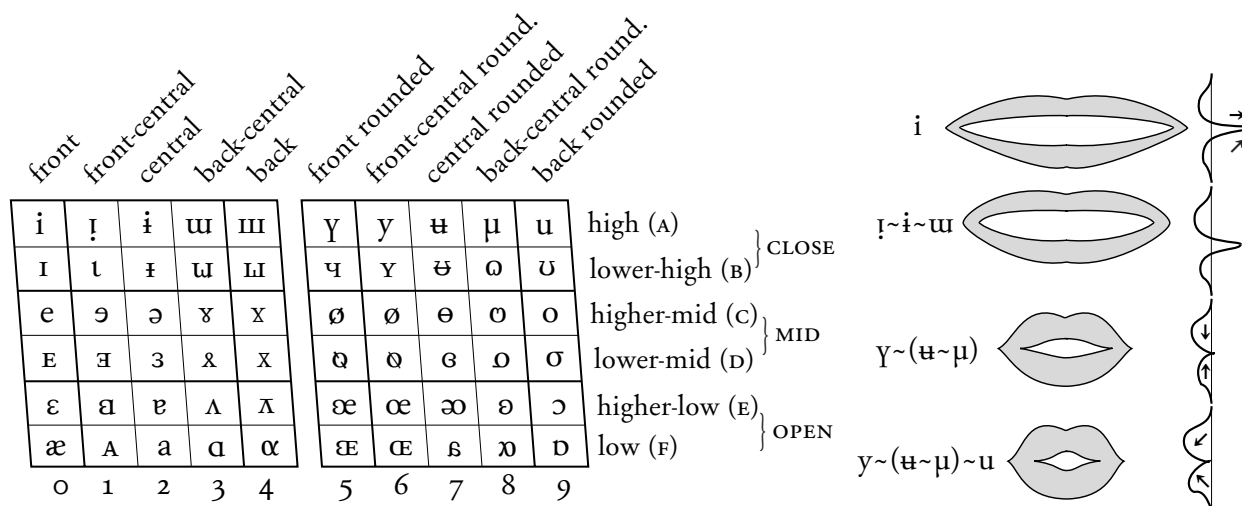
The left side of the vocogram is thus the front limit of the articulatory area for vocoids, while the right side is the back limit. The space between these two limiting barriers can be usefully divided into five columns. On the ends, we have the FRONT and BACK vocoids; in the middle, there are the CENTRAL ones. Since it has been proved worthwhile to use specific markers also for phones in the areas comprised between these strips, the two other vocoid columns are referred to as FRONT-CENTRAL and BACK-CENTRAL respectively.

Observing the vocogram of the phones which are *unmarked* (in the sense of being unrounded – fig 8.3, first vocogram, columns 0-4), we see that in the back region, the four closed and mid boxes have their vocoid symbols placed in parentheses. This is due to the fact that when back unrounded vocoids are found in languages (mostly Eastern Asian ones), these vocoids, ([ɰ, ʊ, ɤ, ɤ]), are articulated farther forward than [u, ʊ, o, ɔ].

They are therefore more accurately defined as BACK-CENTRAL vocoids, rather than purely back ones. If, one day, a language should be found possessing vocoids in the area of these four boxes, an appropriate symbol can always be brought into use. These supplementary symbols, prepared according to the principles leading to the expansion of this present *handbook*, are, in fact: [ɰ, ʊ, ɤ, ɤ].

We move ahead, now, to the vocogram of the rounded phones, which are *marked* because they are produced with lip rounding (fig 8.3, second vocogram, columns 5-9). Here it can be seen that, corresponding inversely to what occurs with unrounded vocoids, the four mid and low front boxes have symbols placed in parentheses. In fact, the vocoids [y, ɣ; ø, ɶ; œ], occurring in languages such as French and German, are articulated farther back than [i, ɪ; e, ɛ; ɛ], and are therefore defined more accurately to be FRONT-CENTRAL vocoids. If symbols for truly front rounded vocoids in these areas should become necessary, it could be possible to use [ø, ɶ, œ, ɶ].

fig 8.3. The 52 vocoids of *canIPA* (with the 8 ‘potential’ ones) and labiograms for the high ones.



corresponding areas for vocoids (to be objective). One approach might be to name five different places of articulation, which could therefore be: palatal, postpalatal, prevelar, provelar, and velar (as, in fact, will be done later, when we seek to indicate nuances and distinctions relating to medial approximants –articulated with the medium-dorsum of the tongue– and similar contoids articulated nearby, cf § 10.13 and fig 10.12, by comparing them to the space of vocoids).

But it seems preferable to follow the terminology proposed above: FRONT, FRONT-CENTRAL, CENTRAL, BACK-CENTRAL, and BACK, in addition to the correspondent ROUNDED forms. In fact, it is appropriate to treat vocoids by means of the vocogram, both for learning and for teaching purposes.

Also alpha(nu)meric indications, using the numbers 0-4 and 5-9 together with the six heights, denoted with A-F, can be a useful way to refer to particular vocoids. This is particularly the case while speaking on the telephone, or while writing e-mail messages (without having to use attachments, which require both people to have the same fonts or being able to write and read *pdf* files). For example, we can write [a] = 2F, [i] = 0A, [u] = 9A, [ø] = 6C and [ə] = 2C...

{Looking carefully, it can be seen that there is a certain difference between the roman 'zero': 0, and the letter *o* written in small capitals: O. The letter has a somewhat greater height than the numeral, and a different thickness, more like that of the roman lower case: o, differently from the numerals (which have much more homogenous shapes, and, in the case of the more traditional roman form of 1, namely 1, a more evident serif, with respect to *i* in small capitals: 1).

These numerals –0 1 2 3 4 5 6 7 8 9– are referred to as *lower case*, or *high and low*, or *traditional*, or *refined*, or also *typographic characters*, and they are definitely more elegant than the *upper case*, or *high*, or *modern*, or *common*, or *school characters* –0 1 2 3 4 5 6 7 8 9.}

Other less useful classifications

8.7. However, if one wished to remain completely faithful to the indications of the x-ray photograms, the result would be a complementary and rather different classification of the vocoids. According to the point of greatest closure of the articulatory channel, the vocoids would be apportioned into at least six places of articulation, and ten would not be by any means impossible. These would or could be: 'palatal, (postpalatal,) prevelar, (provelar,) velar, (postvelar,) uvular, uvulopharyngeal, (prepharyngeal,) pharyngeal'! In order to express the degree of progressive opening, the diagram would resemble a wheel hub with spokes coming out of it, pivoting on the area of [ɶ].

The result would be that, for example, from [i] to [ɛ], vocoids would be considered 'palatal'; from [u] to [ə], 'velar'; and from [æ] to [ɑ], 'pharyngeal'! But, a classification of this sort has no practical advantage, even as regards the complex phenomena of assimilation and coarticulation.

Rather, the subject would become needlessly complicated. Furthermore, the same 'love of the truth', if applied rigidly, could induce one to think of [i] (and the

full series, even including [ʋ]) as ‘bidental’ vocoids; and also [u] (and the full series, even including [ɣ]) as bilabials, since the narrowest point of passage for the air in the articulatory channel is actually between the teeth, or between the lips, respectively. At this point, one would encounter the fresh problem of trying to come up with new terms, in order to distinguish between the members of these new and ‘alien’ series! Therefore, we will not speak of this classification any more – yet certain people, working exclusively with machines, seemed to consider it a more scientific approach.

In the meantime, the full validity of the articulatory (and auditory) classification has been fully and convincingly demonstrated. In fact, neither the ‘highest point’ of the tongue, nor the point of ‘narrowest passage’ between the articulators are particularly important for practical purposes. *Acoustically*, the shape of the articulatory channel determines the GLOTTOMETRICAL instrumental measurements; however, these are more speculative than practical. Instead, the GLOTTOGRAPHICAL data furnished by NATURAL PHONETICS (that is *articulatory* and *auditory*, as well as *functional*) give precious and essential information and descriptions, which are absolutely indispensable in learning and teaching.

But the fact of considering the ‘highest point’ of the tongue in the x-ray prints as the truly fundamental aspect led to a series of problems. In fact, the undeniably brilliant idea of Daniel Jones (to which the experiments of previous phoneticians also contributed) became manifested in a sort of deformed trapezoid, with the upper part much longer than the lower part, and the back part less long 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. It would have been better to adopt a partially different criterion with respect to that useful for contoids, for which a global articulation is decidedly more important.

Considering, instead, a *constant point*, namely the CENTER OF THE MEDIUMDORSUM (ie the absolute center of the back of the tongue, where the lead ball on the chain was placed during our early experiments), the resulting figure is similar to a much more regular quadrilateral. With modern technology, it is no longer necessary to use the chain and lead ball – better and more ‘natural’ results can be obtained with a few simple considerations and certain particular substances.

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.

8.8. Another defect was the attempt to subdivide the internal spaces between the four ‘cardinal’ points in the quadrilateral by means of an ‘auditory equidistance’, instead of continuing with ARTICULATORY SUBDIVISIONS, naturally, aided by AUDITORY FEEDBACK. It is quite clear that something which is purely auditory cannot be faithfully transmitted without a direct contact with the source or producer of the sound. In this manner, even the learning and training of specialized phoneticians has suffered, and the results have inevitably included undesired and unappreciated discrepancies, with respect to the articulatory method assisted by auditory feedback.

Those who have not become blinded uncritically in the conviction that the lowest and frontest vowel is '[a]', but instead try to do (articulatory *or* acoustic) phonetics without preconceptions and irrational biases, and to see directly what is going on, will necessarily arrive at the conclusion that the lowest and frontest possible vowel is certainly [æ]. For the sake of precision, given the partial difference between the two approaches in question, we should mention that the 'cardinal' value of '[a]' corresponds, in practice, to our [A] ([A⁺]), which, in any case, is different both from [æ] and from [a] (given that it is practically halfway between these two vocoids, according to our classification).

Of course, it is not our responsibility to convince everyone that this is true, given that it would be simple and sufficient for anyone (even minimally) competent in the subject to check the matter personally, once the idea has been explained clearly. Nonetheless, we cite here some sources, who –with different principles and methods– have come to the same logical (and objective) conclusions: Delattre *et al.* (1951), Hyman (1975), Chapman *et al.* (1988³), without mentioning various contributions of the present writer. All things considered, it has been known for a ('relatively' short) time that the Earth is *not* flat and that the Sun does *not* revolve around it! Just a question of 'points of view'?

8.9. At any rate, as the tongue is moved so as to produce successively all of the most external vocoids (those which are most PERIPHERAL in the diagram), the resulting figure is somewhat circular, a sort of lopsided oval. This can be seen in fig 6.1, where we move gradually from the more realistic to the more schematic, due to the practical reasons mentioned above.

Afterwards, we will see the orograms of all of the vocoids, in their medial values. By 'medial values', we mean the central position in their box, within the vocogram. It is useful to work from these values as starting points, which can be considered BASIC, FUNDAMENTAL, or CANONICAL. The 'cardinal' values used by Jones were instead as peripheral as possible in the vowel trapezoid, and as far from one another as possible. The Jonesian cardinal vowels (recorded on discs, cf Jones 1956), in all, were only 18 in number. They were subdivided into 'primary' cardinal vowels and 'secondary' ones: 'primary' [i, e, ε, a, α; ɔ, o, u], and 'secondary' [y, ø, œ, æ, ɒ; ʌ, ɤ, ʊ], together with [ɪ; ʊ].

Moreover, the vowels of Jones were organized by reference to their frequency in the different languages of the world, with particular emphasis on the European languages. For this reason, the rounded and the more 'normal' unrounded vowels are 'mixed' together, instead of being presented in two homogeneous series, as in our approach. In any case it is unquestionably true that the *primary vowels* are more widely used in the various languages of the world, and that the *secondary vowels* are only added afterwards in learning phonetics (even if there are certainly exceptions, unless all the differences are leveled away in the context of a very abstract form of phonology).

In any case, in common practice, 8 additional vowels were usually added to the 18 'cardinal' ones: [ɪ/ɪ, ʏ, ʊ/ʊ; ə, ɵ, ɜ; ɐ; æ] (in practice, there were two notational variants, shown here separated by slashes, while [œ] was omitted –until the reform

of 1979– because of not being documented in the descriptions of real languages). The trapezoid of the most recent reform (finished in 1996) adds [ə, ɐ] and makes [ɪ, ʊ] official, thereby rejecting [ɪ, ɔ]. However, the value of each symbols has been made (even more) vague, within a fairly theoretical and ‘potential’ trapezoid; this is particularly true in the case of [ə].

The official location of [a] still suffers from the original limited use of symbols, for phonemic purposes, when it was enough to be able to distinguish two kinds of *a*, in respect of only one graphemic symbol. Therefore, one of the two extremes was denoted ‘normally’, with [a], while for the other a graphical variant of this symbol was used, whether derived from cursive script (as in the case of *a* [a]), or from Greek, or from horizontal or vertical reflections of roman letters in some other cases. In certain types of intraphonemic transcription used for English, [æ] /æ/ was symbolized by ‘/a/’, while [ɑ:] /ɑ:/ was simplified into ‘/a:/’, and likewise [ɪ, ɔ] /ɪ, ʊ/ became ‘/i, u/’, in opposition to [ɪi, ʊu/μu] /ii, uu/ represented (still today! – as has already been mentioned) with ‘/i:, u:/’, as if the difference was only one of length.

The real problem of the 18 ‘cardinal vowels’ (unlike our various canonical *canIPA* vocoids) is highlighted by the fact that they are not easy to be adequately reproduced even for trained phoneticians (not to speak of makeshift phoneticians, perhaps on the Internet). In fact, the CV (as they currently are) are just the pursuit of (almost) *unnatural boundaries* (obtained mostly auditorily, sometimes even for the four initial CV!).

Instead, we have to find those *articulatory positions* which can be *easy* for everyone to produce through their own organs, with no stressful excess (which, of course, does not mean that people are allowed to freely use the vocoids of their own language!). In addition, even the internal subdivisions must *not* be an (auditory) *imitation* of an absolute model, to be just reproduced parrot-fashion. On the contrary, they have to correspond to precise *articulatory gradations*, which must be calibrated for the mouth of each person, without ‘cheating’ (perhaps even unintentionally) by introducing *paraphonic* characteristics (precisely as voice imitators do), and playing with secondary tones or using supplementary modifications of the pharyngeal and labial cavities (exceeding what is natural).

More about vocoids

8.10. We have instead 52 symbols (or 60, including the eight available for articulations which had not yet been found in the languages of the world), and we use a vocogram with more rigorous subdivisions and clearly demarcated areas, which makes precision *obligatory*. In fact, it is not enough (for us, at least) to dump symbols here and there all over the diagram. Proceeding in this way, there is a serious risk of ending up with the common problem (unfortunately, seen in a great number of books) of trapezoids of the same language (and the same accent), which seem to be referring to very different languages, instead of just one. This problem occurs in the case of trapezoids made by different authors, but it can al-

so occur with those of a single author (sometimes even within a single book). One cause is, of course, the excessively indeterminate nature of the official diagram, in which there are practically no internal subdivisions.

To present our vocoids, we use two separate vocograms, depending upon whether the lips are rounded or not (cf fig 8.3, fig 8.8, & fig 8.9). Of course, this separation is only methodological. In fact, while describing languages, vocoids should be given together, regardless of the shape of the lips. The shape of the lips is not ignored, however (as often happens, even with the official trapezoid), but is instead clearly marked by the shape of the markers placed in the positions of the relevant phones. Thus **ROUNDED VOCOIDS** have a **CIRCULAR MARKER**, while **UNROUNDED ONES** have a **SQUARE** one. This convention can be seen in all our vocograms, and in those in *Ch* 16-23, but in particular in those in *HP*r.

When vocoids occur with the lips in a position halfway between the two of these, that is **HALF-ROUNDED**, they are indicated by markers in the form of lozenges, or equiangular rhombi (thus, a square, rotated by 45°, ie a sort of diamond shape).

Therefore, in theory, we could have 26 vocoids more, by counting the half-rounded ones (and potentially 30, with the extra 4 unrounded vocoids not yet found in languages, but see § 8.29-31, as well).

So far, the most common ones have been: [i, ɨ, ʉ; ɪ, ʏ, ʊ; ɘ, ɤ, ɜ; ɜ, ɝ; ɞ, ʌ; ɤ, ʌ, ɤ, q]. Labiograms for half-rounded vowels are shown in the central column of fig 8.9. In the same figure, it is also possible to see the differences between the two main types of lip rounding: the types with and without some protrusion of the lips. In the case of high vowels, where the differences are more evident, we have: with protrusion, [y, u], while without protrusion, [ɥ], and with half-rounded lips, [ɨ, ɨ, ʉ]. In the case of [ɤ, ɤ], we have more commonly the type of rounding without protrusion; but the type with protrusion is also possible. Occasionally, rounding without protrusion can occur even with [y, u], in particular languages.

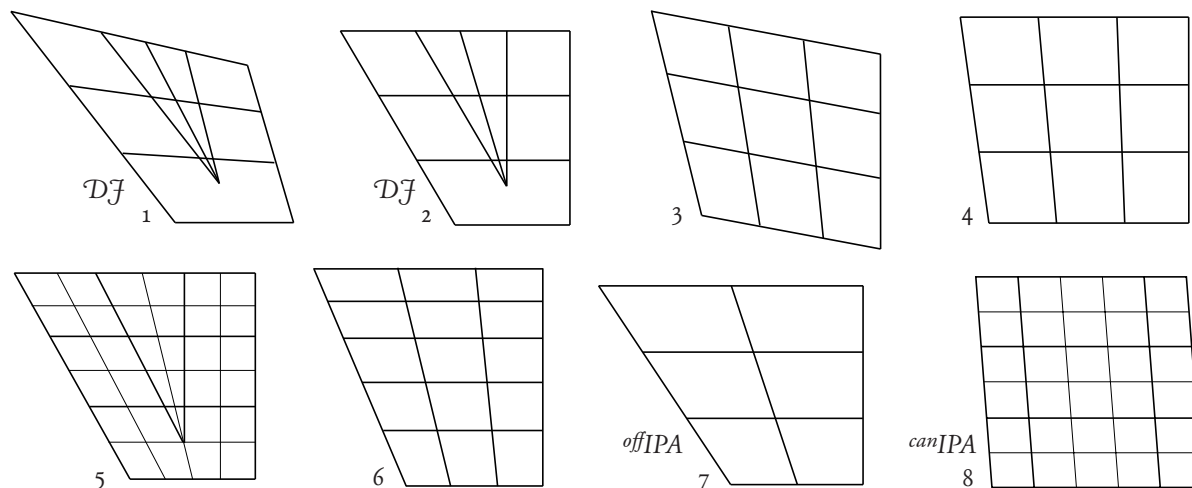
As has already been mentioned, the orograms (or sagittal cross-sections) also contain a sort of skeleton of the vocogram (the vowel quadrilateral). This 'skeleton' can then function as a reference for comparisons and contrasts, as well as for acquiring the vocoid in question. In the description of actual and particular languages, only the large vocogram needs be used (and possibly multiple ones, if one alone is insufficient for the task of showing clearly all of the realizations possible).

In fig 8.4.1, we give a variety of vocoid diagrams (vocograms). The first two are those given by *Daniel Jones* (the first of these suffers, as can be seen by its shape, from the unfortunate fact of having considered as primary the 'highest point of the tongue', instead of a *fixed point*, ie the center of the mediumdorsum). The next four represent successive *developments* of these original diagrams. The seventh is the *official* diagram, given in the most recent reform (*offIPA*). The eighth is our own *quadrilateral* (*canIPA*), which is for us the **VOCOGRAM** *par excellence*, also seen, in a smaller size, in the orograms of fig 8.1, and, enlarged, in fig 8.2.

In order to make a useful comparison with the canonical *canIPA* vocoids (9 of which are different: 5 unrounded and 4 rounded), we have placed in fig 8.4.2(.1) the 18 official *cardinal vowels* of Daniel Jones. Here we list the latter in italics, to avoid any possible confusion: [i, e, ε, a, a, ɔ, o, u], [y, ø, œ, æ, v, ʌ, ɜ, u], [ɨ, ɤ].

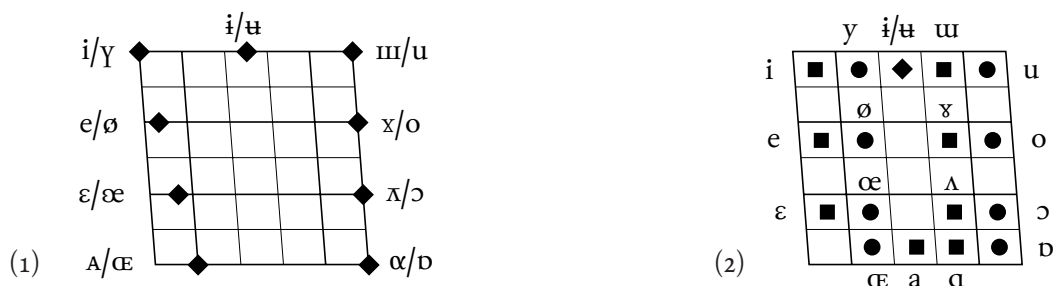
Were we to follow our own habitual ordering (which keeps the unrounded and rounded vocoids separate), we would have: [i, e, ε, a, ʌ, ɤ, u; ɨ], [y, ø, œ, æ, v, ɔ, o, u; ʉ], that is *canIPA*: [i, e, ε, ʌ, α, ʌ, x, ʉ; ɨ], [y, ø, œ, æ, ɒ, ɔ, o, u; ʉ].

fig 8.4.1. Different types of diagrams for vocoids.



In fig 8.4.2(.2), again using *canIPA* symbols, we show the values most commonly attributed to these (official) symbols in phonetics treatises: [i, e, ε; ɨ, a; ʉ, ɤ, ʌ, ɑ], [y, ø, œ, æ; ʉ; u, o, ɔ, ɒ]; while the theoretical and peripheral values (which are found much more rarely, if at all) are better represented by other symbols (which, nevertheless, suggest their values): [ʌ, α, ʌ, x, ʉ], [y, ø, œ], fig 8.4.2(.1).

fig 8.4.2. The *cardinal vowels* of Jones placed upon our vocogram using *canIPA* symbols (1) and *canIPA* values referring to ‘cardinal’ symbols (2).



The markers placed in fig 8.4.2(1) are those which, in our convention, are used for representing vocoids with ‘intermediate’ lip position, that is, half-rounded lips. The only purpose is 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 8.4.2(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.

We have included fig 8.5 as well (for Spanish and for British English), in order

to show two triangular vocoidal schemes which are decidedly not advisable, given that they do not respect the phonetic reality of the articulatory apparatus in various languages of the world. These are given in A.1-2, and despite their defects (the first is actually upside-down), they continue to be used. We have also provided the more common acoustic scheme (based on the first two formants, F_1 and F_2 ; note that 25 = 2500 Hz, 2 = 200 Hz) for Spanish (A.3, as in the stressed vowels of *uno, dos, tres, cuatro, cinco*) and for the 12 monophthongs of British English (B.1, as in: *city, to bring, to eat, book, beck, lack, luck, mark, mock, four, fur* ['sɪtɪ, ˈθəˈbɪŋ, ˈbrɪŋ, ˈbʊk, ˈbɛk, ˈlæk, ˈlɛk, ˈmɑːk, ˈmɒk, ˈfɔː, ˈfɜː]. They are not derived from a triangle, but rather from a quadrilateral with the upper right corner part tilted to the right (although English /u/ is actually back-central rounded). In this it differs from our quadrilateral, where that part tilts to the left (B.3), and from the current official compromise trapezoid (B.2), where that part is vertically straight. In this last case, it is easy to see the vagueness concerning subdivision, and the markers placed upon it which are always black and always round (regardless of lip position and stress). We have placed there the 12 vocoids (corresponding to 12 monophthongs) of neutral British English, which are then given again in our own faithful vocogram (B.3), together with all of its inherent advantages.

fig 8.5. Different ways of showing vocoids (5 Spanish and 12 British English monophthongs).

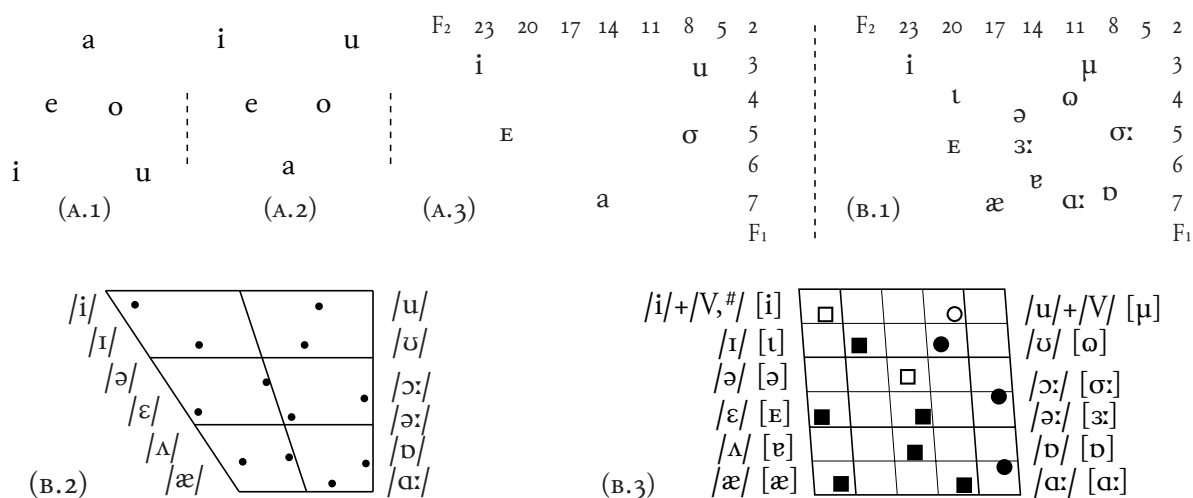


fig 8.6-7 show, respectively, the orograms and labiograms of the 12 *vocoids* found in neutral British English, [i, ɪ, ʊ, e, ɜː, ɔː, ʌ, ɒ, ɑː, ɔː, ɜː, ʌ] (corresponding to the actual *monophthongs* of English, excluding thus cases such as *tea, two* /ˈtiː, ˈtuː/ [ˈθri, ˈθruː], which –clearly– are diphthongs, as we like to repeat).

8.11. With even a cursory examination of some of the vocograms in the phonosyntheses (and those for the 12 languages in *HPr*), it can be seen that a great level of precision is possible. Inside each box in the vocogram, the markers can be found located in a variety of different positions, even along the boundary lines at the border between two or more boxes. By simplifying somewhat, however, we can say that each vocoid has at least *nine* possible locations within a given box. Thus,

besides a central [a] in its box, [a_ɾ, a_λ, a_ɪ, a_ɹ, a_ɫ, a_ɻ, a_ɽ, a_ɿ], as well. For instance, it is quite easy to hear different kinds of [a]-sounds in the first elements of the diphthongs /aɛ, aɔ/, as in *height*, *house* /'haɛt, 'haʊs/ [ˈhaɛt, ˈhaʊs]. In regional pronunciations, they can vary as far as [A, ʌ, ɑ, ɒ] &c for /aɛ/, and [æ, ɐ, A, ʌ, ɑ] &c for /aɔ/.

fig 8.6. Orograms of the vocoids of the 12 neutral British-English true monophthongs.

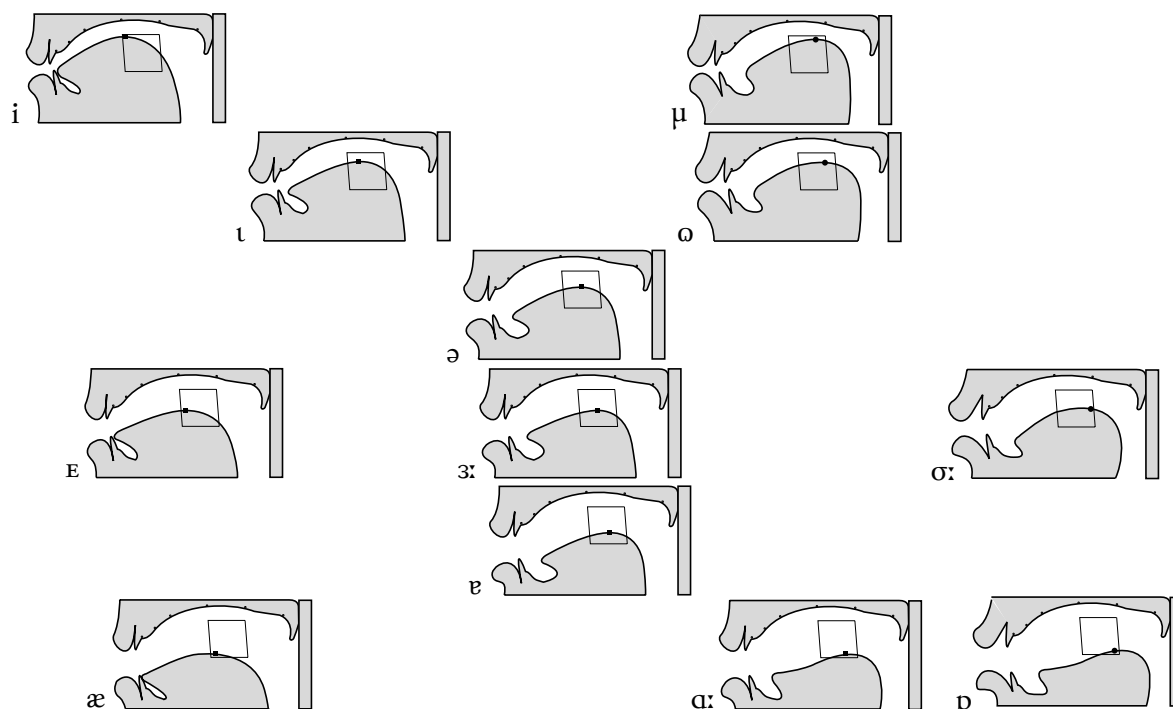
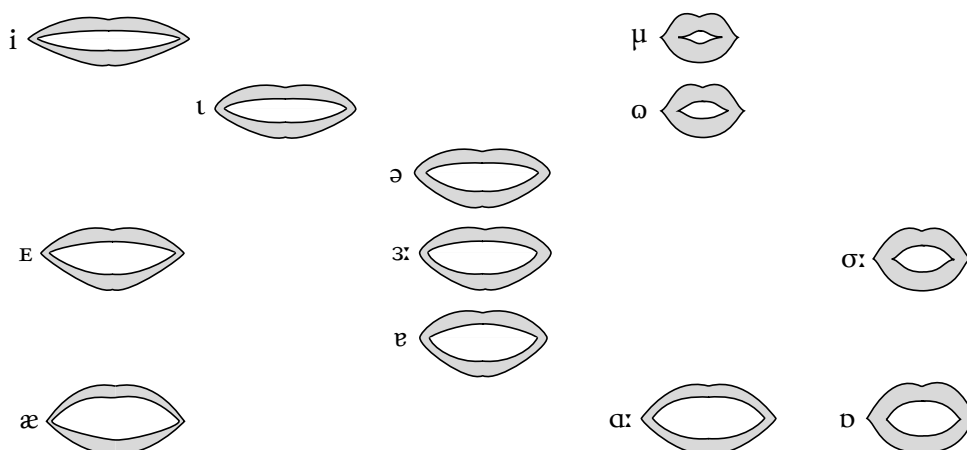


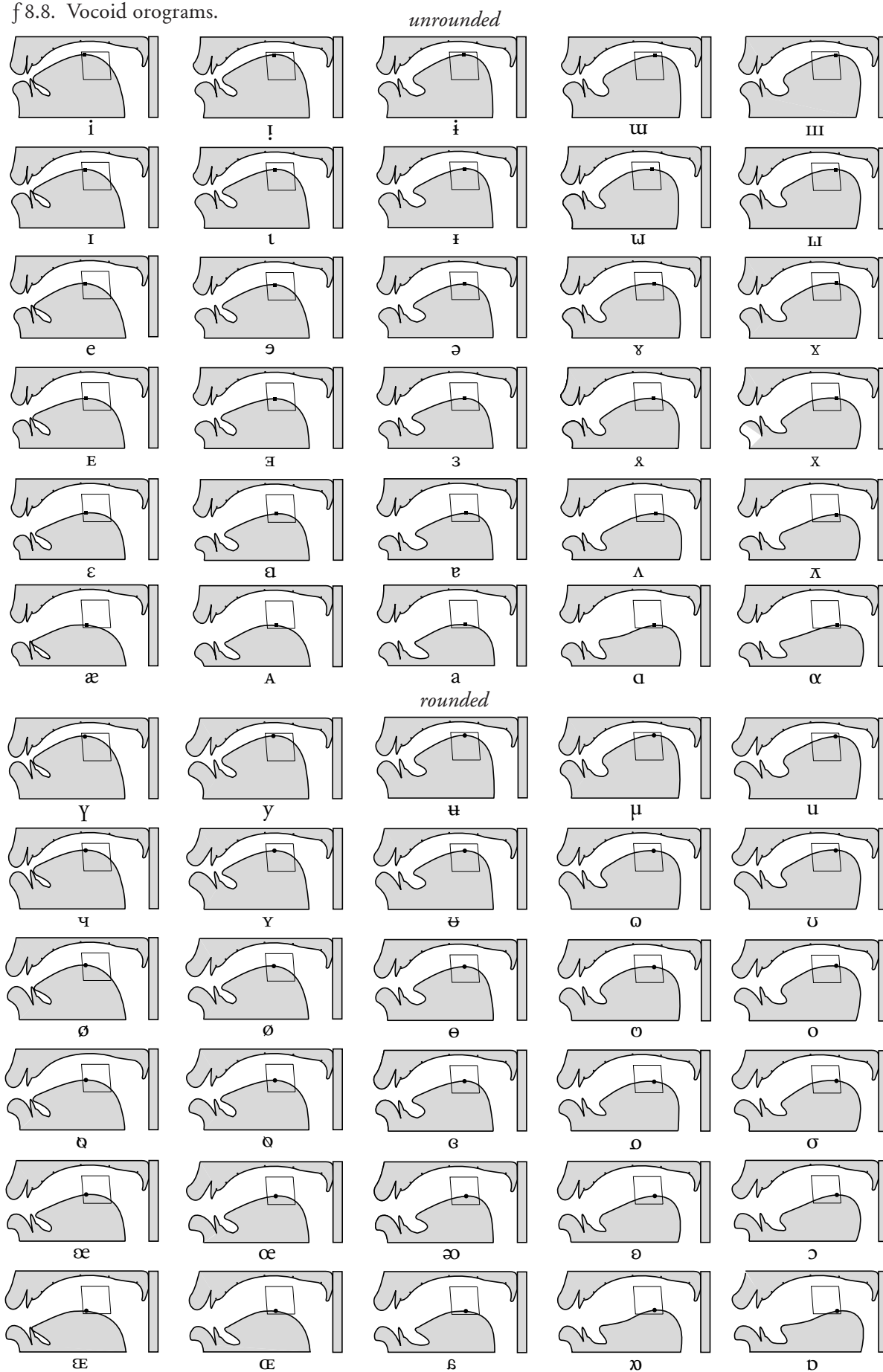
fig 8.7. Labiograms of the vocoids of the 12 neutral British-English true monophthongs.



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). Besides this, there is the possibility of shifting in a high–low direction, or in a front–back direction. Combinations are also possible, such as high–front, low–back, low–front, high–back.

While listening to recordings in order to analyze a particular language, it is

f 8.8. Vowoid orograms.



types of rounding. The more common one involves the addition of a certain amount of lip *protrusion* (cf fig 8.3 and fig 8.9), and is typical of the front-central rounded vocoids (such as [y]) as well as the back rounded ones (such as [u]). The other type is a sort of *vertical* rounding (as can be seen in fig 8.3 [cf fig 8.9, as well]). It is typical of front rounded vocoids (such as [ɥ]). Central rounded vocoids (such as [ʉ]) and back-central rounded ones (such as [ɯ]) can be articulated in either of the two ways, according to the language. For this reason, in the illustrations mentioned, these vocoids are placed in both categories (in brackets). In fig 8.9, the half-rounded vocoids also appear in brackets (and, in fact, they are not extremely common), while the 8 ‘virtual’ vocoids are placed in double brackets.

It will not be superfluous to emphasize that the *offIPA* vocoids, located as they are in their ‘potential’ trapezoid, without true subdivisions and with only a meager number of symbols available, seem to have been ‘forced’ together due to an anxiety for generalizations. This organization is responsible for the (not unduly scientific) ‘beliefs’ that [y], in reality, is merely [i] with rounding (the vocoid we denote [ɥ]), and that [ɯ] is actually [u] without rounding (the vocoid we denote [ʉ]). Instead, phonetic reality shows that [y] is a front-*central* rounded vocoid, while [ɯ] is back-*central* (unrounded).

8.13. For the purpose of learning and rationally memorizing the value and location of all of the elements of our vocogram, we will proceed through the various symbols, explaining their origin as well when this is useful. We will begin with the symbols for the 18 Jonesian cardinal vowels, considering fig 8.3 (and relying upon the orograms already provided, as well). These symbols will be considered according to the conventions of use which have developed over the course of time – particularly the practice of denoting the most widely used and most frequent sounds with the most normal symbols. In fact, at this point, some of the cardinal symbols have ceased to represent the sound they (theoretically) had originally, and now denote the values that were more commonly attributed to them (often including more than one of our boxes), because of being commoner in the languages of the world.

As other symbols are added, it becomes necessary to maintain the connections between the new symbols and the old ones, within the limits posed by keeping them clearly distinct and by the necessity of allowing them to be (relatively) easily written, by hand as well.

Given that the Latin alphabet served as a starting point, it was natural for the five vowel letters to represent the most frequent and normal sounds: [i, e, a, o, u]; these are used by many languages in stressed and unstressed syllables. In order to indicate the most frequent variants of [e, a, o], it was decided, logically enough, to denote more open vocoids, with respect to [e, o], with the symbols [ɛ, ɔ] (and, in fact, these symbols are literally *open*). In Portuguese, German, Italian and many other languages, we encounter ‘closed’ phonemes /e, o/ and ‘open’ ones /ɛ, ɔ/. (This terminology refers to the relationships between the two *e*’s and the two *o*’s, not to the extreme points on the vocogram which are *high* and *low* – officially *close* and *open*.)

A timbre different from [a] was shown by a variant in ‘cursive’, which was then

wisely 'straightened' and adapted to the type of character which is technically referred to as *roman*, or *plain*, or *non-italic*. The resulting character was [ɑ]. In the traditional pronunciation of French, it was important to distinguish between two different kinds of *a* sounds, a 'front' one and a 'back' one (but in reality, one is front-central, [A], and the other back-central, [ɑ]), although in modern pronunciation, the phonemic nature of the distinction has been done away with, because the second timbre has been eliminated. In neutral English, whether American or British, the front *a* is a truly front vocoid, [æ], in opposition to [ɑ:]. (For English and French as well, in regional variants, or even in pronunciations widely used in the media, the actual realizations can be notably different, cf *HPr* ⑥ 2 & 4.)

8.14. Continuing to pass through the symbols, the grapheme *y* was used, very intelligently (and with the inspiration of some northern European languages), for the front-central rounded vocoid [y], found in French *flûte*, [y], or in German *über*, [y:]. This freed the alphabet, finally, from the handicap of previous 'phonetic alphabets' (and some later ones as well!), namely, the use of diacritics to denote TIMBRES, instead of MODIFICATIONS OF TIMBRES, as would be more than logical. For this reason, 'symbols' such as 'ü, ö, ä, ë, ï' are absurd, without mentioning 'masterpieces' like 'ö̈', in place of [œ:].

Taking the graphemes *ø*, *œ* from European alphabets as well, it was then possible to represent the other two front-central rounded vowels which are most commonly found, [ø, œ]: in French *bleu* /ø/, *œuf* /œ/, and in German *schön* /ø:/, *löschen* /œ/. To these, a small capital version was added, for the open vocoid, [œ] (which is often omitted from tables and lists due to its rareness, or because it was thought to be absent from real languages).

In the back region, the unrounded vocoids theoretically corresponding to [u, o, ɔ] were denoted, in this case as well with quite positive results, by [ɯ, ɤ, ʌ]. In reality, rather than being 'back' vocoids (as they would be theoretically), they are *back-central*, given that in the back region it is difficult to produce unrounded vocoids (since they would sound rather similar, while requiring a greater effort).

The cardinal symbols become 18 in all, with the simple, but clever, addition of [ɨ, ʉ], for the high central vocoids.

8.15. The next additions involved other distinctions which were important for the relative openness of several vocoids already present. In these cases, small capitals were used (wisely adapted to the dimensions of lower-case characters, even if the difference, though real, was not obvious; however, *noblesse oblige*!).

In this way, the lower-high vowels [ɪ, ʏ, ʊ] were obtained, corresponding to [i, y, u] (even though, in place of [ɪ, ʊ], the optional variants [ɪ, ʊ] were frequently found; we use these last for other, similar values, as will be seen shortly). With this expansion of symbols (and, naturally, in accord with the actual timbres of the vocoids), [ɪ, ʏ, ʊ] represent well the sounds of neutral German in *List*, *fünf*, *Lust* /'list, 'fʏnf, 'lʊst/. As it happens, [ʊ] is not a true small capital, (which would be '[U]'), and this last is actually used by publishers who do not have the real symbol), but it is decidedly more conspicuous than the small capital, and also easier to write by hand.

The emaciated central area of the vocogram received three more elements, which are fundamental in British English, namely [ə, ɜ, ɐ], progressively opener (ie lower), as in *the murder* [ðə'mɜːdɐ]. To these, [æ] was added, as in *hat* [hæt]. As is well-known and as we have emphasized, this vocoid constitutes today the lower front limit of the modern scientific vocogram, even though the official trapezoid obstinately places '[a]' in this corner, while putting '[æ]' above it. The value of [ɐ] is clearly connected, in its shape as well, to that of our central [a]. In fact, if one were to use the official trapezoid rigorously, but rather blindly, [ɐ] would need to be used for Spanish or Italian *casa* (even for the stressed syllable!), since –among the few official symbols– [ɐ] is the one which is closer to the timbre in question. However, phonetics is an artistic, and also human, science and thus is capable of common sense (and of the possibility of expansion and adaptation), notwithstanding ridiculous and anachronistic refusals to move forward.

8.16. In the latest reform, three other vocoids have been added to the official trapezoid. One is the rounded vocoid corresponding to [ɜ], namely [ɞ] (which, appropriately, is similar to the unrounded symbol, while being closed off, given that the vocoid is rounded). This vocoid occurs, for example, in neutral New-Zealand English, as in *fur* [fɞː], while British English has [fɜː]. (In the early periods of the reform, from 1989 to 1993, the symbol was mistakenly flipped horizontally – in place of [ɞ], there appeared '[ə]', which in our system *canIPA* is used with a different value.) Another symbol is [ø], which represents a rounded vocoid, as is logical from the shape, with the addition of the horizontal line characteristic of central high vocoids. We find an example in the Netherlands Dutch *lus* [løʃ]. In our vocogram, this new symbol corresponds completely to the SCHWA (/ʃwɑː/) [ə], naturally with rounding.

Officially, the other new symbol, [ə], ought to represent the unrounded vocoid corresponding to [ə]. However, given that in the official trapezoid, [ə] is extremely vague and generic (which denotes, more than anything else, 'not being on the periphery', and can refer to fully 17 of our symbols, in transcriptions of different languages by different authors!), we prefer to give [ə] its more normal and frequent value, which is the value officially attributed to '[ə]'. In this way, we can reserve the front-central value (not just central, but certainly higher-mid) for [ə], which, given its relationships of symmetry with other symbols, fits well between [e] and [ə]. It is used, very usefully, for the second element in the English diphthong of words like *fly* [flaːə] (rather than '/flaɪ/'; or '/flai/', which was very commonly used in a still earlier period).

canIPA vocoids

8.17. At this point, we move on to additional vocoid symbols, found in *canIPA*. These represent quite precise vocoids which are in no way secondary to those already treated. Beginning, again, with the *unrounded* ones, we have, between [i] and [ɪ], the high front-central vocoid, [ɪ], whose shape is clearly linked to that of

[i], but with a bit of difference. This vocoid occurs in Somali: *inan* [ɪˈnan], or also in the Italian dialect of Bologna: *finîr* [fɪˈnɪr]. Below [ɪ], we find [ʊ], which is very common in English, for example in *lisp* [lɪsp]. This symbol resembles the lower part of [e] (as is logical, given that the vocoid is similar to [e, ə] from an auditory point of view).

In the central box of the lower-high vocoids, we find the small capital version of [i], namely [ɪ], as in German: *bitte* [ˈbɪtɪ], which fits in well into the series of [ɪ, ʏ, ʊ]. At this point, however, the visual pattern of small capitals (which had to be interrupted earlier by [ʊ]), continues, to a certain extent, with [ʉ], clearly related to [ʊ], given that it is the lowered variant of this last. This vocoid occurs in Turkish: *kari* [kɑˈɾʉ].

A small-capital *e* (adapted perfectly, as always, to the correct dimensions) provides an ideal way to fill the urgent need for a front phone, halfway between [e] and [ɛ], which is therefore [ɶ], as in English: *yes* [ˈjɶs].

8.18. The mirror image of [ɶ], that is [ɶ̯], can certainly be linked up to the parallelism between [e, ə], as can be seen from the vocogram. An example can be found in Mandarin Chinese: *rén* [ˈʐən]. The higher-low front-central vocoid, [ɶ̯], maintains a clear relationship with [ɛ], while naturally remaining distinct from it. We find this vocoid in Arabic: *walad* [ˈwalad]. The last element of this series is [ʌ], as in French: *papa* [paˈpa], or Mandarin Chinese: *wān* [ˈwan]. Frankly, it might seem, given the general pattern of the small capitals used elsewhere, that it would make more sense to use this symbol for the value we denote here by [a], thereby forming a (perhaps more ‘harmonious’) series ‘[a, ʌ, ɶ̯]’. However, as we have already mentioned, the central value is for *a* by far the most normal and frequent one, in the languages of the world. For this reason, the order [ʌ, a, ɶ̯] is fully legitimate, and logical as well. The back-central lower mid vocoid, [ɶ̯], clearly resembles both [ɤ] and [ʌ], which are on either side of it, vertically. We find this vocoid, for example, in Mandarin: *fēng* [ˈfɤŋ], and in Russian: *vodka* (водка) [ˈvɔtˠkɶ̯]. We represent the value theoretically denoted by ‘[ʌ]’, that is, higher-low back, with the vocoid [ʌ̯], whose shape is similar to that of [ʌ], given that the sounds are similar, though not identical. We encounter this vocoid in the Netherlands Dutch: *koud* [ˈkʌʊt], or in the Tyrolean dialect spoken in Alto Adige (in northeastern Italy): *wasser* [ˈβɔːsʌ̯].

The actual cardinal value of ‘[a]’, in the trapezoid and in the records provided by Jones, is the rarely occurring [ɑ], which is found in Dutch: *Amsterdam* [ɑmstɛˈdɑm]. Instead, we use the symbol [a], more logically, for the value found, for example, in British English: *car* [ˈkʰɑː], in American English: *car* [ˈkʰɑːɹ], and in very many other languages. The link between [ɑ] and [a] is made even stronger by the fact that certain publishers, due to typographical limitations, would substitute [a] with [ɑ].

8.19. We now move on to the *rounded* vocoids, pronounced with rounding of the lips. We mention again that the theoretical ‘[y, ø, œ, æ]’ are in reality, front-central rounded vocoids; thus, it is appropriate to leave them with the values they have always had in practice. All that is left is to complete the sequence (including

[ɤ]), by adding the intermediate [ø], similar to [ø], but not identical, as with the other flipped or rotated symbols. We find it in French: *seulement* [sølmø̃].

If we move on to the true front rounded vocoids, we find only the two close ones, [ɥ, ʏ], as in Swedish: *ny* [ˈnɥɣ] (/ˈnyy/). The shapes, irrespective of any graphemic value for the second symbol, resemble one another (as lower-case and small capital, respectively), but are also similar to the nearby [y, ʏ]. It is therefore more useful and ‘natural’ to consider the more frequent ([y, ʏ]) as more ‘canonical’, and to derive [ɥ, ʏ] from these (instead of the other way round), by moving the tongue forward by an average of a couple of millimeters.

Moving on to the central rounded vocoids, it is logical to fill the gap between [ɰ, ə] by adding [ɘ], which can be found in Icelandic: *unna* [ˈʔʊnːa]. Just as motivated, in its phonic value as well, is the use of [ə̃] for the higher-low vocoid in the series, as in Parisian and mediatic French: *bonne* [ˈbɔ̃n], or in Swedish: *dörr* [ˈdœr]. The low vocoid, [ɘ] sounds like an [a] with a sort of darkening added. This is caused by the rounding, which is necessarily not very strong, given that the vocoid is (so) low. This vocoid occurs in the rather broad English accents of Cardiff or Truro (Cornwall), as in *on* [ɒn]; or in the Dutch accents of Amsterdam or Leiden (or mediatic Flemish, as well): *kan* [ˈkɒn]; or in the broad accent and dialect of Bari (in southern Italy): *sante* [ˈsɛ̃ndə]. For these reasons, the connection with [a] is fairly solid and natural. Our symbol is preferable to the more bulky ‘[æ]’, decidedly difficult to write by hand (the reader should try, if in doubt!), even though this last might seem more ‘logical’, in a series.

8.20. In the back rounded series, the addition of [σ] deserves some comment. It was added to fill in the lower-mid position, as in the other series. However, the shape of [o] cannot be effectively modified by rotations or reflections, nor by creating a small capital. For this reason, the only way to maintain the connection with the normal letter *o* was to use the Greek letter sigma (σ, disregarding its completely different value in Greek). Therefore, [σ] represents the timbre halfway between [o, ɔ], as found in English: *pour*, [ˈphɔː(ɪ)] ([ɪ] is for the American pronunciation), or in Spanish: *moda* [ˈmɔ̃ða].

All of the back-central rounded series, [ɰ, ɯ, ʊ, ɔ, ɘ, ɰ], is nothing other than a modification of the back rounded series, and (some more, some less) all of the symbols resemble the others. For example, [ɰ] and [u]; [ɯ] resembles the corresponding unrounded vocoid ([ɯ], with the same location) as well, not just [ʊ]; [ʊ] resembles both [ɘ] and [o]; [ɘ] is derived from [σ], as well, by 180° rotation; finally, both [ə̃] and [ɰ] resemble, respectively [ɔ] and [ɔ̃], with modifications chosen from among the few still possible at this point.

Although phonemic transcriptions (but also those which seek to be phonetic) of French, by using /u, ɔ, ɔ̃/, create the idea that this language has vocoids similar to those of Portuguese, or Italian, or German, the reality is quite different. In fact, in French (in ‘modern’ pronunciation), we find examples of all six of the back-central rounded vocoids, as in *pourtour* [pɔʁˈtɥr], *monôme* [mɔ̃ˈnɔ̃ːm], *bonne* [ˈbɔ̃n], *cent* [sɛ̃]. In English, the symbol [ɯ] is necessary in words such as *look* [ˈlɒk].

In Tuscany as well, the Italian phonemes /u, ɔ, ɔ̃/ are actually pronounced [ɰ,

o, ə], at least as the basic form, with forwards or backwards diphthongizations possible in certain areas (as can be seen from the Tuscan phonosyntheses, for Florence, Siena, Pisa, Livorno/Leghorn, and Piombino, in \mathfrak{G} 16). Here are a few examples in the pronunciation of Florence: *luna*, *dopo*, *modi* [ˈlɥ:nɒ, ˈdɔ:ɸɔ, ˈmɔ:di].

8.21. Now, keeping in mind the 52 orograms of fig 8.8 (placed at the end as an appendix for purposes of referral and checking, and with the 8 currently ‘theoretical’ ones as well), we will present briefly the symbols together with languages using these vocoids. The examples are not complete, since for now it is sufficient to run through the vowel phones quickly. In \mathfrak{G} 15-23, the phonosyntheses of 320 tongues (ie languages, dialects, and variants are given). Further examples can be found there, as well as reliable information for beginning a rigorous study. *HPr* gives systematic treatments of the twelve languages there considered (together with variants of these): English, Italian, French, German, Spanish, Portuguese, Russian, Arabic, Hindi, Chinese, Japanese, and Esperanto.

Unrounded vocoids:

- [i] *vivir* Spanish
- [ɪ] *Kind* German
- [e] *sete* [ˈsete] Italian
- [ɛ] *settecento* [ˈset-] Italian
- [ɛ] *sette* [ˈset-] Italian
- [æ] *hat* English
- [ɪ] *inan* [ˈɪnan] Somali
- [ɪ] *bit* English
- [ə] *bite* [ˈbaɪt] English
- [ɛ] *bèn* Mandarin Chinese
- [a] *walad* [ˈwalad] Arabic
- [A] *lac* French
- [ɪ] *ty* (= *mbɪ*) Russian
- [ɪ] *bitte* [-tɪ] German
- [ə] *to be* [tə-] English
- [ɜ] *fur* British English
- [ɐ] *lover* [ˈlɛvɐ] British English
- [a] *datar* Spanish
- [ɯ] *zì/zì* Mandarin Chinese
- [ɯ] *hammock* [-ɯk] English
- [ɤ] *cè* Mandarin Chinese
- [ɤ] *céng* Mandarin Chinese
- [ʌ] *love* American English
- [ɑ] *hot* American English
- [ʌ] *paus* [ˈpʌʊʃ] Neth. Dutch
- [ɑ] *kans* Neth. Dutch

Rounded vocoids:

- [ɤ] *ny* [ˈnɤ:] Norwegian
- [ɥ] *ny* [ˈnɥɤ] Swedish
- [ɤ] *lune* French
- [ɤ] *Glück* German
- [ø] *deux* French
- [ø] *sœurette* [sø-] French
- [œ] *sœur* [ˈsœ:ɐ] French
- [œ] *sœur* [ˈsœœr] Canadian French
- [ɥ] *null* Norwegian
- [ɥ] *nul* Flemish Dutch
- [ø] *nul* Neth. Dutch
- [ɜ] *fur* New Zealand English
- [ə] *dörr* Swedish
- [ɐ] *kan* [ˈkɐn] some Dutch accents
- [ɥ] *vous* French
- [ɔ] *look* English
- [o] *beau* French
- [o] *bonnet* [bo-] French
- [ø] *bonne* French
- [ɔ] *ân* [ˈɔn] Persian
- [u] *susurro* Spanish
- [ʊ] *und* German
- [o] *sotto* [ˈsotto] Italian
- [o] *ottocento* [ˈot-] Italian
- [o] *otto* [ˈot-] Italian
- [o] *hot* British English

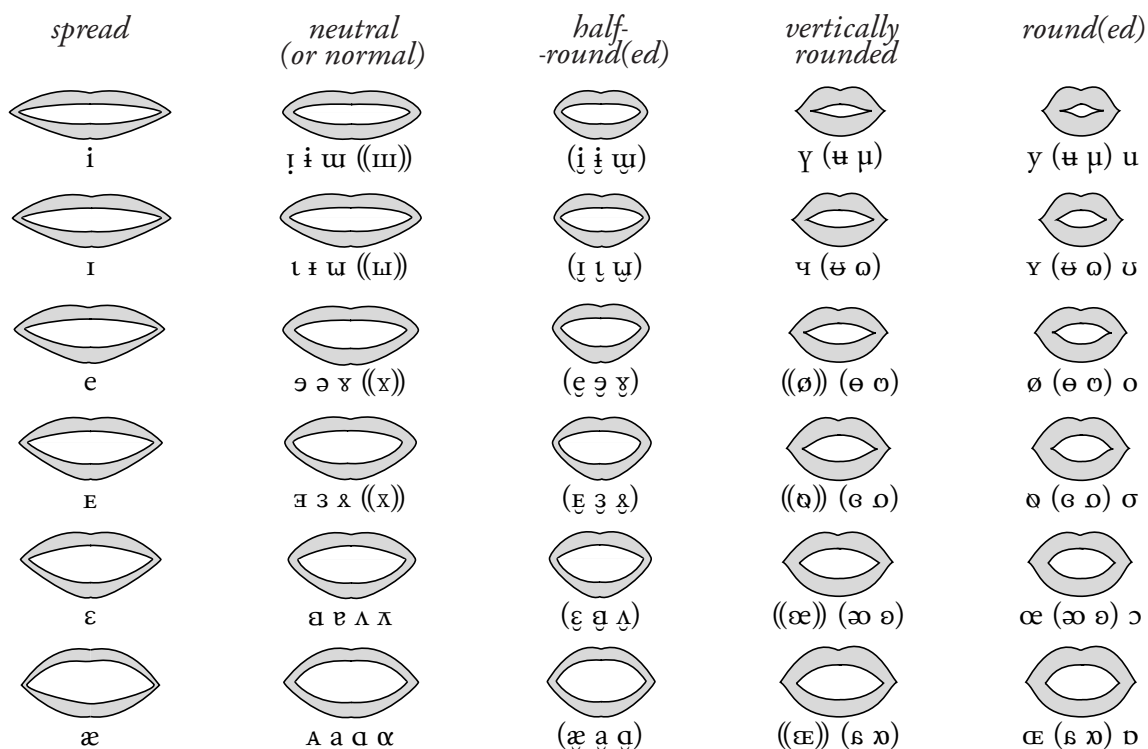
We will proceed according to places of articulation, rather than by manners – therefore, vertically, along the columns. (Here we give as well, in parentheses, the symbols for possible vocoids in the eight boxes which are currently empty.) We have, therefore: *front* [i, ɪ, e, ɛ, æ], *front rounded* [ɥ, ʏ, (ø, œ, œ)], *front-central* [ɪ, ɪ, ə, ɛ, ɛ, ʌ], *front-central rounded* [ɥ, ʏ, ø, œ, œ, ɛ], *central* [ɪ, ɪ, ə, ɜ, ɜ, ʌ], *central rounded* [ɥ, ʏ, ø, œ, œ, ɛ], *back-central* [ɯ, ʊ, ɤ, ɤ, ʌ, ɔ], *back-central rounded* [ɯ, ʊ, ɔ, ɔ, ɔ, ɔ], *back* [(ɯ, ʊ, ɤ, ɤ), ʌ, ɔ], *back rounded* [ɯ, ʊ, ɔ, ɔ, ɔ, ɔ].

At any rate, it is naturally also useful to produce the horizontal series (by manners), as an exercise: *high* [i, ɪ, ɪ, ɯ, (ɯ)], [ɥ, ʏ, ɥ, ɯ, ɯ], *lower-high* [ɪ, ɪ, ɪ, ɯ, (ɯ)], [ɥ, ʏ, ɥ, ɯ, ɯ], *higher-mid* [e, ə, ə, ɤ, (ɤ)], [(ø), ø, ø, ø, ø], *lower-mid* [ɛ, ɛ, ɜ, ɤ, (ɤ)], [(œ), œ, œ, œ, œ], *higher-low* [ɛ, ɛ, ɛ, ʌ, ʌ], [(œ), œ, œ, ɔ, ɔ], *low* [æ, ʌ, ʌ, ʌ, ʌ], [(œ), œ, œ, ɔ, ɔ].

8.22. The phonetic method makes it possible to conquer (with a bit of practice, that is, getting into the spirit of the method) the sounds of other languages and dialects, by starting from one's own. For this reason, we will now observe at least the *orograms* of the *twelve* vocoids which are the realizations of the actual monophthongal phonemes of present-day neutral British English (fig 8.6, with unstressed /i, u/, as in *react*, *influenza*), in order to provide an objective starting point (even though almost every native speaker has a regional pronunciation, at least to some degree). We give *labiograms* as well (fig 8.7, without showing the teeth), which are more functional and to the point, since they allow the viewer to concentrate on the essential elements without distractions.

While, for the languages indicated in § 8.21, the reader is referred to the *phonosyntheses* or to *HPr*, where they are dealt with, for the somewhat simplified *voco-*

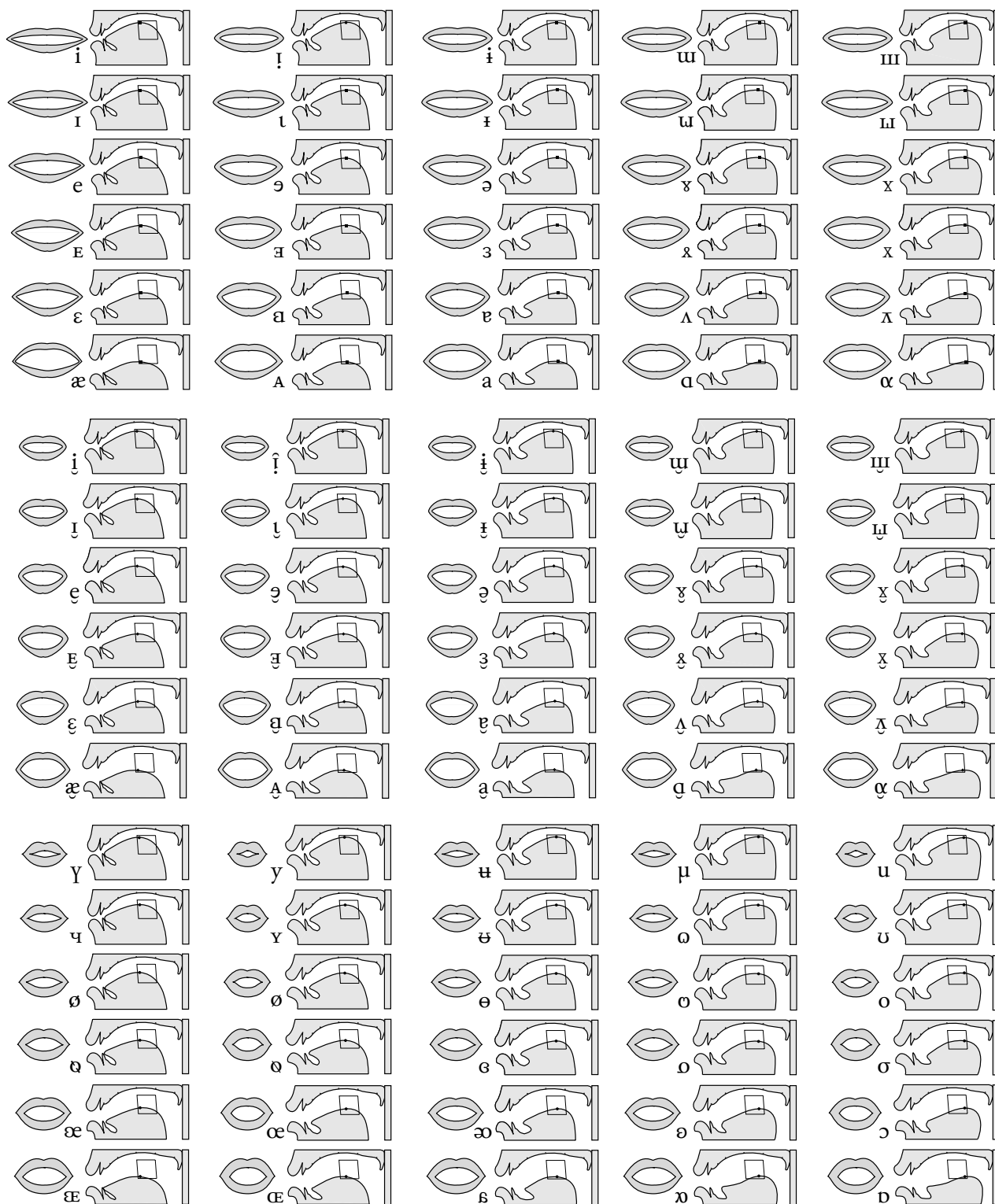
fig 8.9. Labiograms of the vocoids, including distinct (and intermediate) states.



grams of British English, we direct the reader back to fig 6.1.2 (and to Ch 2 of *HPPr*, for a fuller treatment of various English accents, with variants).

And now (cf 8.8), let us examine the 52 *orograms* necessary for describing adequately the languages and dialects of the world (with the 8 theoretical ones added as usual). It would naturally be helpful to look at the *vocograms* in the various pho-

fig 8.10. Labio- and orograms of all the vocoids, including distinct (and intermediate) states.



nosyntheses (and in *HPr*), and not just for study, but also to satisfy a simple (but legitimate, and healthy) scientific and human curiosity.

fig 8.9 gives *labiograms* for the vocoids, many of which naturally coincide (since different vocoids can have the same lip position). It will be useful to consider all of them carefully, proceeding with kinesthesia as necessary in order to produce each articulation, working from the more familiar to the less common ones. There are 5 types of lip position, with 2 which are more normal (ie neutral and rounded), and 3 complementary ones (ie spread, half-rounded, and vertically rounded).

For the sake of greater completeness, we give in fig 8.10 all of the possible vocoids, including both the 8 potential ones and also the 30 with intermediate lip positions (halfway between neutral and rounded), that is, half-rounded (shown by the appropriate diacritic).

Articulatory practice

8.23. Once the most common (or familiar, for a given person) vocoids have been located in the vocogram, it is necessary to find out their true positions, not just what one thinks they ought to be. It is also necessary to be able to pass from one sound to another, initially starting with the more familiar ones (as always).

To use kinesthesia to feel the different positions of the tongue and of the lips, it is singularly useful to articulate the sounds slowly, with great patience and care. It is particularly important to learn to articulate them *silently* – without letting air out and without ‘voicing’, or in other words without letting the vocal folds vibrate, even in the reduced manner present while murmuring. As it happens, voicing covers over and masks the essential movements, thereby distracting from the full sensation of kinesthesia. Whispering (voiceless lenis phonation) will be used later, as a compromise between the useful artifice of silent articulation and normal phonation of real speech.

It is only necessary to make a single attempt in order to see how our ability to perceive movements of the tongue and lips becomes incredibly expanded, if we concentrate only on the sounds, without any sort of phonation. (Of course, this does not mean that we should stop breathing.)

This is the practice of *silent introspection*, and it helps us to discover many unexpected and unsuspectable things. It is possible to add, instead of exhalation, a voiceless *inhalation* (performed in a noiseless way). In fact, if we articulate a phone (whether a vowel or consonant, but required to be *continuous*, ie without occlusion), and then inhale while maintaining the position of the phone, we become better able to perceive the point of articulation, because we are aided by the sensation of breeze caused by the incoming air. In the case of constrictive contoids, this sensation is naturally even more evident.

In the case of vocoids, one should try to practice pronouncing phones which are between those already known (including new ones that have already been learned well). Here again, silent introspection is a good method, in alternation with inhalation, whispering, and full voicing.

It is necessary to reach the point (at the beginning, with the help of a handheld mirror) where one is capable of feeling fully all of the *movements* of the *lips*, the *tongue*, and the *jaw*.

8.24. If we use neutral British English as a starting point, and continue to make reference to the general vocograms (fig 8.3 & fig 8.8-9), it will be possible to learn to produce phones which are near [ɪ] = [ɪ, ɪ̯], or [ɪ, ɐ]; near [ʊ] = [ʊ, ʊ̯], or [μ, ʊ]; near [ɛ] = [e, ɛ; ɛ̯]; near [σ] = [o, ɔ; ɔ̯]; near [æ] = [ɛ, ɐ, ʌ]; near [ɒ] = [ɔ, ɐ, ʌ]; near [ɑ] = [a, ʌ, ɔ̯]; near [ɐ] = [a, ɜ] or [ʌ, ɐ]; near [ə] = [ɛ, ɜ], or [ə, ɜ]; near [ɜ] = [ə, ɐ], or [ɛ, ɜ]. Lip rounding can be added, while taking care not to change the position of the tongue, in cases like: [ɪ] → [ɪ̯]; [ə] → [ə̯]; [ɜ] → [ɜ̯], &c. Rounding can also be taken away, such as in: [ʊ] → [ʊ̯]; [ɒ] → [ɑ], &c.

Then, one can isolate the members which form the diphthongs of British English: [ɪɪ, ɛɪ, aɐ, σə, aʊ, ɜʊ, μu], [ɪ, ɪ, ɛ, a, ə, ɜ; σ, ɒ, ʊ, μ, u], and then change their lip positions: [ɣ, ɸ, ʊ, ɐ, ʊ̯, ɐ; x, ɛ, ʊ, ʊ̯, ɪ̯].

If we have already learned, or *phonetically felt* [ɣ, ʊ̯, ɐ], or [ʊ̯, ɛ, ʌ], perhaps we instinctively articulate them as front-central rounded vocoids (and not *front* rounded ones, [ɣ, ʊ̯, ɐ]) and as back-central ones (not *back* unrounded ones, [ɪ̯, x, ʌ]), respectively.

In the context of this exercise, it would be useful to succeed in producing even vocoids not currently found in any analyzed language, since the result would be progress in disciplining one's articulatory movements. At the same time, it is naturally clear that in languages such as French and German, front rounded vocoids ([ɣ, ɸ, ʊ̯, ʊ̯, ɐ]) should not be accepted in place of [ɣ, ɣ, ʊ̯, ʊ̯, ɐ]; just as [ɪ̯, ɪ̯, x, x, ʌ] would not be appropriate in languages (Asian or otherwise), which have [ʊ̯, ʊ̯, ɛ, ʌ].

Other exercises, which should also be carried out calmly and patiently (and in the beginning in silence, following one's progress carefully on the vocograms), involve producing homogeneous and gradual sequences of vocoids (at the initial, perhaps incomplete ones). Thus, it is possible to move along the columns, from the top to the bottom (and vice versa), as well as horizontally, from front to back (and vice versa). We have: [ɪ, ɪ, ɛ, ə, ɛ, æ], [ʊ, ʊ, ɒ, σ, ɔ, ɒ], [ɣ, ɣ, ʊ̯, ʊ̯, ɐ, ɐ], [ʊ̯, ʊ̯, ɛ, ʌ, ɑ], &c. Also: [æ, ɛ, ɛ, ɛ, ɪ, ɪ], [ɒ, ɔ, σ, ɒ, ʊ, ʊ], [ɐ, ɐ, ʊ̯, ʊ̯, ɣ, ɣ], [ɑ, ʌ, ɛ, ɛ, ʊ̯, ʊ̯], &c. And still: [ɪ, ɪ, ɪ̯, ʊ̯, (ɪ̯)], [ɪ, ɪ, ɪ̯, ʊ̯, (ɪ̯)], [ɛ, ə, ə, ɛ, (x)], [ɛ, ɛ, ɜ, ɛ, (x)], [ɛ, ɑ, ɐ, ʌ, ʌ], [æ, ʌ, a, ɑ, ɑ] (and vice versa).

It is possible to do the exercises along diagonal movements, even though this is a bit trickier, since two parameters change each time instead of just one. For example: [ɪ, ɪ, ə, ɛ, ʌ], [ɪ, ə, ɜ, ʌ, ɑ], or: [ɣ, ɣ, ʊ̯, ʊ̯, ɔ], [ɸ, ʊ̯, ɐ, ʊ̯, ɒ], &c. An exercise such as: [ɪ, ɣ, ə, ɒ, ʌ], [ɪ, ʊ̯, ɜ, ʊ̯, ɑ] would be yet more complicated, but certainly not useless; here changes in all three parameters occur together.

Another exercise, which is quite a bit less difficult, but certainly not useless, involves alternating the two fundamental positions of the lips, while moving vertically and horizontally (in the two directions; and, as always, in silence at the outset): [ɪ → ɣ], [ɪ → ɸ]; [ɪ̯ → ɸ], [ɪ̯ → ɣ], [ə → ʊ̯], [ɛ → ʊ̯], [ʌ → ɐ]; [ʊ̯ → μ], [ʊ̯ → ʊ], [ɛ → ʊ], [ʌ → ʊ], [ʌ → ʊ], [ɑ → ʊ]; and [ʊ̯ → ɑ], [ʊ̯ → ʌ], [ʊ̯ → ɛ], [ʊ̯ → ɛ], [ʊ̯ → ʊ],

[$\mu \rightarrow \text{u}$]; [$\text{œ} \rightarrow \text{a}$], [$\text{ø} \rightarrow \text{ɛ}$], [$\text{ø} \rightarrow \text{ə}$], [$\text{ɤ} \rightarrow \text{ɪ}$], [$\text{ɥ} \rightarrow \text{ɪ}$]; [$\text{ɥ} \rightarrow \text{ɪ}$], [$\text{ɣ} \rightarrow \text{i}$]; [$\text{ʉ} \rightarrow \text{i}$], &c. Clearly, checking the position of the lips and of the tongue (when possible), in a mirror, can be a great help.

In the case of the lips, however, it is certainly practical to start with the vocoids of one's own language, even if not a neutral variety. From this point, rounding can be taken away (or added, depending on the case), as we have already seen above. And still more exercises can be imagined...

8.25. There are various quantitative dimensions associated with the articulations of vocoids: the opening of the jaw with respect to the front teeth, the distance from the palate to the back of the tongue, as well as the distance between the lips in the case of rounded and unrounded vocoids. We can give average measurements in these cases, to be found in fig 8.11 (in correlation with the six adjoining bands of fig 8.3).

fig 8.11. Average measurements for the different vocoids.

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

But, on the other hand, it is apparent that we can pronounce [i, ɪ, ɛ, ə, e, æ, a, ɐ, ɜ, ɔ, ɑ; ɒ, σ, ɔ, ɔ, μ, u] fairly clearly, both with our teeth together, as well as with two fingers placed between the teeth, to create an artificial opening of at least 30 mm. In fact, the mouth uses various compensatory adjustments to continue to speak in a satisfactorily comprehensible way.

It is sufficient to remember that we generally are understood even when speaking (bad-manneredly) with food in our mouth, or (more tolerably) while sucking on a candy. The mouth uses appropriate adjustments also when certain consonants are found near the vowels. In order to produce the grooved consonants /s, ʃ/, as in *sassy*, *shush!* ['sæsi; 'ʃɛʃ, 'ʃʌʃ], or in Italian *sasso* and *Sciascia* ['sas:so, 'ʃaʃ:ʃa], there has to be very little jaw opening – in fact, the teeth are quite close together (as can be seen in fig 6.12 & fig 9.1 as well). Now, in order to produce [s, ʃ] with an [æ, a] in the middle, it is natural for the [æ, a] to become adapted to these circumstances, by being pronounced with less opening (as can be easily seen with a handheld mirror).

Naturally, the physical structure (of the articulatory apparatus) of the speaker makes the picture more varied, as we move from the average case to particular ones. A small child and a big man almost 7 ft tall will have correspondingly different measurements, which can be different (smaller for the child, bigger for the man) by as much as 50%. This is without considering other communicative variables – if a person yells in anger, or two lovers speak softly together, the configuration of the phonoarticulatory apparatus changes radically, and this change is also

due to the paraphonic characteristics which are added (cf ¶ 14).

Human language is so complex and organized, but at the same time adaptive, that any 'speaking' machine (both for encoding and, especially, for decoding messages) remains far away from being convincing, or even from being able to communicate effectively. This is true even without taking into account the more complicated and remarkable semantic and conceptual aspect of the problem.

Diphthongs: one phoneme or two?

8.26. The question of whether diphthongs should be considered *mono*-phonemic or *bi*-phonemic is easily resolved by considering the facts of the matter, not just theoretically, but according to practical phonemics.

Beforehand, we observe that it is appropriate to use the Latin prefix (*bi*-) instead of the Greek one (*di*-) – even though the opposition is with *mono*- (Greek). The reason is to avoid uncertainties and ambiguities with related terms, such as *diphonic*, which refers to pairs of phone(me)s with the same articulation (in place and manner), but with different sorts of phonation: eg [p, b] /p, b/.

The other similar term, but only lexically, is *diaphonemic*, which refers to functional entities belonging to a given system, but showing differences with regard to accents. In a single language, it is frequently important to differentiate social or geographical accents. This occurs, for example, in the case of British and American English – from a diaphonemic transcription such as /'gʊʊ, 'suup, 'hʌt, 'læst, 'lɒst, 'həʊi, 'kɑ:ɪ, 'beʃəɪ, 'njuu/ &c (*go, soup, hut, last, lost, hurry, car, better, new*), it is then possible to derive the British phonetic transcription ([ˈgʊʊ, ˈsuup, ˈhʌt, ˈlæst, ˈlɒst, ˈhəʊi, ˈkɑ:ɪ, ˈbeʃə, ˈnjuː]), and the American one ([ˈgʊʊ, ˈsuup, ˈhʌt, ˈlæst, ˈlɒst, ˈhɪri, ˈkɑ:ɪ, ˈbeɪ, ˈnuː]).

In Italian, as in Spanish and many other languages, diphthongs are sequences, which are also as such in writing, by combining the normal symbols which are available: they are, consequently, *biphonemic* sequences. These sequences are formed by simply combining the various vowel phonemes, with their normal realizations (subject only to certain limitations on which combinations are possible, due to historical and contingent reasons). The most frequent Italian diphthongs (the true diphthongs, correctly excluding sequences of /CV/, as in /jɛ, wɔ, ja, wa/, cf § 5.2-3) are: /ai, ia, ie, io, au/, followed by: /ɛa, ɛe, ei, eo, ɔi/, and: /ɛu, eu, ei, oi/. The diphthongs /ae, ɔa, ɔe, ea, ua, ue, ao, ɔo, eo, oa/ are decidedly less frequent, while /oo, ui, iu, ii, ee, aa/ are still rarer. If we do not restrict ourselves to words, but count phrases and sentences as well, Italian has examples of all phonic diphthongs possible, including /ɔu, ou, uu/ (cf § 5.1.2-3 of *M^aPI*).

We will give only a few examples, from the most to the least common: *partirai*, *fattoria* /partirai, fattoria/ [ˌpartirai, ˌfattoˈria] (both with three syllables), *sono urgenti* /sonourˈdʒɛnti/ [ˌsonourˈdʒɛnti] (sequence of four syllables).

The choice of whether to indicate diphthongs explicitly or not depends naturally on functional and statistical factors, not just distributional and structural ones.

Thus, in Italian (and in similar languages, such as Spanish and Portuguese, &c),

it is normally possible to avoid making lists of all the diphthongs (or vowel sequences) available. Equally, one generally does not make lists of all of the consonant sequences, among other reasons, because it would not be easy to be certain of giving really complete lists (or tables). The only way to be sure of the results would be to manage to consider all the scientific, technical, and rare words, while including only 'official' words, but leaving out connected utterances.

8.27. The Germanic languages, instead, have systematic inventories of diphthongs, even though the orthographies are normally not so systematic, often presenting multiple ways of writing restricted and recognizable phonemic entities (for reasons having to do with the historical evolution of languages).

For example, within words in English, we have the following diphthongs: [ɪi, eɪ, aə, aɔ, ɜʊ/σʊ, ɪə/ʊə, ɔə] (excluding, for now, cases like *hear*, *care*, *hears*, *cares*, *hearing*, *caring* /'hɪəɪ, 'kɛəɪ; 'hɪəɪz, 'kɛəɪz; 'hɪəɪŋ, 'kɛəɪŋ/, in order to avoid complicating excessively our development – given in diaphonemic transcription). These diphthongs are clearly *mono-phonemic*, first of all because they are paradigmatically in opposition both to other diphthongs, and to simple /V/, as in: *leak* ['li:k], *lake* ['leɪk], *like* ['laɪk], *Luke* ['lʊk/'lu:k], *look* ['lʊk], *lick* ['lɪk], *lack* ['læk], *lock* ['lɒk/'lɑ:k], *luck* ['lʊk/'lʌk] (where the slashes are used to separate British and American pronunciations).

Secondly, they are mono-phonemic also because their phonetic *realization* is not derived from the individual symbols within each diphthong, but globally. Should we go on to consider other English accents (such as the more than 200 given in EPs), the phenomenon would become even clearer, as many variations are encountered which depart considerably from the (dia)phonemic representation (cf the examples given in § 1.5).

Moreover, in English it is not possible to find examples of single segments or symbols, such as /a, ɔ/, but only /ɑ:, ɔ:/, unless we should go back to obsolete notations, such as /a, ɑ:, ɔ, ɔ:, ai, au/ for /æ, ɑ:, ɒ, ɔ:, æ, aɔ/. The last two of these are still given today as /aɪ, aʊ/, even though the real and normal articulation is [aə, aʊ]; but this is the maximum amount of precision and refinement to be found, for the time being, in internationally printed works.

We will briefly, as an example, look into the case of /ɪəɪ, ɪəɪ/, which presents a complication due to the existence of two fundamental types of neutral English accents, British and American. As elsewhere, the problem is resolved diaphonemically. American English is 'rhotic', or in other words *r* is pronounced in all cases, not just when transcribed /ɹ/ (ie in front of vowels), but also as the diaphoneme /ɹ/ (ie in word-final position, or before a consonant): *hear*, *hears*, *hearing* /'hɪəɹ, 'hɪəɹz, 'hɪəɹŋ/ ['hɪɹ, 'hɪɹz, 'hɪɹŋ]. British English, on the other hand, has not been rhotic for about the last three centuries, and has therefore become 'non-rhotic': ['hɪvə, 'hɪvəz, 'hɪəɹŋ]. From the transcriptions, it can be seen that British English has diphthongs in these cases as well (and in the case of /ɛəɪ, ɛəɪ; ʊəɪ, ʊəɪ/, too).

8.28. It is certainly true that in English, there are also other vowel sequences, which form triphthongs. However, in these cases we are always dealing with com-

binations of elements which have already been seen elsewhere. For example, British English has: *higher* /'haeɪ/ [ʰhaɐ̯], *tower* /'taʊə/ [ʰthaʊ̯], *slower* /'sləʊə/ [ʰsləʊ̯], and in both accents we have: *Hawaii* /hə'waɪ, 'waɪ, 'waɪi/ [hʷa'waɪ, 'waɪ, 'waɪi], *Haweis* /'hɔɪs, 'hɔɪs/ [ʰhɔɪs^a, 'hɔɪs^b, 'hɔɪs], *Louis* /'luɪs, 'luɪs, 'luɪi/ [ʰluɪs^a, 'luɪs^b, 'luɪi^a, 'luɪi^b]; also, in the word *idea*, the neutral British pronunciation is generally: /æ'diə/ [aə'di̯ə], while the American one is: /æ'diiə/ [aə'di̯i̯ə].

German has three *monophonemic* diphthongs: /ae, ao, ɔɪ/ [ae, ao, ɔɪ], which have, inevitably, many different realizations in different accents. These can be seen in 5 of *HPr*, or especially *German PronunciationS*, and also in the dialect phonosyntheses of 17, in *NPT*: Alsatian, (Munich) Bavarian, Luxembourger, Mocheno German (Italy), (South Tyrol/Alto Adige) Tyrolese (Italy), Viennese, (Zurich) Swiss German. In these other dialects, other diphthongs can be found, of a centralizing type, which can be generically described as /iə, yə, uə/. Phonetically, there is much more variety than the phonemic or graphemic notation of many descriptions would encourage one to think.

For the sake of simplicity, we now consider the typical realizations of the three canonical phonemes in just the broad regional accents of Vienna and Zurich. Given the examples *Eis*, *Haus*, *neun* /'aes, 'haos, 'nɔyn/, in neutral German, we have: [ʰaes, 'haos, 'nɔyn], while in the accent of Vienna: [ʰɛəs/ʰæəs, 'həʊs/ʰɔʊs, 'nɔɐ̯n/ʰnɔɐ̯n] (also [əʊ, əʊ]), and in that of Zurich: [ʰaiz̥, 'hɐm̥z̥, 'nɔin/ʰnɔin]. If we were, for the sake of hypothesis, to consider the three diphthongs as bi-phonemic, that is, formed from combinations of five independent elements, such as /e, a, ɔ, o, ɪ/, the diaphonemic aspect of the transcription would be lost, thereby rendering this sort of transcription of no utility.

8.29. As happens with contoids, also for vocoids some special *halfway* symbols may be necessary, if we want to avoid having to decide almost on the toss of a coin which symbol to use, as when within *offIPA*, two different transcribers might chose either [e] or [ɛ], [o] or [ɔ], [a] or [ɑ], for actual [ɛ, ɔ, a]. These further *canIPA* symbols can be useful, when we want to highlight articulatory nuances between different accents of one language, as well. For Spanish and Italian, for instance, it could be expedient to use symbols which are astride two (or even four, cf fig 8.15) others: [e/ɛ] [⌊e⌋], [ɛ/ɛ] [⌊ɛ⌋]; [o/ɔ] [⌊o⌋], [ɔ/ɔ] [⌊ɔ⌋]; [A/a] [⌊A⌋], [a/ɑ] [⌊ɑ⌋]; even astride: [i/ɪ] [⌊i⌋], [ɪ/e] [⌊ɪ⌋], [u/ʊ] [⌊u⌋], [ʊ/o] [⌊u⌋]. This last series might be useful for variants of German as well, together with [y/ʏ] [⌊y⌋] and [ʏ/ø] [⌊ʏ⌋]. Besides, the following could come in handy as well [ɛ/æ] [⌊ɛ⌋], [æ/A] [⌊æ⌋], [ɑ/α] [⌊ɑ⌋]; and [ɔ/ɒ] [⌊ɔ⌋].

fig 8.12. Possible 'special' symbols for intermediate *canIPA* vocoids.

ɪ	ʏ	ɨ	ʉ	
ɘ	ɜ	ɞ	ɟ	
ɛ	ɜ	ɞ	ɟ	
æ	ɶ	ɷ	ɸ	
ɶ	ɶ	ɶ	ɶ	

ɪ	ʏ	ɨ	ʉ	
ɘ	ɜ	ɞ	ɟ	
ɛ	ɜ	ɞ	ɟ	
æ	ɶ	ɷ	ɸ	
ɶ	ɶ	ɶ	ɶ	

For the sake of completeness, fig 8.12 shows the 42 halfway symbols for vocoids which could actually be useful. As a matter of fact, it concerns cases where any decision to use either symbol between more normal ones could conceal some important realities. These symbols can resolve this dilemma over the best way to render nuances accurately, avoiding troublesome and ugly diacritics (and, indeed, ambiguous ones), just as we decided to do also for certain contoids, which are typical of particular languages or variants).

The first vocogram shows the unrounded ‘halfway’ vocoids; the second, the rounded ones. But it is recommended to use (some of) them in cases of real necessity and, above all, if one actually knows how to do it. Otherwise, ‘normal’ *canIPA* symbols –or even *offIPA*– should be sufficient. In certain books and websites one can even find official quadrilaterals very much alike for different languages (with markers absurdly placed exactly on *cardinal* points).

canIPA vocoids & correspondent *offIPA* symbols

[i] ‘[i]’ (=)	[x] ‘[ɣ] or [ʌ]’	[u] ‘[u]’ (=)
[ɪ] ‘[ɪ]’ (≡)	[ɫ] ‘[ʌ]’ (≠)	[ʊ] ‘[ʊ]’ (≡)
[e] ‘[e]’ (=)	[ɑ] ‘[ɑ]’ (≠)	[o] ‘[o]’ (=)
[ɛ] ‘[ɛ] or [ɛ̃]’	[ɣ] ‘[ɣ]’ (≠)	[σ] ‘[ɔ] or [ɔ̃]’
[ɛ̃] ‘[ɛ̃]’ (=)	[ɥ] ‘[ɥ]’ (≠)	[ɔ] ‘[ɔ]’ (=)
[æ] ‘[a]’ (≠)	[ø] ‘[ø]’ (≠)	[ɒ] ‘[ɒ]’ (=)
[ɪ̃] ‘[ĩ], [ĩ] or [ĩ]’	[ɔ̃] ‘[ø] or [œ]’	[ĩ] ‘[ĩ] or [ɣ̃]’
[ɪ̃] ‘[ĩ] or [ĩ]’	[œ̃] ‘[œ̃]’ (≠)	[ĩ] ‘[ĩ] or [ɣ̃]’
[ə̃] ‘[ẽ], [ē] or [ɛ̃]’	[æ̃] ‘[æ̃]’ (≠)	[ɥ̃] ‘[ɥ̃] or [ĩ]’
[ã] ‘[ā̃] or [ē̃], [ɛ̃]’	[ỹ] ‘[ȳ], [ȳ]’	[ɪ̃] ‘[ĩ] or [ɣ̃]’
[Ã] ‘[ā̃] or [ã]’	[Ỹ] ‘[Ȳ], [Ȳ]’	[ɪ̃] ‘[ĩ] or [ɣ̃]’
[ĩ] ‘[ĩ]’ (=)	[ø̃] ‘[ö], [ø̃]’	[ɥ̃] ‘[ɥ̃] or [ö̃]’
[ɪ̃] ‘[ĩ] or [ĩ]’	[ɔ̃] ‘[œ̃], [œ̃] or [ö̃], [ö̃]’	[ẽ] ‘[ẽ] or [ø̃]’
[ə̃] ‘[ə̃] or [ə̃]’	[œ̃] ‘[œ̃], [œ̃]’	[ə̃] ‘[ē̃], [ē̃] or [ə̃]’
[ɜ̃] ‘[ɜ̃]’ (=)	[æ̃] ‘[æ̃], [æ̃]’	[ɣ̃] ‘[ɣ̃] or [ö̃]’
[ɐ̃] ‘[ɐ̃]’ (=)	[ɥ̃] ‘[ɥ̃]’ (=)	[ɛ̃] ‘[ē̃] or [ɛ̃]’
[ã] ‘[ā̃] or [ə̃]’	[ɥ̃] ‘[ɥ̃] or [ə̃]’	[ɜ̃] ‘[ɜ̃] or [ø̃]’
[ɥ̃] ‘[ü̃], [ɥ̃]’	[θ̃] ‘[θ̃]’ (=)	[ɣ̃] ‘[ā̃], [ā̃] or [ö̃], [ö̃]’...
[ɥ̃] ‘[ü̃], [ɥ̃], [ɥ̃] or [ɣ̃]’	[ɛ̃] ‘[ɛ̃]’ (=)	[ɛ̃] ‘[ē̃] or [œ̃]’
[ɣ̃] ‘[ɣ̃] or [ɣ̃]’	[œ̃] ‘[œ̃]’ (≠)	[ə̃] ‘[ā̃] or [œ̃]’
[ɣ̃] ‘[ā̃], [ā̃] or [ɣ̃], [ɣ̃]’	[s̃] ‘[ḡ]’ (≠)	[Ã] ‘[ā̃], [ā̃] or [ö̃], [ö̃]’
[Ã] ‘[ā̃], [ā̃]’	[μ̃] ‘[ü̃], [ɥ̃]’	[æ̃] ‘[ā̃] or [ḡ]’
[ɑ̃] ‘[q̃], [ä̃]’	[õ] ‘[ö̃], [ɥ̃]’	[ə̃] ‘[ā̃] or [ə̃] or [ḡ]’
[ɥ̃] ‘[ɥ̃]’ (≠)	[õ] ‘[ö̃], [ɥ̃]’	[ɑ̃] ‘[ā̃], [ā̃] or [ö̃], [ö̃]’
[ɥ̃] ‘[ɥ̃] or [ɣ̃]’	[õ] ‘[ö̃], [ɥ̃] or [ö̃], [ö̃]’	
[x̃] ‘[ɣ̃]’ (≠)	[ə̃] ‘[ö̃], [ɥ̃]’	
	[x̃] ‘[ö̃], [ɥ̃]’	

8.30. We now present systematically our 60 vocoids (omitting the ‘special’ ones) and their correspondents among the 28 official ones; this task will obviously require adding a fair amount of diacritics to the official ones, if they are not to remain generic and vague. We give the eight potential vocoids as well, so that the differences can be better understood – in fact, as we have already mentioned, in our system the more normal and natural values are given to the traditional symbols. We include 18 with intermediate lip position, as well. We show by (=) perfect coincidence in the use of symbols, by (\equiv) an approximate coincidence, and by (\neq) a conflict between the two systems.

8.31. Going back to *canIPA* vocoids, let us notice that with [ɛ, ɔ] we indicate backing or fronting of the dorsum (whereas *offIPA* uses [ɛ, ɔ] for this purpose, but [ɛ, ɔ] for the so-called ‘retracted/advanced tongue root’. Instead, in our system [ɪ] indicates spread or neutral lip-position, as in the general symbol [V̥]. (Let us also observe that paraphonically ⟨V̥⟩ indicates an added smile while speaking; whereas ⟨V̥⟩ shows pouting, cf fig 8.14.)

We have seen (cf fig 8.9-10) that, when using actual –not generic– symbols, it can be useful to be able to indicate an intermediate lip-position between neutral (and spread as well) vocoids and rounded ones, as in [ə, ə, ø] or [ʌ, ʌ, ɔ], cf fig 8.13. However, it could be important to be able to also distinguish further degrees such as [ə, ə, ø, ø, ø] or [ʌ, ʌ, ɔ, ɔ, ɔ]. In fact, sometimes it is useful to show *slightly* delabialized phones, such as the third elements in the series just given, [ø, ɔ], or else *slightly* labialized phones, such as the second ones, [ə, ʌ]. When these notations are useful and used, we have to explicitly indicate that it is not the plain intermediate position between unrounded and rounded vocoids, ie half-rounded ones (fig 8.13), as can be seen from fig 8.14. In addition, if necessary, the last elements of the series given above are used to indicate that (already) rounded vocoids are over-rounded, [ø, ɔ] (fig 8.14).

Also for central approximants, above all, it could be useful to distinguish degrees of labialization, as for instance in: [ʍ, ʍ, ʍ, w, ʍ].

fig 8.13. Scale of *three* labial positions.

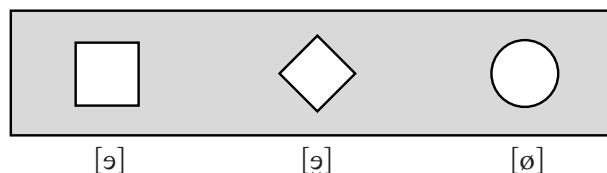
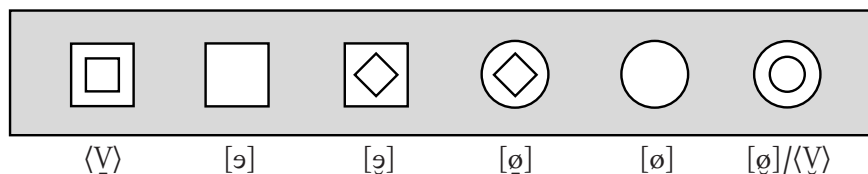


fig 8.14. Scale of *six* labial positions (the first is paraphonic as the last one can be).



Appendix

Intermediate vocoids

8.32. Considering fig 8.12, let us expand a bit the number of possibilities for ‘special’ –or halfway– symbols for intermediate *canIPA* phones. For easier comparisons, we show normal *canIPA* vocoids, followed by those of fig 8.12 (mostly for vertical insertions), adding a further possible set of special intermediate vocoids (for crosswise insertions, between two or four other symbols). Of course, these are not really necessary. But, indeed, they could be useful to distinguish between accents of a same language, when other ‘special’ symbols are already used to show timbre nuances, which might be important not to ignore.

fig 8.15. Further possible ‘special’ symbols for crosswise intermediate *canIPA* vocoids.

i	ɪ	ɨ	ɯ	ɰ
ɪ	ɪ	ɨ	ɯ	ɰ
e	ə	ə	ɤ	ɥ
ɛ	ɛ	ɜ	ɶ	ɷ
ɛ	ɛ	ɶ	ɶ	ɷ
æ	æ	æ	ɑ	ɑ

Y	y	ɥ	ɰ	u
ɥ	Y	ɥ	ɰ	u
(ø)	ø	ø	ø	ø
(œ)	œ	œ	œ	œ
(œ)	œ	œ	œ	œ
(œ)	œ	œ	œ	œ

i	ɪ	ɨ	ɯ	
ɪ	ɪ	ɨ	ɯ	
e	ə	ə	ɤ	
ɛ	ɛ	ɜ	ɶ	
æ	æ	æ	ɑ	
æ	æ	æ	ɑ	

	y	ɥ	ɰ	u
	ɥ	ɥ	ɰ	u
	ø	ø	ø	ø
	œ	œ	œ	œ
	œ	œ	œ	œ
	œ	œ	œ	œ

e	ə	ɤ		
ɛ	ɛ	ɶ		
		ɶ		
		ɶ		

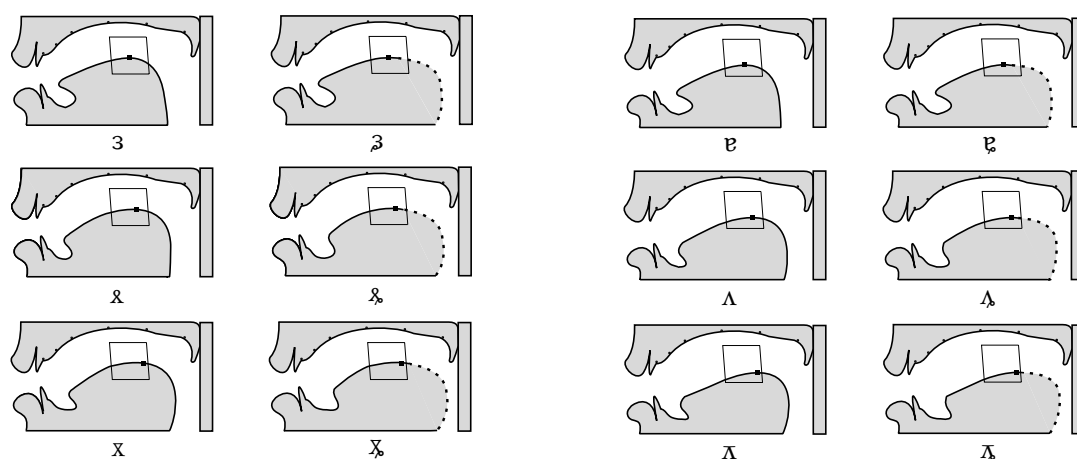
	Y	y	ɥ	
	Y	y	ɥ	
			ø	
			œ	



Uvulo-pharyng(e)alized vocoids

8.33. To accurately describe certain pronunciations of German, for instance, we need to identify at least six such vocoids, that we show side by side with their plain correspondent vocoids.

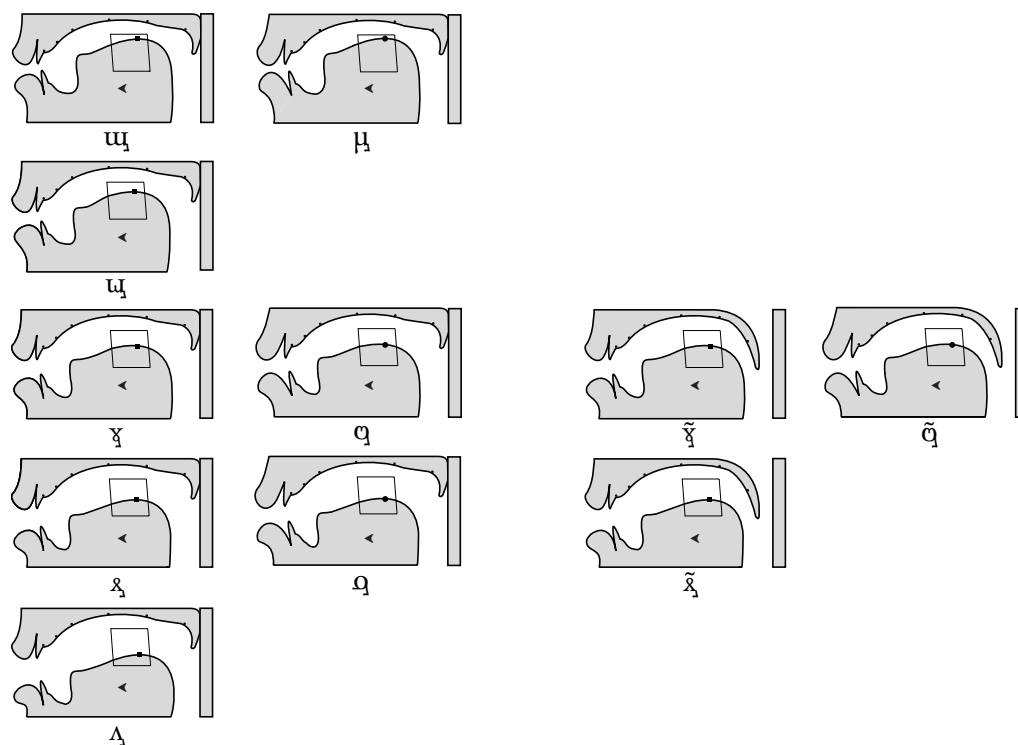
fig 8.16. Some uvulo-pharyng(e)alized *canIPA* vocoids.



Lateralized (or latero-contracted) vocoids

8.34. Equally, to accurately describe the neutral pronunciation of Mandarin Chinese, we need to identify at least eleven such vocoids, that we show side by side with their plain correspondent vocoids.

fig 8.17. Some lateralized (or latero-contracted) *canIPA* vocoids.

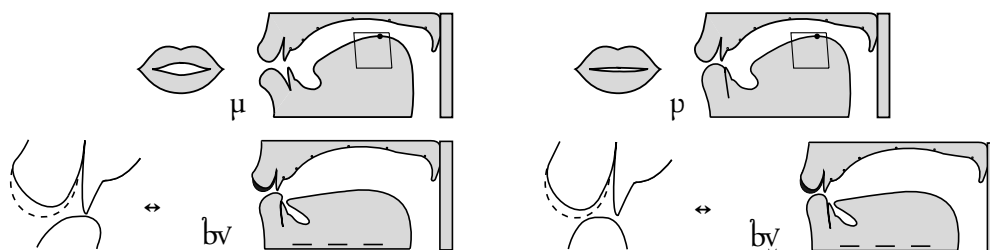


Labiodentalized vocoids

8.35. To describe the mediatic accent of the Netherlands, we need at least a labiodentalized vocoid taxophone, [p], that we compare with its plain rounded counterpart, as a general vocoid, [μ] (though Netherlandic has [u] for /u/). It can occur for /VuV/, mostly /Vuə/, which often becomes [VuV, Vuə], and thus [VpV, Vpə], as in *duwen*. (By the way, let us notice that /u/, in International Netherlandic, is rather /β/, and that it is no good idea at all to show it as /w/.)

In the same mediatic accent, before V (not necessarily between V), /u/ can typically be realized as a voiced labiodental *semistop-semi*(con)strictive by detension (with possible bilabialization, too, that we add in fig 8.18, although it would be more logical, perhaps, to show and treat it in \mathcal{G} 10): [bv, by], as in *wie*.

fig 8.18. A labiodentalized *canIPA* vocoid (and two contoidal taxophones).

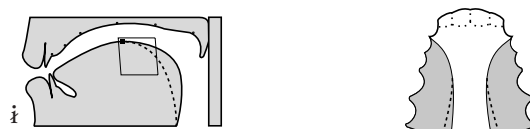


Semi-velarized vocoids

8.38. Up to now, one single semi-velarized vocoid has been found (fig 8.19): an ‘[i]’ sound with a strong dark coloring: [i̤], which will not be confused with central [i̥], either as a sound (or as a symbol, if an analogy between [l] and [ɭ] is clearly drawn).

This new modified vocoid, in fact, sounds as a combination of [i] and [ɨ], and occurs in the broad accent of Berlin, for /i:/, as in *sieben* [ʔi̤ɪbm̩], instead of [ʔi:bm̩].

fig 8.19. Orogram & palatogram of the semi-velarized vocoid [i̤] (the dotted lines indicate normal [i]).

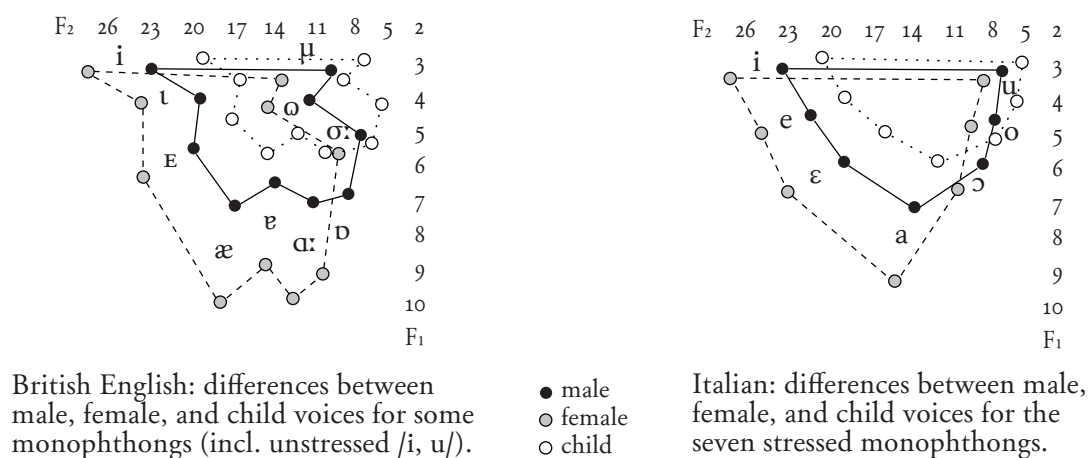


Differences in vocoids for male, female, and child voices

8.38. The human ear can normally distinguish between male and female (and, indeed, infant) classes of voices, in an easy and automatic way, by spontaneously compensating and calibrating all the actual differences that we all can perceive.

However, acoustically this cannot be done in such a natural and immediate way, as fig 8.22 clearly shows, although these diagrams result from an average of several voices. Instead, each single voice would inevitably show many surprising and puzzling peculiarities.

fig 8.22. The acoustic way of 'showing' phonic things.



Bad ways of dealing with vowels & vocoids

8.39. It is clear, by now, that Phonetics is not for anyone, to say nothing about Tonetics. This is true both for learners and would-be teachers, owing to lack of interest or skill. In this case, they generally just neglect what they cannot appreciate and use. But, in the case of would-be authors, who actually happen to write a book on the subject, without having the gift for doing it, things become very serious and dangerous, too. Unfortunately, there are very many cases of this calamity.

As for the treatment of vowels, there are five frequent ways to cause damage. The *first* one consists in not using any diagram at all, but showing only symbols, possibly very general ones, in a list, just with a written example for each phoneme. Thus abandoning the readers to themselves, with no useful explanation. This commonly happens in current language dictionaries.

The *second* way consists in still using very general symbols, but putting them in an unsatisfactory kind of table of little help, with few or no explanations, as for instance in *The Oxford Dictionary of Pronunciation for Current English*.

The *third* way of dealing badly with vowels consists in using some kind of more or less official diagram, such as the IPA quadrilateral, but still considering the symbols used as a kind of spelling. Thus putting them exactly on the cardinal points, and wast-

ing any opportunity of being really useful, as did C.M. Wise in his books (and so many after him, as well).

The *fourth* bad way consists still in using generic symbols and putting them in quadrilaterals, but with poor skill and with little correspondence to actual sounds, especially for '/i:, u:/', as it happens in *The Longman Pronunciation Dictionary* and the *Cambridge English Pronouncing Dictionary*, too. In addition, as they refer to the same kind of pronunciation, they should, at least, be more uniform and coherent in their way of putting the symbols on the diagrams.

The *fifth* way consists in showing quadrilaterals, drawn simply from written reported descriptions by other authors, without actually having listened to these sounds. This is what used to do, for instance, Jack Windsor Lewis, for scores of languages, with no clear distinction between phonemes, phones, and taxophones. Not rarely, even some phonemes were lacking in his diagrams, and taxophones were very incoherently shown, producing unreal and risible figures.

9. Consonants & contoids (1)

9.1. In this chapter we will thoroughly deal with consonantal articulations, which we call CONTOIDS when we consider them from an exclusively phonetic point of view, or *consonant phones*. Instead, when we speak of their distinctive function, in some languages, we will call them CONSONANTS, or *consonant phonemes*. When we refer to their orthographic aspect, we will call them *consonants* again, or *consonant graphemes*.

As we already know, even the characteristic qualities of contoids –as those of voicoids– depend on the shape given to the ARTICULATORY TRACT during their production. However, the areas involved are decidedly much wider than that of voicoids (which is very restricted, as we have seen in § 8.1-6). As a matter of fact, from the lips to the larynx, each place can be decisive to articulate a contoid. And there are also complex articulations, with both different simultaneous or sequential places, as we will not fail to see below.

However, even for contoids there are three fundamental components for their production, which are made possible by the expiratory air that gives them <voice>. This is produced by the presence of vibrations of the vocal folds, as far as (the most) normal contoids are concerned. In fact, we will then see that for certain contoids (used in some languages) some articulatory ^{or} phonatory modifications are possible, including the activation of non-pulmonic mechanisms.

For the moment, though, we will deal with the *three* fundamental components (by taking them up again from § 6): the MANNER OF ARTICULATION, from nasal to lateral (according to our own preferred order, based directly on articulatory considerations), with further internal subdivisions, which are necessary to specify some manners or their combinations more clearly.

Then, the PLACE OF ARTICULATION, from bilabial to laryngeal, with an even greater number of further internal subdivisions, which are also necessary, to be able to explain differences (which can be slight but not at all unimportant). They are determined by minor changes or by combinations of one or more places together.

Finally, for contoids their PHONATION TYPE is paramount, as it generally makes it possible to double the number of contoids, with the possibility of opposing –even functionally in various languages– voiced and voiceless contoids, as in *lagging*, *lacking* or *view*, *few* /'læɡɪŋ, 'lækɪŋ; 'vjʊu, 'fjʊu/.

9.2. Also for contoids there was an older, prescientific, method of describing the <consonants> of a foreign language by making vague reference to the sounds <hypothesized> for one's own language, with occasional cross-reference to some other <better-known> widely-spoken European languages, without ever using articulatory figures, like orograms –mostly– which must be analyzed in the smallest de-

tail (of course when they are clearly reliable) for useful and necessary comparisons.

This is needed exactly in order to be able to *see* the differences, even before being able to *perceive* them auditorily and kinesthetically (ie through an appropriate awareness of the movements of the various articulators, during the production of different contoids).

Therefore, it is necessary to analyze even the contoids of a given language with a scientific method, which must be unrelated to any language, although firmly based on a precise inventory of a considerable number of natural languages. Thus, the (aforementioned) PHONETIC METHOD is the answer. As for vocoids, the first stage consists in becoming aware of the contoids of one's own *mother tongue* (which does not necessarily coincide with the national or official language). Starting from these contoids, afterwards it will be possible to pronounce any other contoid belonging to any language.

9.3. By nature, CONTOIDS contrast with the other category of segmental sounds – *vocoids* (as already said). In fact, contoids are mainly distinguished by having the following essential characteristics for articulatory organs: MOVEMENT, APPROACH (between parts, which is quite evident, even up to full contact) and EXTENSION to all possible articulatory areas, even very peripheral ones, which go from the lips and teeth to the pharynx and larynx, with any possible intermediate and combined positions.

All this is contrasted –for vocoids– with their relative *staticity* and considerable *distance* between the articulators, and the *limited* physical area within the oral space, which is necessary for their articulation (substantially constituted by the area ranging from the zone of the *prevelum* to the boundaries of the palate and the velum, as can be seen in fig 8.1).

Contoids can have their timbres modified by the intervention of the LIPS; but generally with no actual influence on the possibility of really changing a phone into a phoneme, within one language. These are mostly just phonetic nuances (not phonemic differences), which must absolutely not be neglected, however, neither in descriptions nor in learning/teaching. In fact, even for French or Mandarin Chinese /j, ɥ/, at least another difference is always present. As a matter of fact, neutral French has /j/ [j], a palatal *semi-constrictive*, vs /ɥ/ [ɥ], a *postpalatal rounded approximant*, while French variants and Mandarin have /j/ [j], a *palatal* approximant (vs /ɥ/ [ɥ], a *postpalatal rounded* approximant). See, however, § 17.56 for Croatian [t̚, d̚; t̥̚, d̥̚].

Therefore, since *repetita iuvant*, contoids are phones characterized by movement, where expiratory air does not go out of the mouth very freely and often produces very important noises (which are typical mainly for certain articulation manners, as the constrictive [or <fricative>] one).

9.4. In order to obtain the possible range of contoids (used –or usable– by the world's different languages), we made x-ray photos and films, and palatograms obtained using both a mechanic and electronic artificial palate. This is a kind of toothless denture (expressly prepared for every particular phonetician's palate)

which is put into one's mouth in order to observe the points of contact between the tongue and the hard parts of the palatal vault. The mechanic type is more pioneering and requires full commitment and considerable skill. In fact, overlooking more specific particulars, after a given phone has been articulated, the artificial palate must be drawn out in order to immediately observe the contact points between parts of the tongue with parts of the palate.

Obviously, the phones must be articulated in the most natural possible way. The operation has to be repeated several times, by simultaneously tape-recording every item, in order to be able to verify their actual naturalness, even later on.

The electronic artificial palate is much more modern (and expensive too). It has a great number of microensors, arranged on the whole surface and connected to very thin wires (coming out from the mouth angles) that are plugged into a computer. In this way it is possible to see on the display all the points of contact or approach during actual articulations, not only those of a single phone but of whole utterances as well. Every movement is shown on the display in real time. Therefore, it is possible to use the display too, in addition to kinesthesia and self-listening, in order to have continuous feedback on the articulations produced, to modify them and immediately verify the effects. Of course, it is possible to store and print everything (both for contoids and vocoids).

9.5. For phonetic notations, above all when handwritten, during the analysis of a language while listening to some recordings, it is certainly convenient to use the diacritics of *DISPLACEMENT*. Therefore, *contoids* are double-underlined, [], to show a (more or less) basic, or canonical element (instead of the dot used for *vocoids*, since in our notation system a dot beneath a voiceless contoid symbol indicates voiceless lenition, as in [ṭ, ṣ]). Also displacements are then indicated, as: [x̣, β̣, β̣, ɣ̣, ẉ, ʃ̣, ʃ̣], following the same criteria used for vocoids, in reference to the most typical places and manners, and some tiny [ɹ̣, ɻ̣, ɻ̣, ɻ̣] can be used as well. Therefore, even for contoids, according to particular (descriptive or teaching) purposes, icons like [x̣] (and [x̣], [x̣], [x̣], [x̣] and [x̣], [x̣], [x̣], [x̣]), can also be useful in order to be able to show up to *nine* general positions, starting from the characteristics of each articulation manner.

A canonical value will be indicated by [x̣], to be rigorous and coherent, even for the stop manner. As a matter of fact, the tiny cross must not be interpreted as a point of contact, rather as the essence of each contoid. Thus, for instance, [x̣] will not necessarily be a stop, but simply a more energetic articulation, which means that when it is applied to a stop, it will indicate a firmer and tenser occlusion; when applied to a constrictive, or an approximant, it will have a closer approach than normal, which is fairly different for constrictives (with noise) or approximants (almost without noise). The opposite nuance is indicated by [x̣]; whereas, [x̣] and [x̣] will indicate more advanced or retracted articulations, respectively, always in relation to those that are considered to be canonical. Finally, [x̣], [x̣], [x̣], [x̣] will indicate combinations. Of course, all these icons can be referred to any articulation manner, again starting from the typical and canonical value each one has. On the other hand, we need not resort to these indications, unless their actual utility is thought to be really important...

9.6. *fig 9.1* shows the most peculiar labiograms for various contoids, typical of some well-known languages. Realizations with extra rounding are also added, in order to highlight differences (which are visible in the three orograms given at the bottom).

Besides, *fig 9.2.1* presents further perspectives, with linguograms which help to distinguish grooved from slit contoids, and those with different types of lateral contraction: bilateral, unilateral, and constrictive unilateral.

fig 9.1. Contoid labiograms (and five orograms for the lips again).

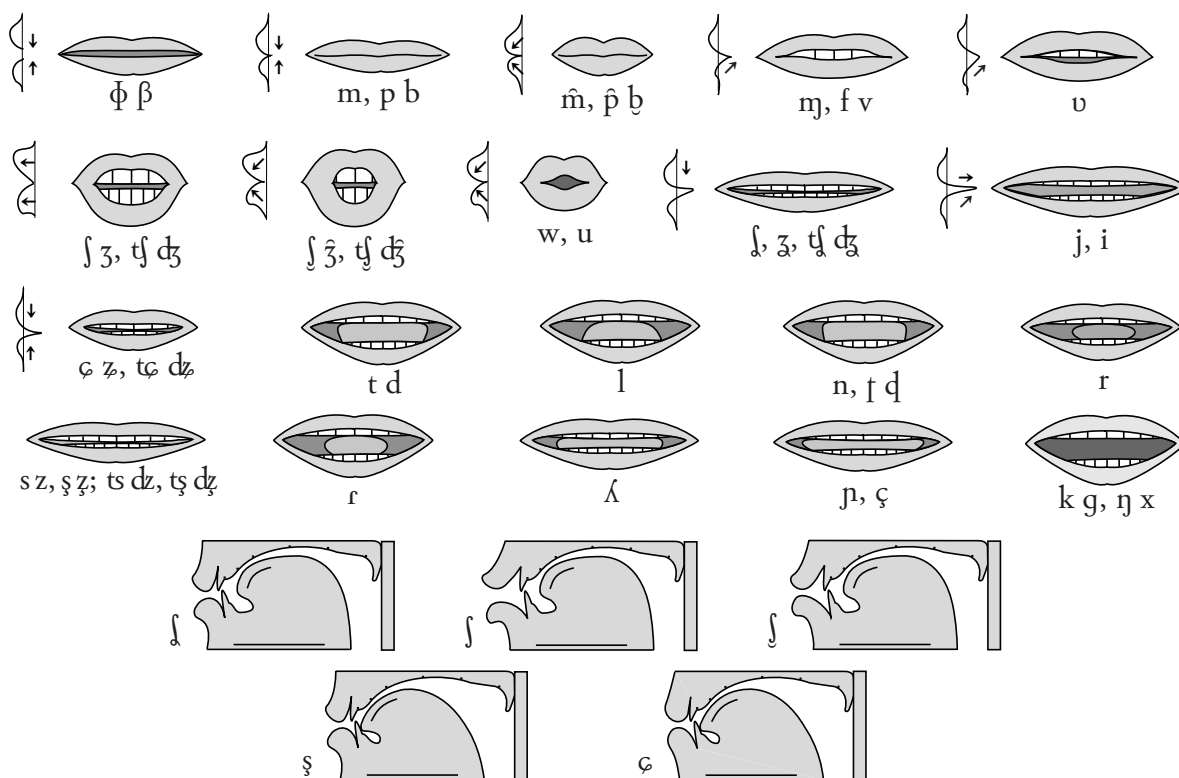


fig 9.2.1. Contoid linguograms.

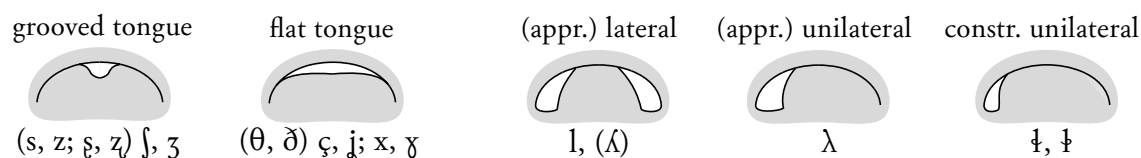


fig 9.2.2. Contoid palatograms.

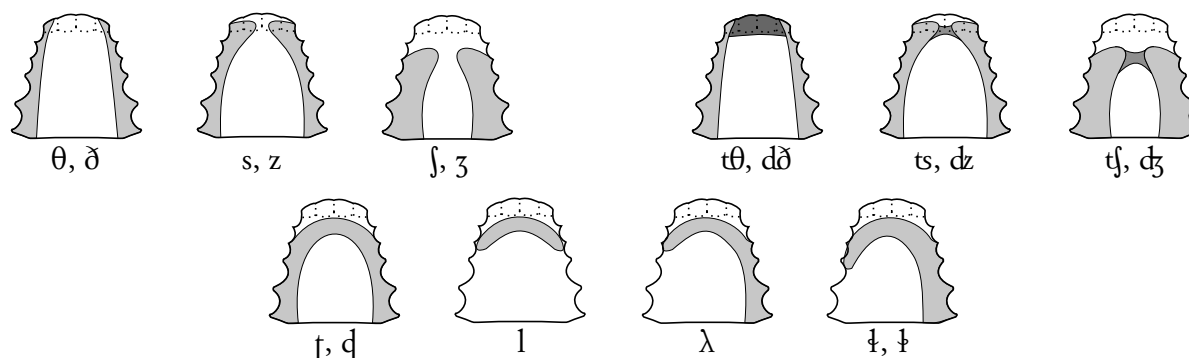
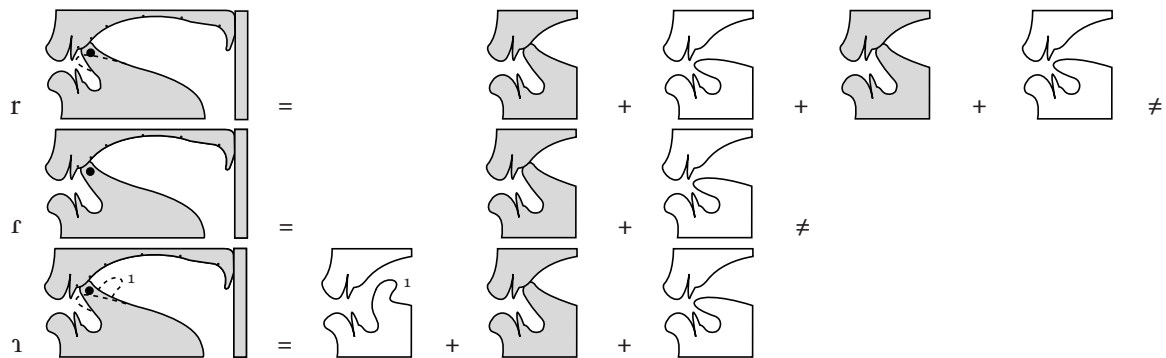


fig 9.2.2 also provides some revealing palatograms, which contribute to further clarifying the differences between some manners of articulation.

In addition, fig 9.2.3 shows the fundamental difference between *trills* (here, the voiced alveolar is given, which has two rapid tapings, [r]), *taps* (again the voiced alveolar is given, [ɾ], with just one tapping), and *flaps* (still voiced alveolar, [ɹ], with one tapping, but of a different kind, since the tip of the tongue is first brought behind the alveolar ridge, and then, while it moves forwards, it rapidly strikes the ridge and ends in a front position, from where it will soon pass to the next phone in the word).

fig 9.2.3. Difference between (alveolar) trill [r], tap, [ɾ], and flap, [ɹ].



Although they are already presented here, by means of definitions and phonetic symbols, in \mathfrak{G} 10 all the contoid orograms considered in this book will be seen in a systematic way. Of course, we will proceed according to manners of articulation, by going horizontally across the table in fig 10.1 (which contains the 321 commonest or most useful articulations, among the 464 found, which are given however in the lists and orogram tables in \mathfrak{G} 10, with their 774 phones).

First of all, let us carefully observe the figures (although not all of them together!); then, we will give some examples.

9.7. Going back to the basic contoids, which were given for each manner of articulation in § 6.3.0-7, let us now consider neighboring articulations, which present slight differences or some combinations of places of articulation. The figures that accompany our exposition must be analyzed very very carefully, in order to perceive the differences. It is important here to really know actual articulations, and to reflect, not only on the symbols, but also on the figures. In this way, one can KINESTHETICALLY comprehend all the components indeed, and then *reproduce* every single phone, although by trials (of course), until one can *produce* it naturally. It would certainly be useful to be able to make constant reference to languages and dialects, which use those sounds. However, even without them –and even without specific examples– it is fundamental to start finding their correspondences, by helping oneself with any available means. In order to see concretely how languages may be analytically described, readers are referred to the 12 languages dealt with in *HP*, beginning from those one knows <better>, to <discover> what one may have always been able to do, but has never thought about, using the advantageous guidelines and terms of the PHONETIC METHOD.

9.8. Similar –but obviously not identical– to (*bilabial*) [m], we find (with secondary coarticulations, in the sense of incomplete articulations, of an approximant type, which are less evident, although perfectly perceptible): [m̠], *bilabial rounded*, with rounding added to the complete contact between the lips; [m̟], *palatalized bilabial*, with the back of the tongue raised towards the palate; [m̠̠], *uvularized bilabial*, with the back raised towards the uvula.

Before meeting these articulations, by proceeding from the outside towards the inside, that is from the lips towards the uvula, we find: *dental*, [n], [ɲ], with the same possible coarticulations, and, before that, *labiodental*, [m̥], also with labialization, [m̠], palatalization, [ɲ̟], or uvularization, [m̤] (and possible further combinations, as the *alveolarized labiodental*, [ɱ], which combines the normal labiodental phone with the alveolar one, simultaneously). Further possible articulations are: *labial-apical*, [ᵐ], with the tip in contact with the upper lip, and *denti-alveolar*, [ɳ].

Besides, there are other nasals, with two simultaneous articulations: *dental–bilabial* [ɱ], or *alveolar–bilabial*, [ɱ], ie a dental/alveolar and a bilabial one. In addition: *postalveolar–bilabial*, [ɱ̠]; *velar–bilabial* [ɱ̠] (it is advisable to write these terms by using an *n-dash*, and pronouncing them with two stresses, for instance: /'vɪlɐɪ̯ bae'leɪbɐt/).

Slightly behind the alveolar place, we find the *postalveolar* nasal, [ɲ] (apico-postalveolar), also with labialization, [ɲ̠] (*postalveopalatal rounded*); and (*sub*)*apico-palatal*, [ɲ̟] (even with labialization: *apico-palatal rounded*, [ɲ̠̟]).

In addition to the *palatal* articulation, [ɲ] (and *palatal rounded*, [ɲ̠]), we have

Following are the two very important pairs: *dental*, [t̪, d̪] and *alveolar*, [t̺, d̺], which must definitely be kept separated and indicated with different symbols, at a phonetic level, although from a phonemic point of view they are both rendered with /t, d/, unless the two articulations are actually opposed phonemically. Equally firm is the decision to assign the unmarked symbols, [t, d], to the dental pair, which is the most frequent and widespread in the languages of the world, although in English (which is the most transcribed language of the world, certainly also because of the poor correspondence between its traditional spelling and actual pronunciation) they are alveolar, [t̺, d̺] (unfortunately still rendered as ⟨[t, d]⟩).

Next comes the (*apico*)*postalveolar* place of articulation, with [ʈ, ɖ], and its variants: (*apico*)*postalveolar rounded*, [ʈ̞, ɖ̞]; *velarized apico-postalveolar*, [ʈ̠, ɖ̠] and *velarized apico-postalveolar rounded*, [ʈ̞̠, ɖ̞̠]; *apico-palatal*, [t̪, d̪] and *apico-palatal rounded*, [t̪̞, d̪̞].

At the velum, of course, there is the very important *velar* pair, [k, g], with its variants: *prevelar*, [ḱ, ḡ] (generally transcribed [k, g]) and *velar rounded*, [ḱ̠, ḡ̠] (which is different from *velar–bilabial*, [ḱᵇ, ḡᵇ]); further back, there are the pairs: *uvular*, [q, ɢ] and *pharyngealized uvular*, [q̠, ɢ̠], and their rounded versions: *uvular rounded*, [q̠̠, ɢ̠̠] and *pharyngealized uvular rounded*, [q̠̠̠, ɢ̠̠̠].

As can be seen in § 10.3.4, some stop-strictive articulations with incomplete contact are also possible.

9.12. We must always keep in mind an important difference which is typical of certain constrictives: between *grooved* and *slit* (the latter being the ‹normal› one). In fact, the lamina (or the tip) of the tongue is apt to form a furrow along its sur-

face. The parts near the furrow are put in close contact with the hard palate: teeth, alveolar and postalveolar regions, and palate. This last is then an apical articulation (not dorsal), and the furrow is in this case not along the tip but along the lamina. However, it adds its characteristic peculiarity, all the same.

Therefore, the furrow becomes a real tunnel, within which the expiratory air is forced, *constricted*, so that a characteristic hiss or whistle is produced. Once we know that the corona can produce this furrow (and with the help of *orograms* and *palatograms*), it is simpler to experiment and identify –by constant auditory feedback– the various articulations, which can actually present it.

We have to clarify one further point. It is extremely important not to unduly extend the concept of sulcalization. In fact, although [f, v] are necessarily numbered among slit contoids, it would be utterly wrong to describe them as articulated with <ungrooved> lamina, since for labiodentals (as [f, v] certainly are) the lamina is not involved at all.

Therefore, only for apical or laminal contoids (concisely called *coronals*), is it possible to have (phonemic) opposition, as in English: *thing* [ˈθɪŋ], normal (or *non-grooved*) and *sing* [ˈsɪŋ], which is *grooved*. So, when [θ] is described as a dental constrictive (with a raised tip of the tongue, or denti-alveolar) and *slit* is added, this is done to be sure to avoid confusing it with [s], [ʃ], which is a dental constrictive (with a raised tip of the tongue) but *grooved*.

The places of articulation, for which the furrow can actually be the only difference in order to phonemically distinguish other slit (or more <normal>) constrictives, are: *dental* (either with a lowered or raised tip), *uvularized dental*, *alveolar*, *apico-postalveolar*.

9.13. If *grooved* contoids are considered *marked*, it is understood that the others are unmarked, and (ungrooved) unmarkedness need not be mentioned (indeed it is definitely better not to, unless it is to avoid ambiguity). Simply, marked contoids have an *extra* articulation feature, for *coronal* contoids.

Starting from the most outer ones, we find the following pairs: *bilabial*, [ɸ, β] and *bilabial rounded*, [ɸ̠, β̠]; *labial-apical*, [ɸ, β]; *labiodental*, [f, v], and *labiodental rounded*, [f̠, v̠]; *palatalized labiodental*, [ɸ̟, β̟]; *uvularized labiodental*, [ɸ̤, β̤], and *uvularized labiodental rounded*, [ɸ̤̠, β̤̠]; *predorsal-dental*, [θ̟, ɖ̟]; *dental*, [θ, ɖ] (in the case of a more forward articulation, with the tip of the tongue slightly protruding, we could have an *interdental* –or *pro-dental*– pair, [θ̟̟, ɖ̟̟], although normally it is simply [θ, ɖ]).

However, the term <interdental> runs the risk of being misleading for those who might actually try to produce a sound by keeping the tip between the upper and lower teeth. Normally, even if the tongue is protruding, only approaching the upper teeth is important, while the lower teeth might even be completely missing. In addition: *dental rounded*, [θ̠, ɖ̠]; *uvularized dental*, [θ̤, ɖ̤]; *alveolar*, [z, ʒ]; *alveolar rounded*, [z̠, ʒ̠]; *(apico)postalveolar*, [z̟, ʒ̟]; *(apico)postalveolar rounded*, [z̟̠, ʒ̟̠].

Moving on to GROOVED constrictives, we find the pairs: *dental* (with a lowered tip) [s, z], *denti-alveolar* (with a raised tip) [ʃ, ʒ], but normally written [s, z]; with the variants: *labiodentalized dental*, [s̟, z̟]; *dental rounded*, [s̠, z̠]; *uvularized den-*

tal, [s, z]; *alveolar*, [ʃ, ʒ], *alveolar rounded*, [ʃ̹, ʒ̹], and *alveolar protruded*, [ʃ̹̟, ʒ̹̟] (note the difference, although slight: in the last cases the rounding diacritic is fused with the symbols, thus becoming *protrusion*; however, the case is different for [ɹ̹, ɹ̹̟], which are probably to be preferred to [x̹, ɣ̹], although for simple labialization, since they can be more frequently used in languages such as Spanish); *velarized alveolar*, [ʃ̹, ʒ̹̟].

Therefore, for some of the places of articulation we have just seen, pairs are distinguished by the presence or absence of the lingual groove: FLAT, [θ, ʝ; θ, Ǿ; θ, ǿ; ʒ, ɿ]; GROOVED, [s, z; s, z; s, z; ʃ, ʒ]. We have to add a constrictive pair which is both (slit) *alveolar* and a *tap* as well, [ʒ, ʝ]; it is thus distinct from both (slit) [ʒ, ɿ] and (grooved) [ʃ, ʒ]. We also find a pair of *grooved dental semi-constrictives* with a lowered tip of the tongue, [ʃ, ʒ] (which is not the only one [cf § 9.14, half-way through it]).

Continuing with GROOVED contoids, we find the following pairs: (*apico*)*postal-veolar*, $[\mathfrak{s}, \mathfrak{z}]$, and (*apico*)*postalveolar rounded*, $[\mathfrak{s}, \mathfrak{z}_\text{r}]$; *velarized* (*apico*)*postalveolar*, $[\mathfrak{s}, \mathfrak{z}_\text{r}]$, and *velarized* (*apico*)*postalveolar rounded*, $[\mathfrak{s}, \mathfrak{z}_\text{r}]$; *apico-palatal*, $[\mathfrak{s}, \mathfrak{z}_\text{p}]$, and *apico-palatal rounded*, $[\mathfrak{s}, \mathfrak{z}_\text{p}]$; *velarized apico-palatal*, $[\mathfrak{s}, \mathfrak{z}_\text{p}]$, and *velarized apico-palatal rounded*, $[\mathfrak{s}, \mathfrak{z}_\text{p}]$.

To complete the survey of grooved constrictives, we have the pairs: *postalveo-palatal*, [ʃ̥, ʒ̥], and *postalveo-palatal protruded*, [ʃ̥̹, ʒ̥̹] (also with a *postalveo-palatal hyperrounded* version, [ʃ̥̹̹̹, ʒ̥̹̹̹]); *postalveo-prevelar*, [ʃ̥̰, ʒ̥̰], and *postalveo-prevelar protruded*, [ʃ̥̰̹, ʒ̥̰̹] (also *hyperrounded* [ʃ̥̰̹̹̹, ʒ̥̰̹̹̹]); *postalveo-velar*, [ʃ̥̤, ʒ̥̤], and *postalveo-velar protruded*, [ʃ̥̤̹, ʒ̥̤̹] (also *hyperrounded* [ʃ̥̤̹̹̹, ʒ̥̤̹̹̹]); *prepalatal*, [ɕ̥, t͡ɕ̥], and *bilabialized prepalatal*, [ɕ̥̠, t͡ɕ̥̠] (or *prepalatal rounded* [ɕ̥̠̠̠, t͡ɕ̥̠̠̠]). Lastly, we also have a pair of grooved *postalveo-palatal semi-constrictives*, [ɕ̥̞, t͡ɕ̥̞] (also with the *protruded* version, [ɕ̥̞̹, t͡ɕ̥̞̹] as well, although with a greater degree of labial and oral opening), but this is not the only one (cf § 9.14).

9.14. Moving back to *slit* constrictives, we have the pairs: *palatal*, [ç, ʝ], and *palatal rounded*, [ç̞, ʝ̞]; *uvularized palatal*, [ç̠, ʝ̠]. Often, the actual pronunciation of [ʝ] is halfway between constrictive and approximant, therefore *semi-constrictive*, which is better represented with a more specific symbol, [ʝ̟] (not given in [1], because it is usefully and frequently used). Also the *postpalatal* constrictives [ç̠, ʝ̠] may be of use.

Besides, we have two further groups of pairs: *velar*, [x, ɣ], and *velar rounded*, [x̤, ɣ̤] (‹philographically›, the symbols [ɣ̤, ɣ̤] might be preferable; they are extendible to other cases as well, but not so easily to all, especially for different places of articulation, particularly grooved ones), with a *prevelar* variant, [x̥, ɣ̥] (normally rendered with [x, ɣ]). Then, *uvular*, [χ, ʁ], and *uvular rounded*, [χ̤, ʁ̤]; *pharyngealized uvular*, [χ̣, ʁ̣], and *pharyngealized uvular rounded*, [χ̣̤, ʁ̣̤]; in addition: *prepharyngeal*, [ɸ, ɸ̤]; *pharyngeal*, [ħ, ʕ], and *pharyngeal rounded*, [ħ̤, ʕ̤]. Lastly: *laryngeal*, [h, h̥], and *laryngeal rounded*, [h̤, h̤̥] (there are also *laryngeal semi-constrictives*, [h̥̤, h̥̤̥]).

There is also a new important category of contoids, *semi-constrictives*, which is formed by phones which are intermediate between constrictives and approxi-

nants. It contains ten diphonic pairs, five of which are slit, and five grooved. In this last case, of course (as these articulations are intermediate), the furrow is less evident than in constrictives; however, its presence is equally perceptible.

Thus we have the following pairs – slit: *labiodental*, [ɸ, ɸ̥]; *dental*, [θ, ð]; *palatal*, [ç, j̥]; *velar*, [ɣ, ɣ̥]; *velar rounded*, [ɣ̠, w̠]; and grooved: *dental*, [ʂ, ʐ]; *postalveolar*, [ʃ̠, ʐ̠]; *postalveo-palatal*, [ʃ̠, ʐ̠]; *postalveo-palatal protruded*, [ʃ̠, ʐ̠]; *prepalatal*, [ʃ̠, ʐ̠] (in addition to two voiced phones: *postpalatal rounded*, [ʋ̠], and *prevelar*, [ʋ̠]) cf § 10.5.4-5.

Sometimes, for semi-constrictives, we find actual oscillation between the constrictive and approximant types. Also for this reason, it may be important to have this intermediate category available – possibly, even for other places of articulation, in comparison with the ten more ‘canonical’ ones given here. Their importance increases also because of the stop-semi-constrictives, which derive from them, as we will see in § 9.18.

In addition to the pair of *constrictive trills* (seen above, [ʀ, ʀ̥]), some further ones, which are articulated in further back positions and are different from those we have just considered: *uvular*, [ʁ, ʁ̥], and *uvular rounded*, [ʁ̠, ʁ̠̥]; *pharyngealized uvular*, [ʁ̠, ʁ̠̥]; *pharyngeal*, [ʁ̠, ʁ̠̥] (they are all ‘stronger’ than: [χ, ɣ; ʁ̠, ʁ̠̥; ʁ̠, ʁ̠̥; ʁ̠, ʁ̠̥], which means that they are produced with greater force, because of an increased amount of expiratory air used).

There are also some *constrictive laterals*; the most widespread pair is the first we give: *alveolar*, [ɭ, ɭ̥] (possibly also *dental*, [ɭ̠, ɭ̠̥]); *postalveolar*, [ɭ̠, ɭ̠̥]; *prepalatal*, [ɭ̠, ɭ̠̥] (possibly also *postalveo-palatal*, [ɭ̠, ɭ̠̥]); *palatal*, [ɭ̠, ɭ̠̥]; *velar*, [ɭ̠, ɭ̠̥]; *uvular*, [ɭ̠, ɭ̠̥].

In a general *table*, the trills and laterals which are constrictive as well will appear more appropriately within their own manners of articulation (rather than with constrictives proper), with the additional feature of constrictive markedness.

Stop-strictives (cf § 10.4 – ‘affricates’)

9.15. Methodologically, it is correct to present stopstrictive contoids after stops and constrictives as well, since they are derived from the (temporal) fusion of these two (homorganic) manners. In fact, their first part is a stop, whereas their second part is a constrictive contoid. Nevertheless, their total *duration* corresponds to that of a simple segment: [tʃ] lasts as long as [t] or [ʃ]. However, in the table of a given language, or in a general table, the correct collocation of stopstrictives is, of course, between stops and constrictives.

In our simplified table of consonant sounds (fig 6.2), we have placed one pair of stopstrictives: *postalveo-palatal protruded*, [tʃ̠, dʒ̠], which has greater variations, as the version without labialization, *postalveo-palatal*, [tʃ̠, dʒ̠]; besides, *postalveo-velar protruded*, [tʃ̠, dʒ̠], and *postalveo-velar*, [tʃ̠, dʒ̠]. For the first two pairs given here, we find a variant with a raised tip of the tongue as well, which can be represented as [tʃ̠, dʒ̠; tʃ̠, dʒ̠], whenever it is thought to be useful. There can also be the need to transcribe a hyperlabialized version of [tʃ̠, dʒ̠], ie *postalveo-palatal hyperrounded*, [tʃ̠, dʒ̠] (if necessary, [tʃ̠, dʒ̠], too).

Geminated stopstrictives are rendered by doubling their whole symbols: [t̥t̥, d̥d̥; t̥t̥, d̥d̥; t̥t̥, d̥d̥; t̥t̥, d̥d̥]... However, if for any reason, we thought it convenient to show that the first part of a geminate has no audible offset, so that in reality it becomes a true stop (unreleased and definitely homorganic to the successive stopstrictive), we ought to resort to some special symbols that show –for the first elements– only the occlusion without the typical characteristic of stopstrictives (ie the combination of a first part, which is a *stop* articulation, with a second one, which is a *constrictive*, in the same place of articulation).

Therefore, in a more meticulous –but not necessary– transcription, we would have: [t̥t̥, d̥d̥; t̥t̥, d̥d̥; t̥t̥, d̥d̥; t̥t̥, d̥d̥], &c (by introducing special symbols for stops that, in actual fact, would almost exclusively occur only in such cases, since the hold of the first phone continues into the second one, with an offset –or explosion– occurring only at the end of the sequences given. It is true, however, that in Hindi the stop variant is possible for postalveo-dorsal stopstrictives, cf § 10.3.2 of *HPr*).

9.16. On the other hand, it is extremely misleading (and even quite unsuitable) to transcribe the first parts of geminated stopstrictives, belonging to this group, by using the symbols [t, d], as too often is still the case: <[t̥t̥, d̥d̥]>. But it is just as misleading to render simple stopstrictives as if they were sequences (among other things, heterorganic, according to the symbols used), as <[t̥, d̥]>! Still, even today (when, at last, we can transcribe whatever we want, and really need, thanks to simple programs to produce fonts), authors and publishers, too often, content themselves with transcriptions like the following (where we show Italian examples because of gemination) </fatt̥ʃe, 'rɛdd̥ʒe/>, or even </f'at̥ʃe, r'ɛd̥ʒe/> (rather: </f'at̥ʃe, r'ɛd̥ʒe/>, also by changing <prevocalic> stress and <chronemes>, /:/, into ordinary apostrophe and colon (</', :/>), for /f'at̥ʃe, 'rɛd̥ʒe/ *facce, regge*...

Strictly speaking, though, the most appropriate symbols for stopstrictives would be some –even <more special>– monograms; this does not mean [t̥, d̥; t̥, d̥], which is a combination of [t, d] with [ʃ, ʒ; ʃ, ʒ], but more typical and original ones, such as [t̥ʃ, d̥ʒ; t̥ʃ, d̥ʒ]. However, this choice would inevitably bring us to use dozens and dozens of new symbols (and even more, including various diacritics) &c.

Instead, it is more than sufficient to have a generic indication of the *three main macro-places of articulation* (together with the indication of voicing as well): *labial*, [p, b]; *prelingual*, [t, d]; and *postlingual*, [k, g]. Their being combined into monograms (which renders reading and writing –even by hand– definitely easier) automatically implies that they are –quite naturally– homorganic. And this is determined by their constrictive element, to which the stop element perfectly adapts: [pf, bv; ts, dz; kx, gx].

Although we have not yet introduced the other most recommendable symbols, for the various necessary stopstrictives (which we will see afterwards), here we provide a choice of them, both to show their complexity and to highlight the advantages of the other *canIPA* symbols, in comparison with the seeming simplicity of the *offIPA* ones. The latter, actually, fail to show several things, which are far from being superfluous! Here are the most important ones: [pf, bv; t̥, d̥; c̥, ɟ̥; q̥x, ɣ̥],

which are decidedly less recommendable than [pf, bv; tʃ, dʒ; kç, gʝ; kχ, gʁ]. On the other hand, they would still be better than plain and ambiguous (and misleading) digrams [pf, bv; tʃ, dʒ; kç, gʝ; kχ, gʁ]... (even than [pf, bv; tʃ, dʒ; cç, ʝç; qχ, gʁ]).

9.17. Going back to the survey of stopstrictive contoids (and continuing from the beginning of the articulatory tract), we now consider the following diphonic pairs: *bilabial*, [pp, bβ], and *labiodental*, [pf, bv]; then, slit *dento-predorsal* (or *predental*, or *dental* with a lowered tip), [tθ, dð]; *dental*, [tθ, dð], *alveolar*, [tɹ, dʁ], and *alveolar rounded*, [t̠, d̠]; besides, (*apico*)*postalveolar*, [t̠, d̠], and (*apico*)*postalveolar rounded*, [t̠, d̠]. For these four pairs it is fundamental to specify that the tongue is slit, since the corresponding grooved articulations exist too, as we will see shortly.

Notice that, strictly speaking, the stop phase of [pf, bv] is produced by the contact between the *internal* part of the upper lip and the *external* part of the lower lip. However, the true and typical articulation remains *labiodental*—and the same is true of the correspondent stop contoids [p, b], § 9.10— as can be seen from fig 10.3.1 & 10.4.1.

Usually, in general tables (for constrictives, as well, of course), *grooved* articulations are explicitly indicated, which are the marked ones since they have an additional peculiar characteristic: to be precise the furrow along the <corona> (ie tip ^{or} lamina). Consequently, all other articulations altogether are defined *slit*, although they include the bilabial and labiodental pairs (just seen), for which it would be absurd to think of the lingual furrow, or of its absence as well, since the tongue is not involved at all in the articulation of these contoids (as we have already said).

The grooved stopstrictives corresponding to the areas of the slit ones (just seen) are above all those of the following diphonic pairs: *dental*, [ts, dz] (with a lowered tip), and *denti-alveolar* (with a raised tip, in which case the symbols [t̠, d̠] can be used, if necessary), with the variants: *dental rounded*, [t̠, d̠], and *labiodentalized dental*, [t̠, d̠]. For grooved contoids in the alveolar area, we have the *alveolar*, [tʃ, dʒ], and *alveolar rounded*, [t̠, d̠], pairs.

We have to add here a slit alveolar pair which is both a *stopstrictive* and a *tap* too, [t̠, d̠] (it is more rarely a *trill*, [t̠, d̠]). Thus, it is different from both [tɹ, dʁ] and [tʃ, dʒ].

9.18. We continue then with the pairs: *velarized alveolar*, [tʃ, dʒ], and *velarized alveolar rounded*, [t̠, d̠]; (*apico*)*postalveolar*, [t̠, d̠]; (*apico*)*postalveolar rounded*, [t̠, d̠]; *velarized apico-postalveolar*, [t̠, d̠]; *apico-palatal*, [tʃ, dʒ]; *apico-palatal rounded*, [t̠, d̠].

Completing the aforementioned pairs with a lamino-postalveolar component (cf § 9.15), we have: *postalveo-palatal*, [t̠, d̠], and *postalveo-palatal protruded*, [t̠, d̠] (also with the *postalveo-palatal hyperrounded* variant, [t̠, d̠]); *postalveo-prevelar*, [t̠, d̠], and *postalveo-prevelar protruded*, [t̠, d̠] (also *hyperrounded* [t̠, d̠]); *postalveo-velar*, [t̠, d̠], and *postalveo-velar protruded*, [t̠, d̠] (also *hyperrounded* [t̠, d̠]); and *prepalatal*, [t̠, d̠], and *bilabialized prepalatal*, [t̠, d̠] (or *prepalatal rounded* [t̠, d̠]). Lastly, we have to mention a *grooved postalveo-palatal stop-semi-constrictive* pair, [t̠, d̠],

Going back to slit pairs, we find: *palatal*, [k̟͡ç, ç̟͡]; *palatal rounded*, [k̟͡ç̠, ç̟̠͡]; *uvularized palatal*, [k̟͡ç̠̠, ç̟̠̠͡]; *prevelar*, [k̠͡x̠, x̠͡] (normally rendered as [k̠͡x̠̠, x̠̠͡]). Then we have: *velar*, [k̠͡x̠̠, x̠̠͡], and *velar rounded*, [k̠͡x̠̠̠, x̠̠̠͡]; *uvular*, [k̠͡χ̠̠, χ̠̠͡], and *uvular rounded*, [k̠͡χ̠̠̠, χ̠̠̠͡]; *pharyngealized uvular*, [k̠͡q̠̠, q̠̠͡], and *pharyngealized uvular rounded*, [k̠͡q̠̠̠, q̠̠̠͡].

There are also some stopstrictives with *lateral explosion*, which are composed of a constrictive lateral with a homorganic stopped first part, that is LATERAL STOP-STRICTIVES. Our symbols are such that we need not pre-empt those of lateral constrictives (which are easily obtainable). The most widely used pair is the first we give: *alveolar*, [ɽ, ɽ̥] (possibly also *dental*, [ɽ̥, ɽ̥̥]); *postalveolar*, [ɽ̥̥, ɽ̥̥̥]; *prepalatal*, [ɽ̥̥̥, ɽ̥̥̥̥] (possibly also *postalveo-palatal*, [ɽ̥̥̥̥, ɽ̥̥̥̥̥]); *palatal*, [k̥̥̥, g̥̥̥]; *velar*, [k̥̥̥̥, g̥̥̥̥̥], and *uvular*, [k̥̥̥̥̥, g̥̥̥̥̥̥].

It is certainly useful to consider another particular group: that of SEMI-STOP-STRICTIVES (which is intermediate between stopstrictives and constrictives). In fact, the first part of the phone is less evident, because it is either less occlusive (ie articulated with a less energetic closure), or shorter than normal (in which case, the second element is generally slightly longer, let us say: 1st $\equiv \frac{1}{3}$ and 2nd $\equiv \frac{2}{3}$). The most appropriate notation for semi-stopstrictives is with a superscript first element, always combined into monograms (to avoid ambiguities), as in: [p^f, b^v; t^h, d^h; k^x, g^x; t^s, d^s; t^ʃ, d^ʃ; t^ʒ, d^ʒ]. These phones can be useful either for actual articulations with reduced first elements, or for fluctuations, which are quite possible. Thus they function as diaphones, too.

Approximants (cf § 10.6)

For prelingual (or coronal) contoids, we have the pairs: *dental*, [ʈ, ɖ] (with a raised tip); *alveolar*, [ɕ, ɟ]; (*apico*)*postalveolar*, [ʧ, ʤ], and (*apico*)*postalveolar rounded*, [ʨ̞, ʥ̞]; *apico-palatal*, [ʧ̟, ʤ̟], and *apico-palatal rounded*, [ʨ̟̞, ʥ̟̞]. As for the dorsum (or back of the tongue), we find the diphonic pairs: *prepalatal*, [ɰ, ɹ], and *prepalatal rounded*, [ɰ̞, ɹ̞]; *palatal*, [ɲ, ɳ], and *palatal rounded*, [ɲ̞, ɳ̞]; *uvularized pala-*

Some of these are also used as *intense* contoids: [ɿ̥, ʈ̥, ɹ̥, ʂ̥]...

As we have already seen (§ 9.14), there are also some *constrictive trills*, in di-
phonic pairs: [ɕ, ɕ̥; ʃ̥, ʃ̥̥; ʈ̥, ʈ̥̥; ʈ̥̥̥, ʈ̥̥̥̥]. For the alveolar place, taps, [ɹ̥, ɹ̥̥], are more
frequent than trills, [ɹ̥̥̥, ɹ̥̥̥̥] (which are more complex).

Whenever *voiceless* symbols for this category are needed, the following can be used: [l̥, λ̥, ʎ̥, j̥, ɰ̥]...

Memorizing

Obviously, at the beginning, it is most important to know where (and how) to look – in the sense of symbols, programs, tables... In fact, the first step towards succeeding in finding what one is looking for is to know that these elements exist (and where they can be found).

Thus, by excluding the six letters –of the Roman alphabet– which are used for vocoids, that is [i, e, a, o, u, y], the nineteen remaining letters –quite rationally– have received their phonic values, according to their use in the main European languages; while, the non-IPA alphabets which use ⟨[y]⟩ for the contoid [j], are obviously obliged to use ⟨[ü]⟩ for [ɣ].

Thus, by considering the NASALS, we can see that more normal are indicated by [m, n], as in *man* ['mæ:n]. In the official table, five more appear, including the (non-phonemic) labiodental, [ɱ], as in *inferior, emphasis* [ɪnfɪ'ɜ:, ɪmfɪ'ɜ:, 'ɛmfəsɪs]; the postalveolar (called <retroflex>), [ɳ], as in British English *entry* ['ɛnʈɹɪ]; the palatal, [ɲ], as in Spanish *doña* ['dɔ:ɲa]; the velar, [ŋ], *song* ['sɔ:ŋ, 'sɔ:ɳ]; and the uvular, [ɴ], in German: *Dehnung* ['dɛ:nʊɴ]. As can be seen, the new necessary symbols were obtained by the addition of a leftward small tail for three symbols: in one case it has been attached to the last leg of [m], to obtain the labiodental variant, [ɱ]; by attaching it to the last leg of [n], in imitation of [g], which is equally velar, [ŋ]; in the third case, [ɲ], the tail has been attached to the first leg of [n], in imitation of [j] (so that it is different even from [ɳ]). The fourth case of tail addition, pres-

ents a rightward small tail, [ŋ], in imitation of the whole postalveolar (‹retroflex›) series, with [t] &c. For the uvular place (of articulation), the prevailing characteristic is the use of small capitals (further adapted by slightly reducing their actual size and somewhat modifying their shape), which produces [ɴ].

9.26. For the *stop* manner, highly logically, we have [p, b], as in *beep* [ˈbriːp]; [t, d], as in Spanish *tender* [tenˈdeɾ]; and [k, ɡ], as in *keg* [ˈkheːɡ]. The avoidance of ‹[g]› will be deeply appreciated, although many –not particularly careful– authors and publishers use it instead of [ɡ], which is obtained from an italic form of *g* (as for [ɑ], from *a*). In fact, [ɡ] integrates better into the series [p, b; d; q], avoiding strange shapes, too; besides, it is easier to write by hand. Lastly, the uvular stop is rendered with [q], logically accompanied by a small cap for the corresponding voiced phone, [ɢ], as in Somali: *qiiq* [ˈɕiːq].

The other official stops are: postalveolar (‹retroflex›), coherently in British English (and in all varieties with postalveolar [ɻ], for /ɹ/) we have *train* [ˈtʁɛɪn], *dry* [ˈdʁɪə]. Quite rationally, palatal stops are rendered with [ç, ʝ], as in Czech: *sít* [ˈsɪːç], *podíl* [ˈpɔɟɪl] ([ʝ], while actually being an overturned [f], recalls [j]; but in the commercial version of the ugly font used in the official chart, many phoneticians and publishers have accepted a very badly made symbol, without considering its typographic origin, which is [ɟ]). The last stop is glottal, [ʔ] (which recalls the apostrophe of transliterations, ‹'›), as in Arabic: *saʔaal* [səʔˈʔæl].

9.27. Momentarily setting aside *stopstrictives* (‹affricates›, which do not appear in the official table, because of the bad habit of erroneously considering them a mere juxtaposition –instead of a combination– of a stop and a constrictive, ‹fricative›), we will now see the symbols of the constrictive manner (of articulation). They are more numerous, also because of some wrong collocations, due to an original underestimation or unawareness of the difference between constrictives and approximants.

True *constrictives* are: labiodental, [f, v], in *five* [ˈfaɪv]; slit dentals (or ‹interdental›, [θ, ð], in *the thing* [ðəˈθɪŋ]; grooved dental, [s, z], in *size* [ˈsaɪz]; postalveo-palatal protruded (‹postalveolar›), [ʃ, ʒ], in *dilution* [dɪˈluʃən, dɪˈlʊʒən] (Am. [dɪˈluʃən]), *delusion* [dɪˈluʒən] (Am. [dɪˈluʒən]), obtained with an ancient convenient deformation of [s, z]. (However, in one of the ‹provincial› phonetic alphabets used in Italy, ‹[ʃ], [ʒ]› correspond to [z], [dʒ]; they are also used in some dictionaries of Italian, which do not use transcriptions, but graphemes with diacritics or modifications.)

Then come true postalveolar constrictives (the sadly notorious ‹retroflex›), regularly indicated with [ʂ, ʐ], as in Mandarin Chinese: *shū* [ʂu] and in Taiwanese pronunciation of Mandarin: *rén* [ˈʐən] (which in Mandarin is [ˈʐən], ie a real approximant, even if traditionally represented with ‹/ʐ/›, for lack of appropriate symbols). Then palatal, [ç, ʝ], as in Greek: *chéri* (χῆρι) [ˈçɛːri], *géiso* (γεῖσο) [ˈjɪːʂo]; obviously [j] recalls [j], although it shows a difference which is not small, even if ignored by many; while, [ç] is immediately associated with palatality, within IPA, so that we –and others too– have chosen [ç] as the element to indicate ‹palatalization›, as in [ɲ, ʈ, ɖ, ʈʂ, ɖʂ, ʂ, ʐ, ʝ]...

After, we find: velar, [x, ɣ], in American Spanish: *jefe* ['xɛfɛ], in Spanish: *pegar* [pe'ɣar]; and uvular, [χ, ʁ], in Iberian Spanish: *jefe* ['χɛfɛ], in German: *Ring* ['ʁɪŋ]. For these symbols, it would be more <logical> to form pairs as <[x, ʁ]> and <[χ, ɣ]>; but, [x] and [ʁ] are so frequent (and so widely used, since the beginning of the IPA) that it was simpler to accept [x, ɣ] and [χ, ʁ]. However, often, in certain languages /x/, /ɣ/ are used phonemically (even for [χ], [ʁ], not necessarily in pairs, though). The last true constrictive in the official table is voiceless pharyngeal (<epiglottal>), [ħ], as in Arabic: *fariħ* [faɾiħ].

9.28. It is better to move the other five –[ɸ, β], <[ɣ̥]>, [h, ɦ]– into the approximant manner, since in most languages, where these symbols have been used they actually correspond to approximants, as in Japanese *fune* [ʰɸu.nɛ], in Spanish *lobo* [lɔ.βo], in Arabic: *fa‘aaliya-h* [faʕʕaʕlija]. Note that for homogeneity we mark all pharyngeals (<epiglottal>) with a horizontal stroke, whereas we indicate prepharyngeals with other symbols, including the voiced one, [ɣ̥]. In this way, the laryngeal stop [ʔ] (or <glottal stop>) is differentiated better from the (voiced) pharyngeal approximant [ʕ], which is certainly more widespread than the pre-pharyngeal (<pharyngeal>) one. Too often, even in books, the two symbols [ʔ, ɣ̥] are confused and misused!

Here are examples of the laryngeal approximants, [h, ɦ]: *hit* [ʰɪt], and *behind* [bɪɦaɪnɪŋd, bə-, -ɦ]. Should it be really necessary to indicate laryngeal constrictives, in the *canIPA* alphabet we have some symbols derived from these, which recall them fairly easily (as we will see below, in the more systematic part: 10, with all the orograms).

9.29. The official table gives a diphonic pair of <lateral fricatives> or rather *constrictive laterals*, that is lateral contoids with a tighter stricture which produces noise. The official symbols are <[ɬ, ɮ]>, but we prefer [ɬ, ɮ], since we have a whole series of constrictive laterals, which otherwise would be difficult to use coherently. We find [ɬ, ɮ] in Zulu: *umlhaba* [umɬa.a'ba], *indlala* [ɪnɬa.a.la]; in Welsh: *Llanelli* [ɬa.nɛɬi] (with local variants, [ɬ, ɬ̥, ɬ̥]).

Among other things, the phoneticians of long standing, who have followed all the developments since the beginning of the IPA, know quite well that the original voiced symbol was not <[ɮ]>, but <[ɮ̥]>, with explicit advice not to consider the symbol a combination of [l] and [ɮ]. In 1888, the present writer was not yet born; but soon after his birth, in 1947, he began doing practical phonetics (as everyone, anyway, but has never stopped since). He started doing it with books and special recordings when he was 12 years old – shortly after the 1951 reform. However, he retraced all the phases from the beginning, thanks to the issues of the phenomenal *Maître Phonétique*, and very soon he joined the International Phonetic Association and subsequently attended University College London, where the IPA had been based for generations. In his school days, even in class, he used to read books on languages and phonetics, so as not to waste time... and he learnt English by himself with the aim of reading the great books on Phonetics, starting from *The Principles of the International Phonetic Association*.

9.30. For *approximants*, the official table provides five (voiced) elements, [ʋ], ⟨[ɹ, ɻ]⟩ (which will be dealt with at the end of this section), [j, ɰ], plus two more, added among the ⟨other symbols⟩, [ɥ, w] (respectively called ⟨labial-palatal⟩ and ⟨labial-velar⟩ for our *postpalatal rounded* and *velar rounded*). Thus we have the labiodental, [ʋ], as in Dutch: *wad* [ʋɑt]; [j, ɥ; ɰ, w], palatal, postpalatal rounded, provelar and velar rounded, corresponding to the vocoids [i, y; ʊ, u]; we find them in *yes* [jɛs] and *wet* [ʋɛt]; in French *nuit* [nɥi]; and in Japanese *kawari* [kɐʋɐ̯ɰi].

In the table, although in a different order, we find three TRILLS, in opposition to two TAPS. The latter, as already seen (§ 6.3.6 & § 9.22), have a single tapping, whereas the former have at least two, or more. The trills are: bilabial, [ʙ], as in Asua (spoken in Zaire): *bo'e* [ʙɔ.ʔɛ]; alveolar, [r], as in Italian *re* [re]; and uvular, [ʀ], as a possible variant in French and German: *rein* [ʀɛ̃], *recht* [ʀɛçt], respectively. The only true tap in the official table is alveolar, [ɾ], as in *caro* in Spanish [ˈkaɾo], or Italian [ˈkaɾo], or Portuguese [ˈkaɾu], respectively, compared with *carro*, Spanish [ˈkarrɔ], or Italian [ˈkarːro] – let us carefully observe the order of each phone: [rr:] (Sp.) and [rːr] (It.). (In Portuguese *carro* is [ˈkaʁu], and in Brazilian Portuguese [ˈkaʁu].)

To be rigorous, postalveolar ⟨[ɻ]⟩, which has been put in the table (obviously as ⟨retroflex⟩), is not a real tap, but a FLAP, as we will see below (§ 10.7 & fig 10.6). Besides, we prefer a different symbol, [ɺ], since ⟨[ɻ]⟩ has too often been used like a jack of all trades, even for ⟨[ɹ, ɻ]⟩, especially before ⟨[ɹ]⟩ was introduced.

In the *canIPA* alphabet, for English ⟨/r/⟩ (rather, interphonemically, /ɹ/), we use [ɹ] for British and [ɻ] for American pronunciation (contrary to the widespread antiphonetic use based not on sounds, but on terms to define them, and on outdated fallacies). Thus, *red* /ɹɛd/ is [ɹɛˈd̥] in British English, and [ɹɛˈd̥] in American English. However, in the *canIPA* alphabet, [ɻ] also appears (and [ɹ] as well), but as a real trill, since it is possible to produce such kind of phones, although they are used in few lesser known languages.

9.31. Lastly, we find four LATERAL approximants: *alveolar*, [l], as in *lily* [ˈlɪli]; *postalveolar* (⟨retroflex⟩), [ɭ], as in Swedish: *Karl* [ˈkʰɔɔɭ]; *palatal*, [ʎ], as in Italian *paglia* [ˈpaʎːʎa], Castilian Spanish *olla* [ˈoʎa], and *velar*, ⟨[ɮ]⟩ – not to be confused with the more frequent *velarized* (*alveolar*) [ɭ], as in *Bill* [ˈbɪɭ]. We prefer to use [L], for the velar symbol (and reserve [ɮ] for the uvular one, for homogeneity within series), as in Somali: *lo'* [ˈlɔʔ].

We omit the contoids given under ⟨other symbols⟩, which have already been mentioned in § 7.2-3, § 7.7 and § 9.30.

Equally, we leave the analysis of the other parts of the official chart to the reader's initiative and interest, including non-pulmonic contoids (which, however, we will treat scientifically presently, in § 11.10-16, by showing the official symbols as well, which are not satisfactory) and segmental and prosodic diacritics (which we find only partially acceptable), but we will deal with all the diacritics belonging to our *canIPA* version.

Articulatory practice

9.32. Obviously, also for consonants, it is very useful to train oneself as much as possible, to manage to appropriately grasp all the differences and characteristics of every single phone. *Silent introspection* (cf § 8.23) is very important for all contoids too, including *inhalation* while an articulation is being sustained (except, of course, for stops and for the non-continuant phase of stopstrictives).

In the same way as for vocoids, also for contoids one must be able to feel exactly all the *movements* of the *lips*, *tongue* and *jaw* (at first with the help of a hand-mirror).

In order to feel the *movement of the velum*, it is advisable to start with a long voiceless [m:] that is [ʰm:]; then, while lengthening it, we have to think of a series of [p]'s, which have to be inserted into the sequence, obtaining [ʰmpʰmpʰmp]. Afterwards, the same has to be done with voicing, which produces [mbmbmb]. At this point, the feeling of the velum, which raises and lowers, is quite evident while it closes and opens the passage into the nasal cavity again.

Soon afterwards, the same effect must be practiced at other places of articulation, until one definitely succeeds in keeping the movements under control. In fact, they have to become intentional.

It is extremely important to become well aware of the difference between [i, u] and [j, w] (cf fig 5.1), by starting from two series of [a:], that is ['a::a:]; they have to be joined by inserting [i:], which produces ['a::i::a:], then ['a::i:a:], and ['a::ia:], ['aia], ['aia]; finally, ['a::jja:] and ['a::jja:] will be uttered, and then ['a::ja:], ['aia], ['aja]. It is necessary to become aware of the difference through silent introspection (without using the air coming from the lungs), then with a whispered voice (as for [lenis] voiceless sounds) and, lastly, with a full voice (as for voiced sounds). Further experiment drills can be done freely with any other contoids, or pairs, or sequences.

To produce a *velar lateral*, [L], it is sufficient to start from palatal [ʎ] and slightly retract the tongue, without removing the dorsal contact, but firmly keeping the typical lateral contraction. Those who (still) lack [ʎ] can begin articulating the stop [g] and laterally contracting the tongue (cf fig 9.2, [l, (ʎ)]), while the place of articulation is being maintained. It could also be useful to pass through an intermediate phase, by producing instead a velar lateral stopstrictive, [gɭ]; then, the lateral constrictive part has to be lengthened, [ɭ], and transformed into the corresponding approximant, [L], by slightly opening the jaw and augmenting the lateral contraction.

9.33. Furthermore, silent introspection of all the kinds of //r//, that the different languages use, would certainly be interesting, ranging from [r, ɾ] to [ʀ, ʁ, ʁ], to [ɹ, ɻ], &c. Those who do not have an appropriate articulation of [r] or [ʀ] are advised to start from the corresponding voiceless phones, [r̥, ʀ̥]. In fact, without the vibrations of the vocal folds, the undertaking is favored by a greater quantity of expiratory air, which is typical of voiceless phones, in comparison with voiced ones (for which the air encounters an obstacle at the glottis). Therefore, a greater a-

mount of air and force manages to move the tip of the tongue or the uvula more easily (as a matter of fact, it is only a matter of mechanical physics, certainly not of intentional commands).

In addition, it is paramount to be able to relax all the muscles of one's own mouth and to use diaphragmatic breathing (cf fig 4.3), so as not to thwart the experiment. Also drinking some water can help. Besides, it can be useful to lean back (or even lie down) to continue the drill better.

In the case of speakers whose language lacks a phonemic opposition between /l/ and some kind of //r// (eg Chinese, Japanese, Korean), there are still greater problems. In fact, they have no awareness of the importance of such a difference, to the extent that they actually can not perceive the two different sounds, since their language has only one distinctive entity (a sole phoneme) in that phonic space.

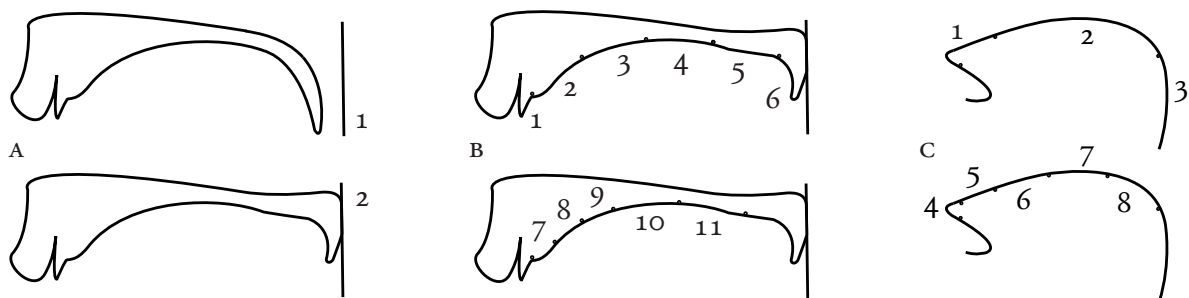
Therefore, at first it is paramount to try to clearly identify the two entities (which are different from both a phonetic and phonemic point of view, in Western languages and many more).

Often, such Oriental speakers articulate [ɭ], both for [l] and [r], thus unifying their characteristics into a sole phone, instead of taking advantage of their differences in order to become able to differentiate them adequately. In fact, one must *just* be a lateral, [l], while the other must *just* be a tap, [ɾ].

Thus, it is fundamental to distinguish and reproduce them, in order to then be able to produce them intentionally, in their appropriate contexts, without confusing words (and concepts) like *Halley* /'hæli/ [hæli] and *Harry* /'hæɹi/ [hæɹi, -ɹi], or *long* /'lɒŋ/ [lɒŋ, 'lɔŋ] and *wrong* /'wɒŋ/ [ɹɒŋ, 'wɔŋ], or even *wall* /'wɔɹt/ [wɔɹt, 'wɔɹt] and *war* /'wɔɹ/ [wɔɹ, 'wɔɹ]. However, there is a greater difference between [l] and [ɭ, ɹ], than between [l] and [ɾ], so these Orientals can succeed better in English than in Spanish or Italian. These examples are crucial: Spanish *mal* /'mal/ [mal] and *mar* /'mar/ [mar], or *alma* /'alma/ [alma] and *arma* /'arma/ [arma]; Italian *male* /'male/ [maɪle] and *mare* /'mare/ [maɪre], or *alto* /'alto/ [alto] and *arto* /'arto/ [arɪto]. In unstressed syllable, it is still more difficult, especially in Italian, since /r/ is [ɾ]: *per parlare* /perparɪlare/ [perparɪlare].

fig 9.2.4. In order to be able to make the best use of the articulatory terminology utilized in the next chapter, it is advisable to pay close attention to the following indications.

A *positions of the velum* (lowered 1, or raised 2). Subdivisions of the articulatory organs in the *oral cavity*. B *palatal vault*, primary: (upper) dental 1, prepalatal 2, palatal 3, prevelar 4, velar 5, uvular 6; and secondary: alveolar 7, postalveolar 8 (together they are prepalatal: 2), postpalatal (between palatal and prevelar) 10, provelar (between prevelar and velar) 11. Point 9 is (sub)apicopalatal, or propalatal. C subdivisions of the *tongue*, primary: coronal 1, dorsal 2, radical 3; and secondary: apical 4, laminal 5, predorsal 6, (mid)dorsal 7, postdorsal 8.



10. Consonants & contoids (2)

August 2013 *Canepari's* updating of *canIPA* contoids in *Natural Phonetics & Tonetics*

10.01. For the sake of thoroughness and to facilitate finding and memorizing the various consonantal articulations, we have to consider some *lists*, which may not be considered just entertaining, but are however something necessary. By grouping them into seven sections, with internal subdivisions, we will provide some 500 articulations (although there can certainly be others, by combining further places and manners of articulation). They will appear after the rich, but partial, table (fig 10.1).

Obviously, diphonic pairs count as one articulation, not as two. Therefore, in practice, every articulation can produce a diphonic pair, with two contoids which are distinguished only by their phonation type (ie voiced or voiceless).

In the table of fig 10.1 (which is long and therefore divided into three parts, to avoid reducing it too much and make it indecipherable), we will give only the (more than) 300 'commonest' or most 'important' articulations (out of the almost 500 included in the lists), depending on vertical and horizontal axes, for more than 500 contoids (out of the some 800 included in *NPT*, and in fig 10.2-8). The signs › (which alternate with the names of the manners provided, on the left side) indicate the 'intermediate' manners, which do not appear in the table. Thus, the table of contoids, although occupying three pages (fig 10.1), is merely indicative, giving only about 70% of all articulations. And, of course, the orograms show much better than definitions their real articulations, also by comparing similar orograms.

Table of the main *canIPA* contoids

10.02. We will now give the *table* of the main *contoids* belonging to the *canIPA* alphabet. It will emerge rather clearly that unitary symbols are preferable to the official ones which need so many diacritics in order to be exact.

However, the way they are placed in the table is quite sufficient to make their values clear (as happens to the vocoids in the vocogram), especially if they are coupled with their orograms (which are to be analyzed very carefully).

canIPA contoids (displayed according to articulation manners)

10.1. In our lists, in double square brackets, less common –but more precise– symbols appear, which can be rendered with more 'normal' symbols, given in simple brackets – in less sophisticated transcriptions, once their exact articulations are clearly known.

n.

[illegible]

CONTONDS (3)

canIPA $\mathcal{L}_U @$

	VOICING	Palatal <i>rounded</i>	Uvularized palatal	Postpalatal	Postpalatal <i>rounded</i>	Prevelar	Prevelar <i>rounded</i>	Postalveol. prevelar <i>rounded</i> .	Provelar	Provelar <i>rounded</i>	VELAR	Velar <i>rounded</i>	Velar–bilabial	Labiodentalized velar	Velar–dental/alveolar	Uvulo-postalveolarized velar <i>r</i> .	UVULAR	Uvular <i>rounded</i>	Pharyngealized uvular	Pharyngeal. uvular <i>rounded</i> .	Prepharyngeal	PHARYNGEAL	Pharyngeal <i>rounded</i>	LARYNGEAL	Laryngeal <i>rounded</i>
(\mathcal{N})	+	$\hat{\mathfrak{p}}$	\mathfrak{p}	\mathfrak{p}		\mathfrak{p}			\mathfrak{p}	$\hat{\mathfrak{p}}$	\mathfrak{p}	$\hat{\mathfrak{p}}$	\mathfrak{p}	\mathfrak{p}	\mathfrak{p}		\mathfrak{p}	$\hat{\mathfrak{p}}$	\mathfrak{p}	$\hat{\mathfrak{p}}$					
(N)	+	$\hat{\mathfrak{n}}$	\mathfrak{n}	\mathfrak{n}		\mathfrak{n}			\mathfrak{n}	$\hat{\mathfrak{n}}$	\mathfrak{n}	$\hat{\mathfrak{n}}$	\mathfrak{n}	\mathfrak{n}	\mathfrak{n}		\mathfrak{n}	$\hat{\mathfrak{n}}$	\mathfrak{n}	$\hat{\mathfrak{n}}$					
(K)	–	$\hat{\mathfrak{c}}$	\mathfrak{c}	\mathfrak{c}		\mathfrak{k}					\mathfrak{k}	\mathfrak{k}	\mathfrak{kp}		\mathfrak{k}		\mathfrak{q}	$\hat{\mathfrak{q}}$	\mathfrak{q}	$\hat{\mathfrak{q}}$		$\mathfrak{ʔ}$		$\mathfrak{ʔ}$	$\mathfrak{ʔ}$
	+	$\hat{\mathfrak{j}}$	\mathfrak{j}	\mathfrak{j}		\mathfrak{g}					\mathfrak{g}	$\hat{\mathfrak{g}}$	$\mathfrak{ɸ}$		$\mathfrak{ɖ}$		$\mathfrak{ɠ}$	$\hat{\mathfrak{ɠ}}$	$\mathfrak{ɠ}$	$\hat{\mathfrak{ɠ}}$		$\mathfrak{ʕ}$		$\mathfrak{ʕ}$	$\mathfrak{ʕ}$
(KX)	–	$\mathfrak{k}\hat{\mathfrak{c}}$	$\mathfrak{k}\mathfrak{c}$	$\mathfrak{k}\mathfrak{c}$		$\mathfrak{k}\mathfrak{x}$					$\mathfrak{k}\mathfrak{x}$	$\mathfrak{k}\hat{\mathfrak{x}}$					$\mathfrak{k}\mathfrak{x}$	$\mathfrak{k}\hat{\mathfrak{x}}$	$\mathfrak{k}\mathfrak{x}$	$\mathfrak{k}\hat{\mathfrak{x}}$					
	+	$\mathfrak{g}\hat{\mathfrak{l}}$	$\mathfrak{g}\mathfrak{l}$	$\mathfrak{g}\mathfrak{l}$		$\mathfrak{g}\mathfrak{x}$					$\mathfrak{g}\mathfrak{x}$	$\mathfrak{g}\hat{\mathfrak{x}}$					$\mathfrak{g}\mathfrak{p}$	$\mathfrak{g}\hat{\mathfrak{p}}$	$\mathfrak{g}\mathfrak{p}$	$\mathfrak{g}\hat{\mathfrak{p}}$					
(KS)	–																								
	+																								
(X)	–	$\hat{\mathfrak{c}}$	\mathfrak{c}	\mathfrak{c}		\mathfrak{x}					\mathfrak{x}	$\hat{\mathfrak{x}}$					\mathfrak{x}	$\hat{\mathfrak{x}}$	\mathfrak{x}	$\hat{\mathfrak{x}}$	\mathfrak{h}	$\hat{\mathfrak{h}}$	\mathfrak{h}	$\hat{\mathfrak{h}}$	\mathfrak{h}
	+	$\hat{\mathfrak{j}}$	\mathfrak{j}	\mathfrak{j}		$\mathfrak{ɣ}$					$\mathfrak{ɣ}$	$\hat{\mathfrak{ɣ}}$					$\mathfrak{ɣ}$	$\hat{\mathfrak{ɣ}}$	$\mathfrak{ɣ}$	$\hat{\mathfrak{ɣ}}$	$\mathfrak{ɦ}$	$\hat{\mathfrak{ɦ}}$	$\mathfrak{ɦ}$	$\hat{\mathfrak{ɦ}}$	$\mathfrak{ɦ}$
(S)	–																								
	+																								
(J)	–	$\mathfrak{h}\mathfrak{y}$	\mathfrak{h}	\mathfrak{h}	$\mathfrak{h}\mathfrak{y}$	\mathfrak{h}	$\mathfrak{h}\mathfrak{y}$		\mathfrak{h}	\mathfrak{h}	\mathfrak{h}	\mathfrak{h}					\mathfrak{x}	$\hat{\mathfrak{x}}$	\mathfrak{x}	$\hat{\mathfrak{x}}$	\mathfrak{d}	$\hat{\mathfrak{d}}$	\mathfrak{d}	$\hat{\mathfrak{d}}$	\mathfrak{h}
	+	$\mathfrak{y}\mathfrak{h}\mathfrak{y}$	\mathfrak{j}	\mathfrak{j}	$\mathfrak{y}\mathfrak{h}\mathfrak{y}$	$\mathfrak{j}\mathfrak{h}$	$\mathfrak{y}\mathfrak{h}\mathfrak{y}$		$\mathfrak{y}\mathfrak{h}\mathfrak{y}$	$\mathfrak{w}\mathfrak{h}\mathfrak{y}$	$\mathfrak{y}\mathfrak{h}\mathfrak{y}$	$\mathfrak{w}\mathfrak{h}\mathfrak{y}$					\mathfrak{r}	$\hat{\mathfrak{r}}$	\mathfrak{r}	$\hat{\mathfrak{r}}$	$\mathfrak{ɖ}$	$\hat{\mathfrak{ɖ}}$	$\mathfrak{ɖ}$	$\hat{\mathfrak{ɖ}}$	\mathfrak{h}
(l)	+							\mathfrak{l}								$\mathfrak{ɻ}$									
(R)	+																\mathfrak{r}	$\hat{\mathfrak{r}}$							
(R)	–					\mathfrak{x}					\mathfrak{x}						$\mathfrak{ɹ}$	$\hat{\mathfrak{ɹ}}$	$\mathfrak{ɹ}$		\mathfrak{x}				
	+					$\mathfrak{ɣ}$					$\mathfrak{ɣ}$						$\mathfrak{ɹ}$	$\hat{\mathfrak{ɹ}}$	$\mathfrak{ɹ}$		\mathfrak{x}				
(\mathcal{R})	+																\mathfrak{r}								
(\mathcal{R})	+																								
(L)	+					\mathfrak{l}					\mathfrak{l}	\mathfrak{l}			\mathfrak{l}		\mathfrak{l}								
(\mathcal{L})	–										\mathfrak{l}						\mathfrak{l}								
	+										\mathfrak{l}						\mathfrak{l}								
(\mathcal{L})	+																								
(\mathcal{L})	+																								
(\mathcal{L})	+					\mathfrak{l}					\mathfrak{l}	$\hat{\mathfrak{l}}$					\mathfrak{l}	$\hat{\mathfrak{l}}$							
(J)	+																								

 \pm 7^2 7^3 7^4 7^5 8^1 8^2 8^3 8^4 8^5 9^1 9^2 9^3 9^4 9^5 9^6 10^1 10^2 10^3 10^4 11^1 11^2 11^3 12^1 12^2

For *sonant* (or *sonorant*, cf § 11.21) phones, which are more often voiced, we will indicate the rarest voiceless phones in round brackets (in the lists). Instead, we will indicate less frequent articulations, which are given near more normal ones (and represented by the same symbols), by putting them in round brackets (in the figures).

When no symbol is given in square brackets, it is substituted with /. For voiceless phones this appears first, while it is shown last for voiced phones. Thus, any possible ambiguity is avoided. Obviously, a symbol appearing alone stands for a laryngeal stop (or a phone with mixed phonation, or else with the phonation type indicated by the corresponding laryngogram).

An eight-pointed asterisk, *, placed before the lips of a given orogram, highlights the few canonical articulations, which constitute the frame of the official consonant inventory (although, somehow, *canIPA* and *offIPA* symbols do not fully correspond). Finally, a small ring, °, indicates that that articulation does not appear in the table of fig 10.1 (which –otherwise– would become impossible to handle and see adequately).

In these synopses, we will use the most precise symbols, to couple each articulation exactly with its symbol, although for some of these, generally, commoner symbols can be used (as can be seen in § 10.2-8).

For all our articulations (with their unitary symbols), we thought it useful to add the corresponding *offIPA* ‘transcriptions’ (given within ‘ ’), in order to show their ‘composition’ (almost as in chemical or algebraic formulae).

This will be useful both to understand the combinations of the few basic symbols with so many diacritics (even if we did not use all those which could have been necessary for absolute precision), and to highlight that it is unthinkable to do ‘diacritical transcriptions’, as all other ‘phonetic alphabets’ do.

Among the fundamental criteria of the original *IPA*, in fact, was also that of avoiding articulatory diacritics. Let us recall that it is paramount to carefully observe the orograms, to constantly compare them, and to find similarities between symbols too, by starting from the official ones, from which the others have been derived (although with useful modifications and some necessary substitutions). Obviously, not all the *offIPA* diacritics we are forced to use combine well (and some are also left out).

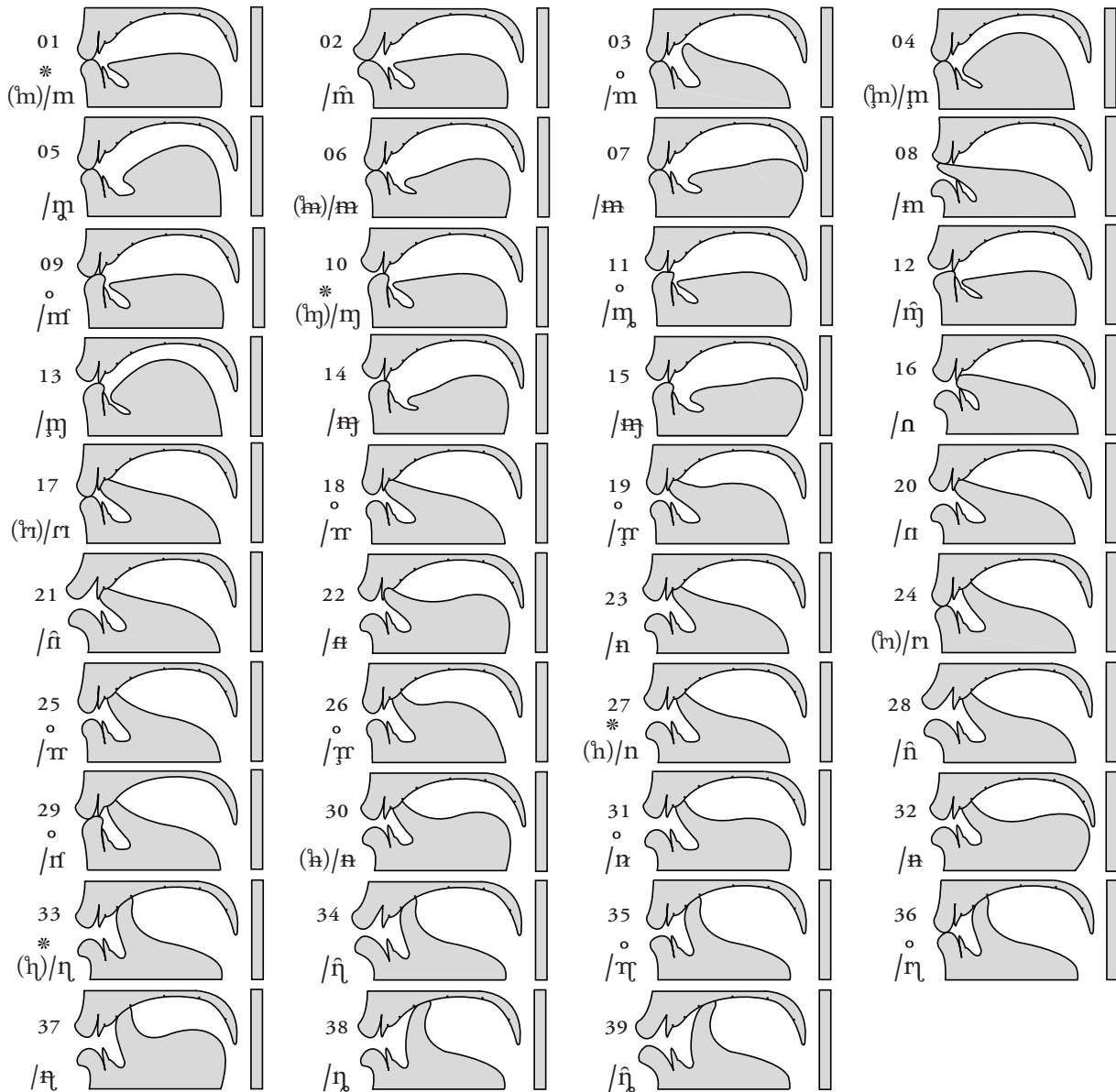


Nasals /N/ [N, ^N] (108)

10.2. These include three synopses grouped into ‘front’, ‘back’, and ‘semi-nasal’ (which have no complete occlusion between the articulators).

10.2.1. *Front* nasals [N] (39).

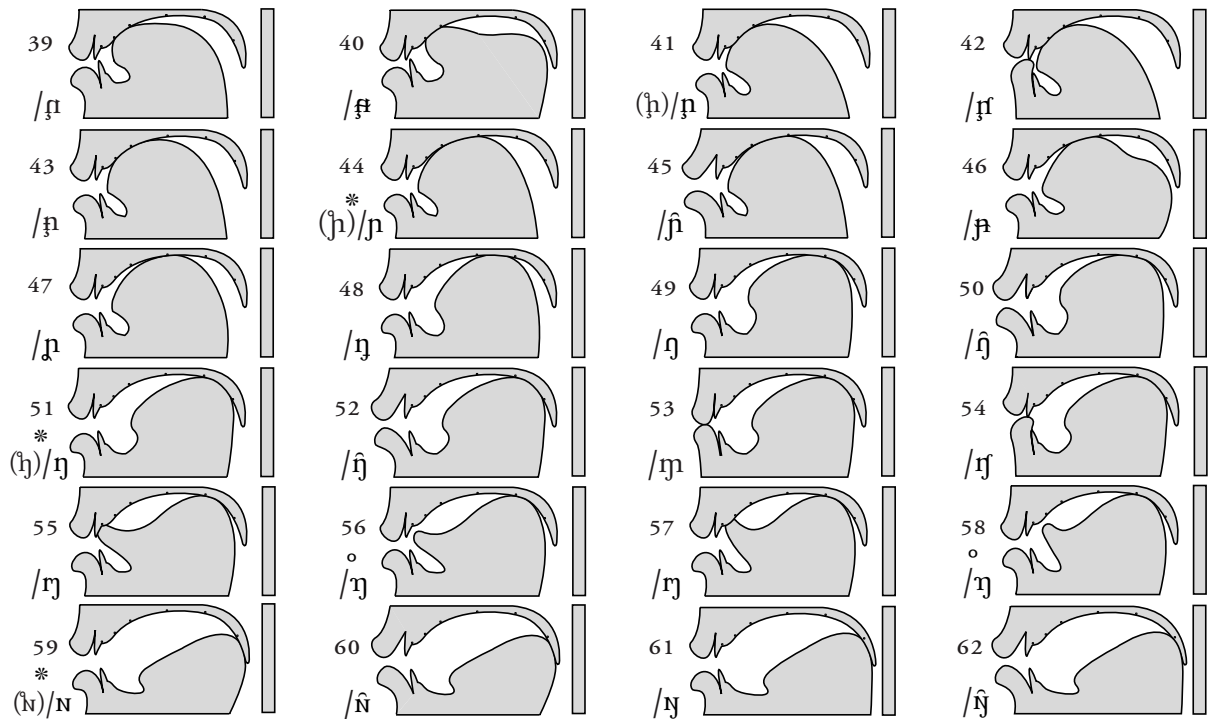
- [^hm], m⁰¹ bilabial (= between the lips) ‘[m̥, m]’ (≠, =)
 [/, m̥]⁰² bilabial rounded (= bilab. with lip rounding) ‘[m^w]’
 [/, m̥]⁰³ alveolarized bilabial (= bilab. w. tip approach. alv. ridge, without contact) ‘[m̥^h]’
 [^hm], m̥⁰⁴ palatalized bilabial ‘[m̥^j, m̥^j]’
 [/, m̥]⁰⁵ prevelarized bilabial ‘[m̥^ɣ, m̥^ɣ]’
 [^hm], m̥⁰⁶ velarized bilabial ‘[m̥^ɣ, m̥^ɣ]’
 [/, m̥]⁰⁷ [m̥] uvularized bilabial ‘[m̥^ɣ]’
 [/, m̥]⁰⁸ labial-apical (= between the upper lip and the tip of the tongue) ‘[m̥]’
 [/, m̥]⁰⁹ [m̥] labiodentalized bilabial ‘[m̥^v]’
 [^hh], m̥¹⁰ labiodental (= between the lower lip and the upper teeth) ‘[m̥^h, m̥^h]’ (≠, =)
 [/, m̥]¹¹ hyper-labiodental (= labiodent., w. firmer contact, no air passes betw. teeth) ‘[m̥^h]’
 [/, m̥]¹² labiodental rounded (= labiodent. + lip rounding) ‘[m̥^w]’
 [/, m̥]¹³ palatalized labiodental ‘[m̥^j]’
 [/, m̥]¹⁴ velarized labiodental ‘[m̥^ɣ]’
 [/, m̥]¹⁵ [m̥] uvularized labiodental ‘[m̥^ɣ]’
 [/, n̥]¹⁶ pre-dental ‘[n̥]’
 [^hh], n̥¹⁷ [(^hh), n̥] dental–bilabial (= *simult.* dent. & bilab.) ‘[m̥^h]’
 [/, n̥]¹⁸ bilabialized dental (= with secondary labialization) ‘[n̥^h]’
 [/, n̥]¹⁹ bilabialized palatalized dental (= with secondary labializ. & palataliz.) ‘[n̥^h^j]’
 [/, n̥]²⁰ [n̥] dental, or prodental (= dent. with a *lowered* or *raised* tip) ‘[n̥] or [n̥]’
 [/, n̥]²¹ [n̥] dental rounded ‘[n̥^w]’
 [/, n̥]²² [n̥] uvularized dental ‘[n̥^ɣ]’
 [/, n̥]²³ [n̥] denti-alveolar (or postdental, or prealveolar) ‘[n̥]’
 [^hh], n̥²⁴ alveolar–bilabial (= *simult.* alveol. & bilab.) ‘[n̥^w, n̥^w]’ or ‘[n̥^hm̥, n̥^hm̥]’
 [/, n̥]²⁵ bilabialized alveolar ‘[n̥^hm̥]’
 [/, n̥]²⁶ labio-palatalized alveolar (= with second. labializ. & palataliz.) ‘[n̥^hm̥^j]’
 [^hh], n̥²⁷ alveolar (= between the alveoli and the tip of the tongue) ‘[n̥^h, n̥^h]’ (≠, ≡)
 [/, n̥]²⁸ alveolar rounded ‘[n̥^w]’
 [/, n̥]²⁹ [n̥] labiodentalized alveolar ‘[n̥^v]’
 [^hh], n̥³⁰ velarized alveolar ‘[n̥^ɣ, n̥^ɣ]’
 [/, n̥]³¹ [n̥] semi-velarized alveolar (with very slight velariz.) ‘[n̥^ɣ]’
 [n̥]³² [n̥] uvularized alveolar ‘[n̥^ɣ, n̥^ɣ]’
 [^hh], n̥³³ postalveolar: (apico-)... (= not laminal) ‘[n̥^h, n̥^h]’ (≠, =)
 [/, n̥]³⁴ postalveolar rounded: (apico-)... ‘[n̥^w]’
 [/, n̥]³⁵ labialized postalveolar ‘[n̥^hm̥]’
 [/, n̥]³⁶ postalveolar–bilabial: (apico-)... (= *simult.* postalveol. & bilab.) ‘[n̥^hm̥]’
 [/, n̥]³⁷ velarized postalveolar: (apico-)... ‘[n̥^hm̥^ɣ]’
 [/, n̥]³⁸ apico-palatal (= between the [hard] palate and the tip) ‘[n̥^h]’
 [/, n̥]³⁹ apico-palatal rounded (with lip rounding) ‘[n̥^w]’.

fig 10.2.1. *Front nasal orograms* (39).10.2.2. *Back nasals* [N] (23).

- [/, ɳ]⁴⁰ [ɳ] postalveo-palatal: (lamino-)... '[ɳ̥, ɳ̥]'
 [/, ɲ]⁴¹ [ɲ] velarized postalveo-palatal: (lamino-)... '[ɲ̥]'
 [(ɳ̥), ɳ]⁴² pre-palatal: (lamino-)... (= between the prepalate and the lamina) '[ɳ̥ʲ, ɳ̥ʲ]'
 [/, ɳ̥]⁴³ labiodentalized pre-palatal: (lamino-)... '[ɳ̥ʲ]'
 [/, ɳ̥]⁴⁴ pro-palatal (= between prepalatal and palatal) '[ɳ̥]' (≠)
 [(ɳ̥), ɳ̥]⁴⁵ palatal (= between the [hard] palate and the [medio]dorsum) '[ɳ̥, ɳ̥]' (≠, =)
 [/, ɳ̥]⁴⁶ palatal rounded '[ɳ̥ʷ]'
 [/, ɳ̥]⁴⁷ [ɳ̥] uvularized palatal '[ɳ̥̤]'
 [/, ɳ̥]⁴⁸ [ɳ̥] postpalatal (= retracted palatal or advanced prevelar) '[ɳ̥]'
 [/, ɳ̥]⁴⁹ [ɳ̥] prevelar (= between the prevelum and the [post]dorsum) '[ɳ̥]'
 [/, ɳ̥]⁵⁰ [ɳ̥] provelar (= between prevelar and velar) '[ɳ̥]' (≠)

[/, ɳ] ⁵¹	[ɳ] provelar rounded ‘[ɳ ^w]’ (≠)
[(ɳ), ɳ] ⁵²	velar (= between the velum and the [post]dorsum) ‘[ɳ, ɳ]’ (≠, =)
[/, ɳ] ⁵³	velar rounded (with lip rounding) ‘[ɳ ^w]’
[/, ɳ̠] ⁵⁴	velar–bilabial (= <i>simult.</i> velar and bilabial) ‘[ɳ̠m]’
[/, ɳ̠] ⁵⁵	[/, ɳ] labiodentalized velar ‘[ɳ ^v]’
[/, ɳ̠] ⁵⁶	velar–dental (= <i>simult.</i> velar and dental) ‘[ɳ̠ɳ̠]’
[/, ɳ̠] ⁵⁷	dentalized velar (with secondary dentalization) ‘[ɳ̠ɳ̠]’
[/, ɳ̠] ⁵⁸	velar–alveolar (= <i>simult.</i> velar and alveolar) ‘[ɳ̠ɳ̠]’
[/, ɳ̠] ⁵⁹	alveolarized velar ‘[ɳ̠ɳ̠]’
[(ɳ), ɴ] ⁶⁰	uvular (= between the uvula and the [post]dorsum) ‘[ɴ, ɴ]’ (≠, =)
[/, ɴ] ⁶¹	uvular rounded ‘[ɴ ^w]’
[/, ɴ̠] ⁶²	pharyngealized uvular ‘[ɴ̠]’ or ‘[ɴ̠]’
[/, ɴ̠] ⁶³	pharyngealized uvular rounded ‘[ɴ̠ ^w]’ or ‘[ɴ̠ ^w]’.

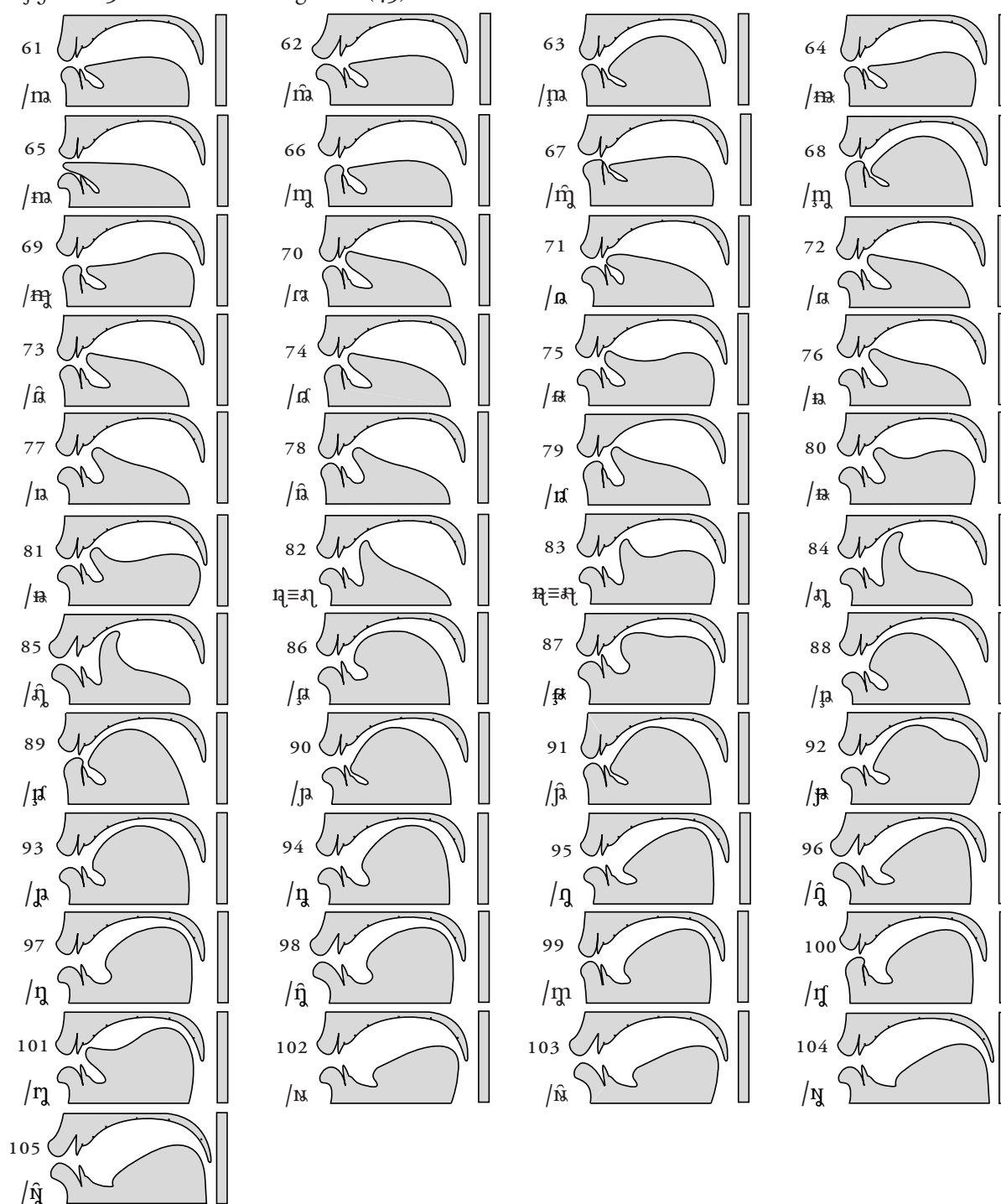
fig 10.2.2. Back nasal orograms (23).



10.2.3. Semi-nasal (45).

[/, ɱ̠] ⁶¹	[ɱ] bilabial <i>semi</i> -nasal (= bilabial, but with no full contact) ‘[ɱ̠]’
[/, ɱ̠] ⁶²	[ɱ] bilabial <i>semi</i> -nasal rounded ‘[ɱ̠ ^w]’
[/, ɱ̠] ⁶³	palatalized bilabial <i>semi</i> -nasal ‘[ɱ̠ʲ]’
[/, ɱ̠] ⁶⁴	velarized bilabial <i>semi</i> -nasal (= bilabial, with no full contact & velarization) ‘[ɱ̠ʷ]’
[/, ɱ̠] ⁶⁵	labial-apical <i>semi</i> -nasal ‘[ɱ̠]’
[/, ɱ̠] ⁶⁶	[ɱ] labiodental <i>semi</i> -nasal (= labiodental, with no full contact) ‘[ɱ̠]’
[/, ɱ̠] ⁶⁷	labiodental <i>semi</i> -nasal rounded ‘[ɱ̠ ^w]’
[/, ɱ̠] ⁶⁸	palatalized labiodental <i>semi</i> -nasal ‘[ɱ̠ʲ]’
[/, ɱ̠] ⁶⁹	[ɱ] velarized labiodental <i>semi</i> -nasal ‘[ɱ̠ʷ]’
[/, ɱ̠] ⁷⁰	dental–bilabial <i>semi</i> -nasal ‘[ɱ̠ ^w]’
[/, ɱ̠] ⁷¹	pre-dental <i>semi</i> -nasal ‘[ɱ̠]’

- fig 10.2.3. Semi-nasal orograms (45).



[[/, ɲ̥]] ⁸⁰	alveolar velarized <i>semi</i> -nasal ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ⁸¹	alveolar uvularized <i>semi</i> -nasal ‘[ɲ̥̠]’
[[/, ɲ̥]] ⁸²	(or [[ɲ̥]]) [ɲ̥] <i>semi</i> -postalveolar <i>semi</i> -nasal (= postalveolar) ‘[ɲ̥]’
[[/, ɲ̥]] ⁸³	(or [[ɲ̥]]) [ɲ̥] velarized <i>semi</i> -postalveolar <i>semi</i> -nasal (= postalveolar...) ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ⁸⁴	apico-palatal <i>semi</i> -nasal ‘[ɲ̥]
[[/, ɲ̥]] ⁸⁵	apico-palatal <i>semi</i> -nasal rounded ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ⁸⁶	postalveo-palatal <i>semi</i> -nasal ‘[ɲ̥̠]
[[/, ɲ̥]] ⁸⁷	velarized postalveo-palatal <i>semi</i> -nasal ‘[ɲ̥̠ʷ]’
[[/, ɲ̥]] ⁸⁸	[ɲ̥] prepalatal <i>semi</i> -nasal (= prepalatal, with no full contact) ‘[ɲ̥ʲ]’
[[/, ɲ̥]] ⁸⁹	labiodentalized prepalatal <i>semi</i> -nasal ‘[ɲ̥ʲʷ]’
[[/, ɲ̥]] ⁹⁰	[ɲ̥] palatal <i>semi</i> -nasal (= with no full contact) ‘[ɲ̥]’
[[/, ɲ̥]] ⁹¹	palatal <i>semi</i> -nasal rounded ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ⁹²	uvularized palatal <i>semi</i> -nasal ‘[ɲ̥̠ʷ]’
[[/, ɲ̥]] ⁹³	apico-palatal <i>semi</i> -nasal ‘[ɲ̥]
[[/, ɲ̥]] ⁹⁴	pre-velar <i>semi</i> -nasal ‘[ɲ̥]
[[/, ɲ̥]] ⁹⁵	pro-velar <i>semi</i> -nasal (between prevelar & velar) ‘[ɲ̥̠]
[[/, ɲ̥]] ⁹⁶	pro-velar <i>semi</i> -nasal rounded (between prevelar & velar) ‘[ɲ̥̠ʷ]’
[[/, ɲ̥]] ⁹⁷	[ɲ̥] velar <i>semi</i> -nasal ‘[ɲ̥]’
[[/, ɲ̥]] ⁹⁸	[ɲ̥] velar <i>semi</i> -nasal rounded ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ⁹⁹	velar–bilabial <i>semi</i> -nasal (= <i>simult.</i> velar and bilabial) ‘[ɲ̥ᵐ]’
[[/, ɲ̥]] ¹⁰⁰	labiodentalized velar <i>semi</i> -nasal ‘[ɲ̥ʷ]’
[[/, ɲ̥]] ¹⁰¹	velar–alveolar <i>semi</i> -nasal ‘[ɲ̥̠]
[[/, ɲ̥]] ¹⁰²	[ɲ̥] uvular <i>semi</i> -nasal (= uvular, with no full contact) ‘[ɲ̥̠]’
[[/, ɲ̥]] ¹⁰³	uvular <i>semi</i> -nasal rounded ‘[ɲ̥̠ʷ]’
[[/, ɲ̥]] ¹⁰⁴	pharyngealized uvular <i>semi</i> -nasal ‘[ɲ̥̠̠]’
[[/, ɲ̥]] ¹⁰⁵	pharyngealized uvular <i>semi</i> -nasal rounded ‘[ɲ̥̠̠ʷ]’.

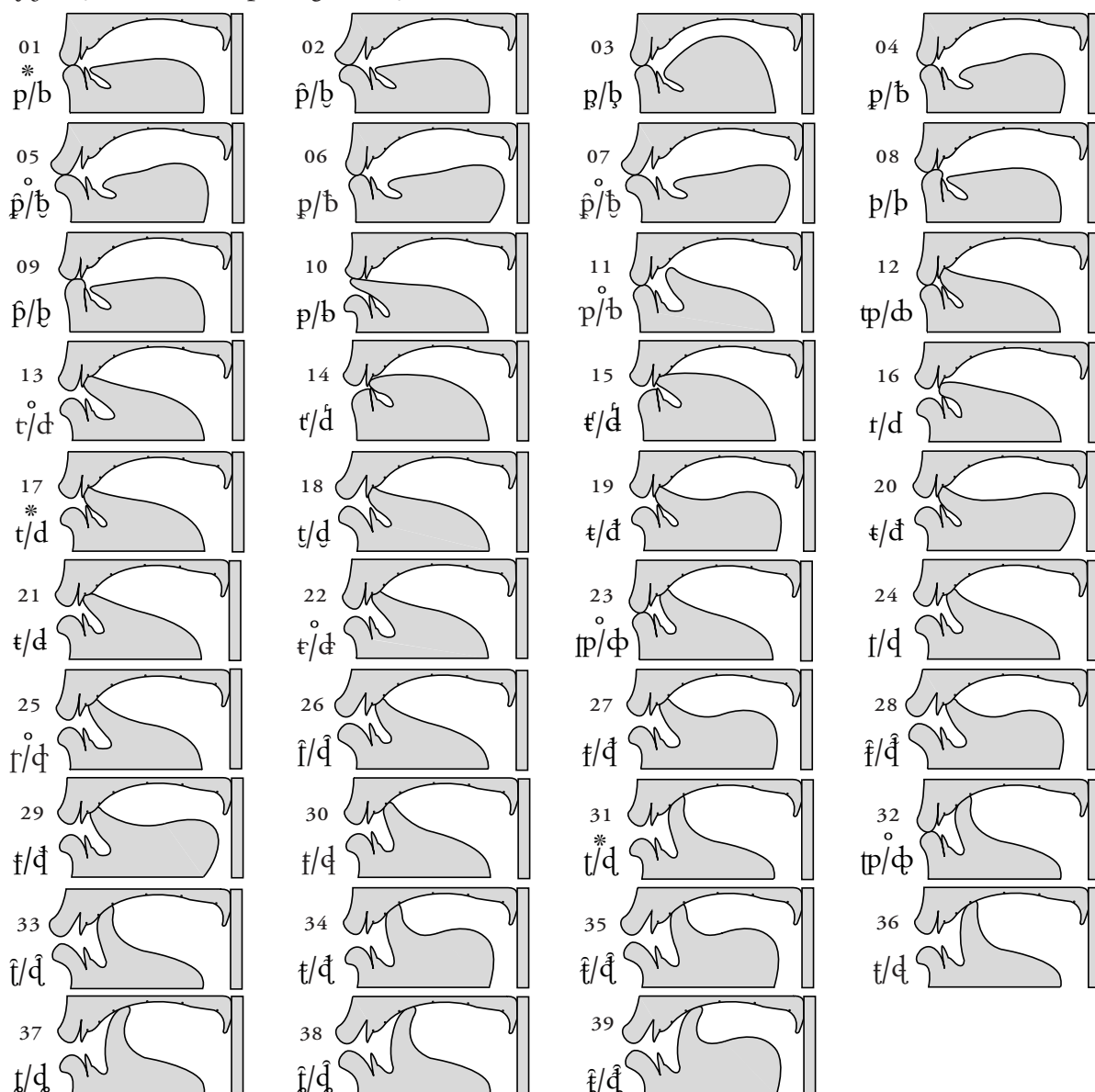


Stops /K/ [K, ʔ] (76)

10.3. These include four synopses: front, back, and laryngeal; with the addition of some ‘semi-stops’.

10.3.1. *Front stops* [K] (39).

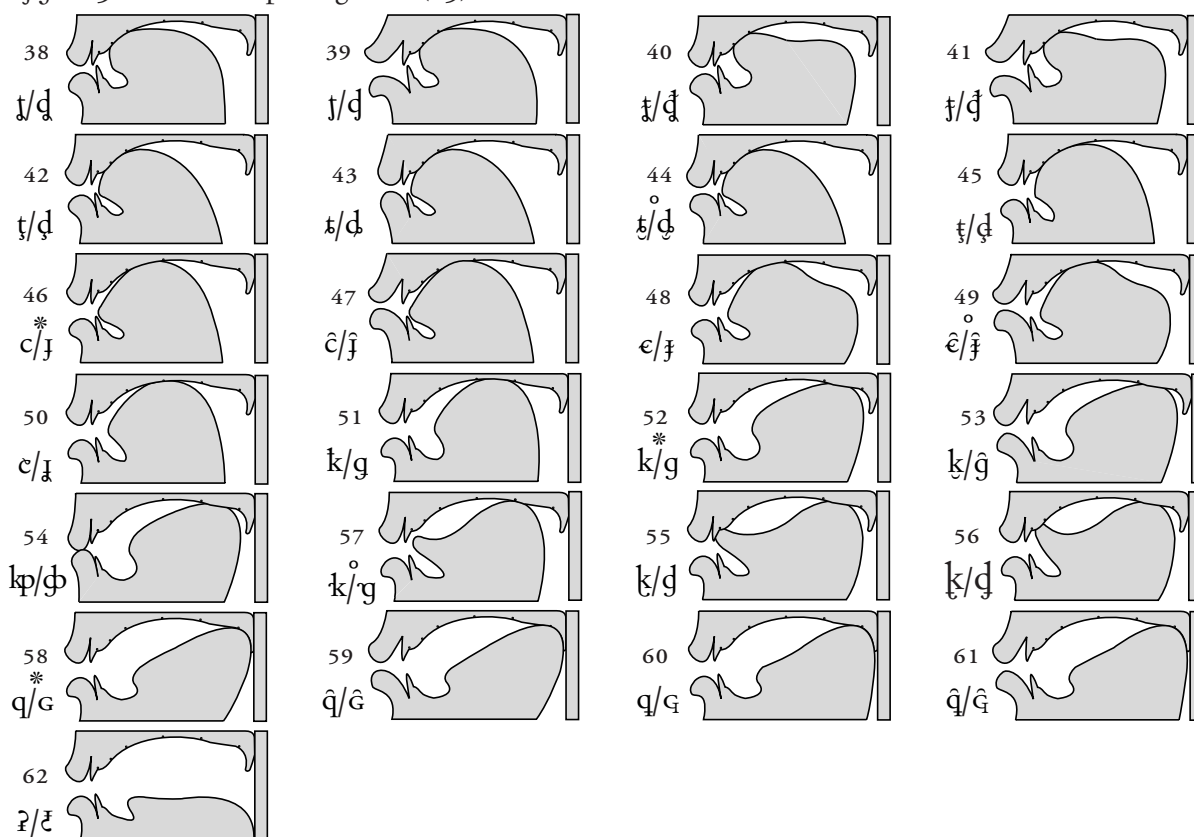
[p, b] ⁰¹	bilabial (= between the lips) ‘[p, b]’ (=)
[p̠, b̠] ⁰²	bilabial rounded (= bilabial with lip rounding) ‘[p ^w , b ^w]’
[p̟, b̟] ⁰³	palatalized bilabial ‘[p ^j , b ^j]’
[p̠, b̠] ⁰⁴	velarized bilabial ‘[p ^ɣ , b ^ɣ]’
[p̠, b̠] ⁰⁵	velarized bilabial rounded ‘[p ^{ɣw} , b ^{ɣw}]’
[p̠, b̠] ⁰⁶	uvularized bilabial ‘[p̠, b̠]’
[p̠, b̠] ⁰⁷	uvularized bilabial rounded ‘[p̠ ^w , b̠ ^w]’
[p̠, b̠] ⁰⁸	[p, b] labiodental (=between the lower lip and the upper teeth) ‘[p ^v , b ^v]’
[p̠, b̠] ⁰⁹	[p, b] labiodental rounded (=between lower lip and upper teeth) ‘[p ^{vw} , b ^{vw}]’
[p̠, b̠] ¹⁰	labial-apical (= between the upper lip and the tip of the tongue) ‘[t̠, d̠]’
[p̠, b̠] ¹¹	semi-alveolarized bilabial (= bilab. with tip approaching alveoli, no contact) ‘[p̠, b̠]’
[t̠, d̠] ¹²	dental–bilabial (= <i>simult.</i> dent. & bilab.) ‘[t̠, d̠]’
[t̠, d̠] ¹³	semi-labialized dental (= with secondary labialization) ‘[t̠, d̠]’
[t̠, d̠] ¹⁴	[t, d] labiodentalized dental (with a <i>lowered</i> tip) ‘[t̠, d̠]’
[t̠, d̠] ¹⁵	[t̠, d̠] [t, d] labiodentalized denti-alveolar (with a <i>raised</i> tip) ‘[t̠, d̠]’
[t̠, d̠] ¹⁶	[t, d] dental, or predental (with a <i>lowered</i> tip) ‘[t̠, d̠]’
[t̠, d̠] ¹⁷	dental, or lamino-dental (with a <i>raised</i> tip) ‘[t̠, d̠]’
[t̠, d̠] ¹⁸	dental rounded ‘[t̠ ^w , d̠ ^w]’
[t̠, d̠] ¹⁹	velarized dental ‘[t̠ ^ɣ , d̠ ^ɣ]’
[t̠, d̠] ²⁰	uvularized dental ‘[t̠, d̠]’
[t̠, d̠] ²¹	[t, d] denti-alveolar (or postdental, or prealveolar) (with <i>raised</i> tip) ‘[t̠, d̠]’
[t̠, d̠] ²²	semi-labialized denti-alveolar (with no firm bilabial contact) ‘[t̠, d̠]’
[t̠, d̠] ²³	alveolar–bilabial (= <i>simult.</i> alveol. & bilab.) ‘[t̠, d̠]’
[t̠, d̠] ²⁴	alveolar (= between the alveoli and the tip of the tongue) ‘[t̠, d̠]’
[t̠, d̠] ²⁵	semi-labialized alveolar (with no firm bilabial contact) ‘[t̠, d̠]’
[t̠, d̠] ²⁶	alveolar rounded (with lip rounding) ‘[t̠ ^w , d̠ ^w]’
[t̠, d̠] ²⁷	velarized alveolar ‘[t̠ ^ɣ , d̠ ^ɣ]’
[t̠, d̠] ²⁸	uvularized alveolar ‘[t̠, d̠]’
[t̠, d̠] ²⁹	velarized alveolar rounded ‘[t̠ ^{ɣw} , d̠ ^{ɣw}]’
[t̠, d̠] ³⁰	back-alveolar: (apico-)... (= not laminal) ‘[t̠, d̠]’
[t̠, d̠] ³¹	postalveolar: (apico-)... (= not laminal) ‘[t̠, d̠]’ (=)
[t̠, d̠] ³²	postalveolar–bilabial: (apico-)... (= <i>simult.</i> postalveol. & bilab.) ‘[t̠, d̠]’
[t̠, d̠] ³³	postalveolar rounded: (apico-)... ‘[t̠ ^w , d̠ ^w]’
[t̠, d̠] ³⁴	velarized postalveolar: (apico-)... ‘[t̠ ^ɣ , d̠ ^ɣ]’
[t̠, d̠] ³⁵	velarized postalveolar rounded: (apico-)... (with lip rounding) ‘[t̠ ^{ɣw} , d̠ ^{ɣw}]’
[t̠, d̠] ³⁶	back-postalveolar: (apico-)... (= not laminal) ‘[t̠, d̠]’
[t̠, d̠] ³⁷	apicalpalatal (= between the [hard] palate and the tip) ‘[t̠, d̠]’
[t̠, d̠] ³⁸	apicalpalatal rounded (with lip rounding) ‘[t̠ ^w , d̠ ^w]’
[t̠, d̠] ³⁹	velarized apicalpalatal rounded (with lip rounding) ‘[t̠ ^{ɣw} , d̠ ^{ɣw}]’.

fig 10.3.1. *Front stop ograms* (39).10.3.2. *Back stops* [K] (25).

- [t̥, d̥]³⁸ postalveo-palatal: (lamino-)... '[t̥^j, d̥^j]'
 [t̥, d̥]³⁹ postalveo-palatal protruded: (lamino-)... '[t̥^{jw}, d̥^{jw}]'
 [t̥, d̥]⁴⁰ postalveo-velar: (lamino-)... '[t̥^{jɣ}, d̥^{jɣ}]'
 [t̥, d̥]⁴¹ postalveo-velar protruded: (lamino-)... '[t̥^{jɣw}, d̥^{jɣw}]'
 [t̥, d̥]⁴² pre-palatal: (lamino-)... (= between the prepalate and the lamina) '[t̥^j, d̥^j]'
 [t̥, d̥]⁴³ labialized prepalatal (with vertical labialization): (lamino-)... '[t̥^{jβ}, d̥^{jβ}]'
 [t̥, d̥]⁴⁴ pre-palatal rounded: (lamino-)... '[t̥^{jw}, d̥^{jw}]'
 [t̥, d̥]⁴⁵ pro-palatal (= between prepalatal and palatal) '[c⁺, ɟ⁺]' (≠)
 [c, ɟ]⁴⁶ palatal (= between the [hard] palate and the [medio]dorsum) '[c, ɟ]' (=)
 [c̥, ɟ̥]⁴⁷ palatal rounded '[c^w, ɟ^w]'
 [c̥, ɟ̥]⁴⁸ uvularized palatal '[c̥^ɣ, ɟ̥^ɣ]'
 [c̥, ɟ̥]⁴⁹ uvularized palatal rounded '[c̥^{ɣw}, ɟ̥^{ɣw}]'

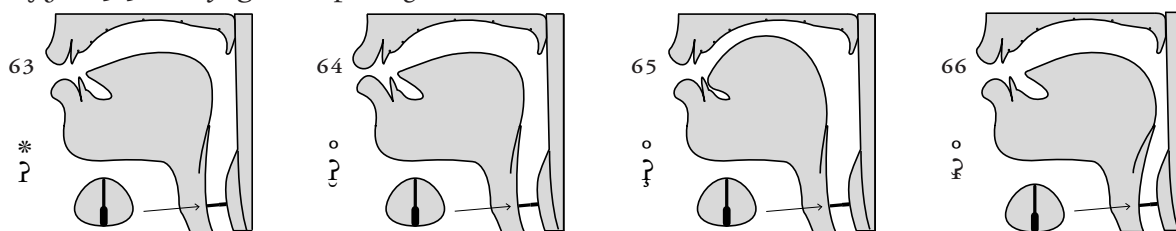
[c, ɟ] ⁵⁰	[c, ɟ] postpalatal (= retracted palatal or advanced prevelar) ‘[c̠, ɟ̠]’
[k̠, g̠] ⁵¹	[k̠, g̠] prevelar (= between the prevelum and the [post]dorsum) ‘[k̠, g̠]’
[k, g] ⁵²	velar (= between the velum and the [post]dorsum) ‘[k, g]’ (=)
[k̠, g̠] ⁵³	velar rounded (with lip rounding) ‘[k̠ʷ, g̠ʷ]’
[kp̠, ɡ̠] ⁵⁴	velar–bilabial (= <i>simult.</i> velar and bilabial) ‘[kp̠, ɡ̠b̠]’
[k̠, ɟ̠] ⁵⁵	semi-dentalized velar (with tip approach. the teeth, but with no contact) ‘[k̠t̠, ɡ̠d̠]’
[k̠, ɟ̠] ⁵⁶	velar–dental (= <i>simult.</i> velar and dental) ‘[k̠t̠, ɡ̠d̠]’
[k̠, ɟ̠] ⁵⁷	[k̠, ɟ̠] velar–alveolar (= <i>simult.</i> velar and alveolar) ‘[k̠t̠, ɡ̠d̠]’
[q, ɢ] ⁵⁸	uvular (= between the uvula and the [post]dorsum) ‘[q, ɢ]’ (=)
[q̠, ɢ̠] ⁵⁹	uvular rounded ‘[q̠ʷ, ɢ̠ʷ]’
[q̠, ɢ̠] ⁶⁰	pharyngealized uvular ‘[q̠ˤ, ɢ̠ˤ]’
[q̠, ɢ̠] ⁶¹	pharyngealized uvular rounded ‘[q̠ˤʷ, ɢ̠ˤʷ]’
[ʁ, ʀ] ⁶²	pharyngeal (= between the lower pharynx and root of tongue, ‘epiglottal’) ‘[ʁ, ʀ]’.

fig 10.3.2. Back stop orograms (25).



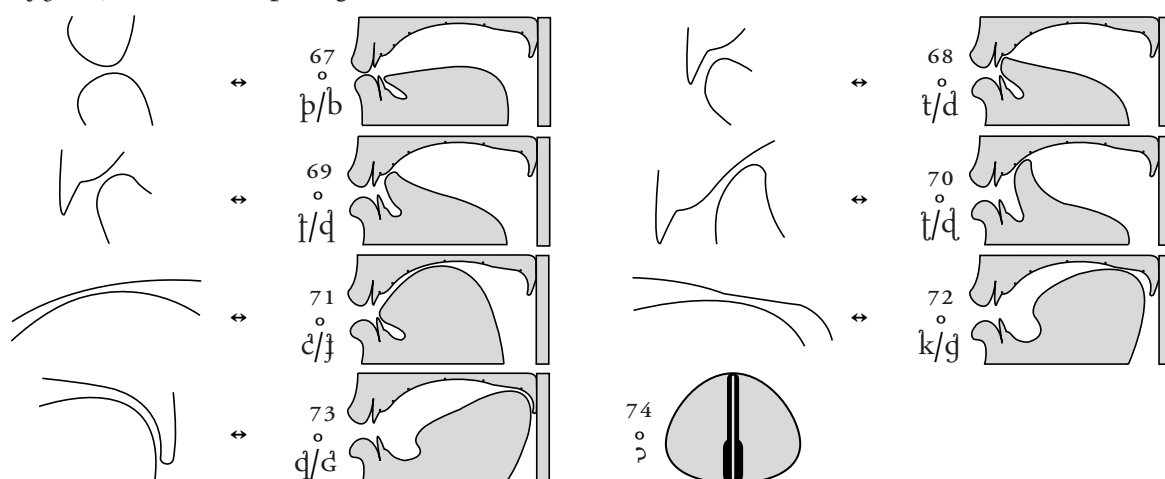
10.3.3. Laryngeal stops [ʔ] (4) – voiceless (or a-voiced, by definition).

[ʔ] ⁶³	laryngeal (= between the vocal folds, including the arytenoid cartilages) ‘[ʔ]’ (=)
[ʔ̠] ⁶⁴	[ʔ̠] laryngeal rounded (with lip rounding) ‘[ʔ̠ʷ]’
[ʔ̠] ⁶⁵	[ʔ̠] palatalized laryngeal (with the dorsum <i>raised</i> towards the [hard] palate) ‘[ʔ̠ʲ]’
[ʔ̠] ⁶⁶	[ʔ̠] – [ʔ̠] uvularized laryngeal (with the [post]dorsum <i>raised</i> towards the uvula) ‘[ʔ̠ʷ]’.

fig 10.3.3. *Laryngeal stop orograms* (4).

10.3.4. Some ‘*semi-stops*’ are also possible, which are less firmly articulated (ie with partial occlusion). They remain different both from very tense constrictives and very lax stopstrictives. We will indicate here only those produced at the most important places of articulation, practically the official ones (8). Their generic symbol is [K], whereas they can be represented with the diacritic shown. It is important to observe well (in the nearby enlargements) the non-contact at the articulation places. For the laryngeal phone cf fig 10.3.3, but most of all cf fig 4.4.B.

[[p, b]]	or [[p̣, ḅ]] ⁶⁷	[p, b] bilabial (with no full contact) ‘[p̣, ḅ]’
[[t, d]]	[[ṭ, ḍ]] ⁶⁸	[t, d] dentale (with no full contact) ‘[ṭ, ḍ]’
[[t̥, d̥]]	[[t̥̣, d̥̣]] ⁶⁹	[t̥, d̥] alveolar (with no full contact) ‘[t̥̣, d̥̣]’
[[t̥, d̥]]	[[t̥̣, d̥̣]] ⁷⁰	[t̥, d̥] postalveolar (with no full contact) ‘[t̥̣, d̥̣]’
[[ç, ʝ]]	[[ç̣, ʝ̣]] ⁷¹	[ç, ʝ] palatal (with no full contact) ‘[ç̣, ʝ̣]’
[[k, ɡ]]	[[ḳ, ɡ̣]] ⁷²	[k, ɡ] velar (with no full contact) ‘[ḳ, ɡ̣]’
[[q, ɢ]]	[[q̣, ɢ̣]] ⁷³	[q, ɢ] uvular (with no full contact) ‘[q̣, ɢ̣]’
[[ʔ]]	[[ʔ̣]] ⁷⁴	[ʔ] laryngeal (with no full contact) ‘[ʔ̣]’.

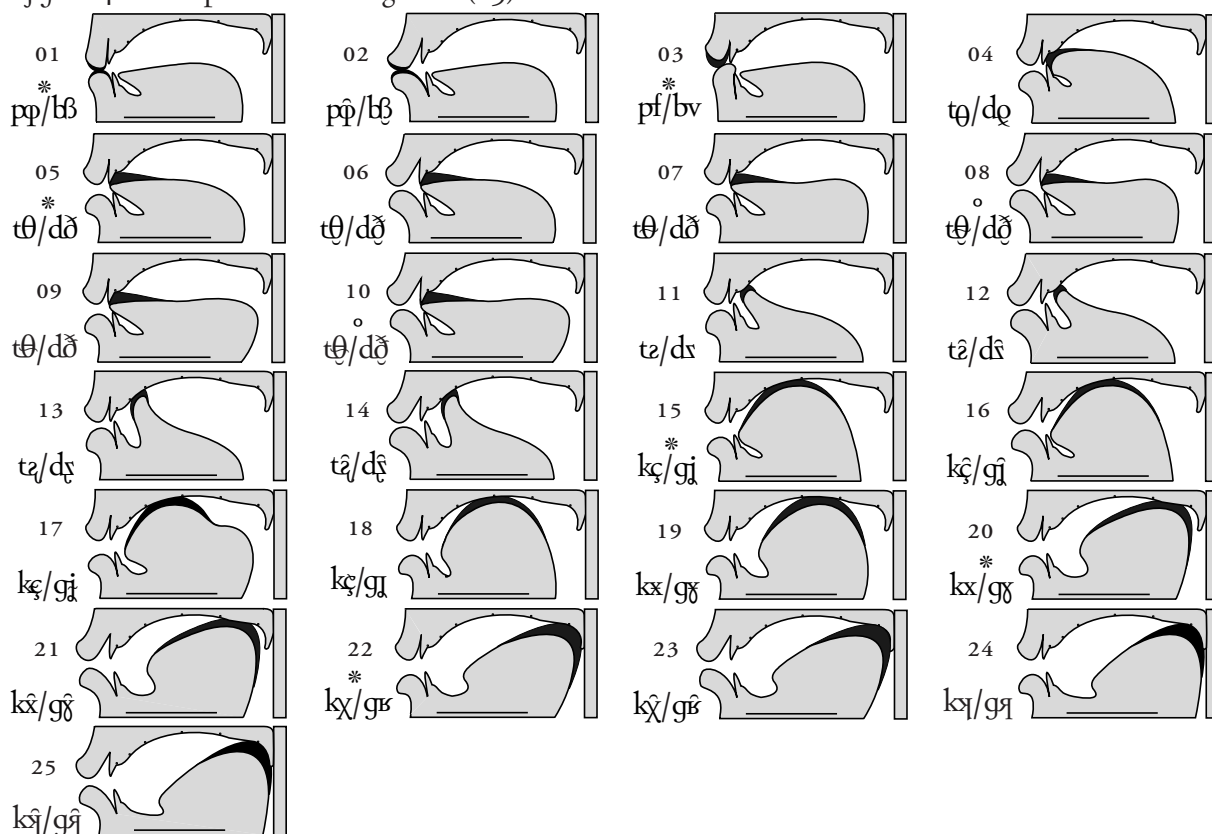
fig 10.3.4. *Semi-stop diagrams* (8).

10.4. These include ten synopses of plain (or ‘slit’, or un-grooved) and grooved phones. Of course, *grooved* refers to the actual groove which can be formed on the tip and lamina of the tongue. Also some laterals and trills are given, since for these phones a stopstrictive manner is frequent.

We include the synopses of stop-*semistrictives* (or stop-*semiconstrictives*, with a *semiconstrictive* second element, § 10.4.5-6) and also the synopses of *semi-stop-strictives*. There are two kinds of semistop-strictives: by *detension* and by *proportion*. Those by detension have, as their first element, a semistop (§ 10.3.4 & § 10.4.7-8). Those by proportion have a very short stop as their first element.

[p̠p̠, b̠b̠] ⁰¹	bilabial (= between the lips) ‘[p̠p̠, b̠b̠]’
[p̠p̠, b̠b̠] ⁰²	bilabial rounded (= bilabial with lip rounding) ‘[p̠p̠ ^w , b̠b̠ ^w]’
[p̠f̠, b̠v̠] ⁰³	labiodental (= between the lower lip and the upper teeth) ‘[p̠f̠, b̠v̠]’
[t̠θ̠, d̠ð̠] ⁰⁴	dental, or pro-dental (with a <i>lowered</i> tip) ‘[t̠θ̠, d̠ð̠]’
[t̠θ̠, d̠ð̠] ⁰⁵	dental, or lamino-dental (with a <i>raised</i> tip of the tongue) ‘[t̠θ̠, d̠ð̠]’
[t̠θ̠, d̠ð̠] ⁰⁶	dental rounded (with <i>raised</i> tip of the tongue) ‘[t̠θ̠ ^w , d̠ð̠ ^w]’
[t̠θ̠, d̠ð̠] ⁰⁷	velarized dental (with <i>raised</i> tip) ‘[t̠θ̠̠̠, d̠ð̠̠̠]’
[t̠θ̠, d̠ð̠] ⁰⁸	velarized dental rounded (with <i>raised</i> tip) ‘[t̠θ̠̠̠ ^w , d̠ð̠̠̠ ^w]’
[t̠θ̠, d̠ð̠] ⁰⁹	[[t̠θ̠, d̠ð̠]] uvularized dental (with <i>raised</i> tip) ‘[t̠θ̠̠̠̠̠, d̠ð̠̠̠̠̠]’
[t̠θ̠, d̠ð̠] ¹⁰	[[t̠θ̠, d̠ð̠]] uvularized dental rounded (with <i>raised</i> tip) ‘[t̠θ̠̠̠̠̠ ^w , d̠ð̠̠̠̠̠ ^w]’
[t̠z̠, d̠s̠] ¹¹	alveolar (= between the alveoli and the tip of the tongue) ‘[t̠z̠, d̠s̠]’
[t̠z̠, d̠s̠] ¹²	alveolar rounded (= alveolar with lip rounding) ‘[t̠z̠ ^w , d̠s̠ ^w]’
[t̠z̠, d̠s̠] ¹³	postalveolar: (apico-)... (= not laminal) ‘[t̠z̠̠̠, d̠s̠̠̠]’
[t̠z̠, d̠s̠] ¹⁴	postalveolar rounded: (apico-)... ‘[t̠z̠̠̠ ^w , d̠s̠̠̠ ^w]’
[k̠ç̠, ɡ̠j̠] ¹⁵	palatal (= between the [hard] palate and the [medio]dorsum) ‘[k̠ç̠, ɡ̠j̠]’
[k̠ç̠, ɡ̠j̠] ¹⁶	palatal rounded (with lip rounding) ‘[k̠ç̠ ^w , ɡ̠j̠ ^w]’
[k̠ç̠, ɡ̠j̠] ¹⁷	[[k̠ç̠, ɡ̠j̠]] uvularized palatal ‘[k̠ç̠̠̠̠̠, ɡ̠j̠̠̠̠̠]’
[k̠ç̠, ɡ̠j̠] ¹⁸	postpalatal (= retracted palatal or advanced prevelar) ‘[k̠ç̠̠̠̠̠, ɡ̠j̠̠̠̠̠]’
[[k̠x̠, ɡ̠y̠] ¹⁹	[k̠x̠, ɡ̠y̠] prevelar (= between the prevelum and the [post]dorsum) ‘[k̠x̠̠̠̠̠, ɡ̠y̠̠̠̠̠]’
[k̠x̠, ɡ̠y̠] ²⁰	velar (= between the velum and the [post]dorsum) ‘[k̠x̠̠̠̠̠, ɡ̠y̠̠̠̠̠]’
[k̠x̠, ɡ̠y̠] ²¹	velar rounded (with lip rounding) ‘[k̠x̠̠̠̠̠ ^w , ɡ̠y̠̠̠̠̠ ^w]’
[k̠χ̠, ɡ̠ʁ̠] ²²	uvular (= between the uvula and the [post]dorsum) ‘[k̠χ̠̠̠̠̠, ɡ̠ʁ̠̠̠̠̠]’
[k̠χ̠, ɡ̠ʁ̠] ²³	uvular rounded ‘[k̠χ̠̠̠̠̠ ^w , ɡ̠ʁ̠̠̠̠̠ ^w]’
[k̠ɣ̠, ɡ̠ʀ̠] ²⁴	pharyngealized uvular ‘[k̠ɣ̠̠̠̠̠, ɡ̠ʀ̠̠̠̠̠]’
[k̠ɣ̠, ɡ̠ʀ̠] ²⁵	pharyngealized uvular rounded ‘[k̠ɣ̠̠̠̠̠ ^w , ɡ̠ʀ̠̠̠̠̠ ^w]’

fig 10.4.1. Stop-strictive orograms (25).

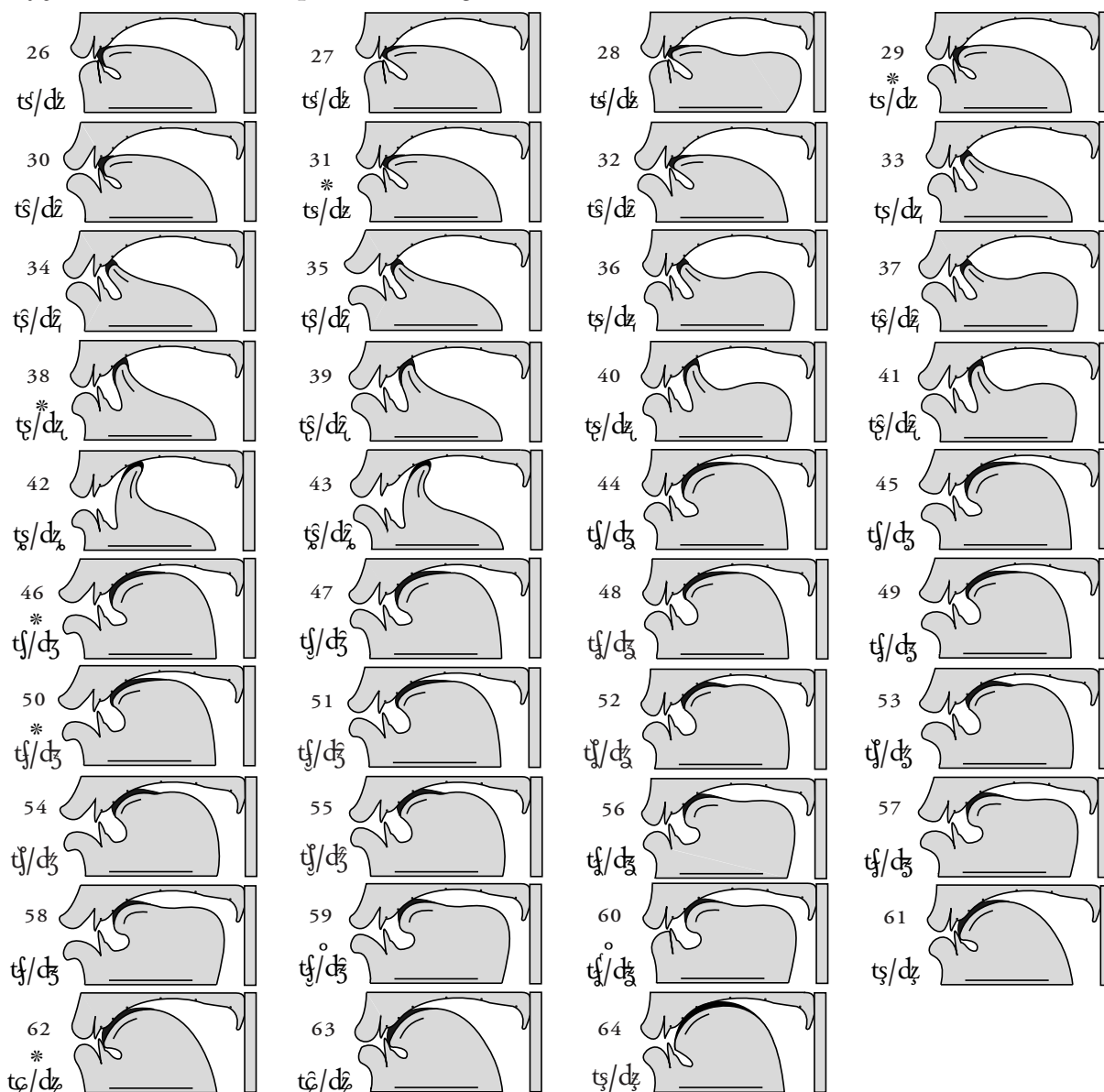


10.4.2. Grooved stop-strictives /KS/ [KS] (39).

- [ʈ, ɖ]²⁶ labiodentalized dental (with a *lowered* tip of the tongue) ‘[ʈ_ṣ^v, ɖ_ṣ^v’
 [ʈ, ɖ]²⁷ labiodentalized dental (with a *raised* tip of the tongue) ‘[ʈ_ṣ^v, ɖ_ṣ^v’
 [ʈ, ɖ]²⁸ [ʈ, ɖ] uvulo-labiodentalized dental (with a *raised* tip) ‘[ʈ_ṣ^v, ɖ_ṣ^v’
 [ʈ, ɖ]²⁹ dental (with a *lowered* tip) ‘[ʈ_ṣ, ɖ_ṣ’
 [ʈ, ɖ]³⁰ dental rounded (with a *lowered* tip + lip rounding) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]³¹ [ʈ, ɖ] denti-alveolar (with a *raised* tip) ‘[ʈ_ṣ, ɖ_ṣ’
 [ʈ, ɖ]³² [ʈ, ɖ] denti-alveolar rounded (with a *raised* tip + lip rounding) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]³³ alveolar (between the alveoli and the tip) ‘[ʈ_ṣ, ɖ_ṣ’
 [ʈ, ɖ]³⁴ alveolar rounded ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]³⁵ alveolar protruded ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]³⁶ velarized alveolar ‘[ʈ_ṣ^ʷ, ɖ_ṣ^ʷ’
 [ʈ, ɖ]³⁷ velarized alveolar rounded (with lip rounding) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]³⁸ postalveolar: (apico-)... (= not laminal) ‘[ʈ_ṣ, ɖ_ṣ’
 [ʈ, ɖ]³⁹ postalveolar rounded: (apico-)... (= not laminal) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]⁴⁰ velarized postalveolar: (apico-)... (= not laminal) ‘[ʈ_ṣ^ʷ, ɖ_ṣ^ʷ’
 [ʈ, ɖ]⁴¹ postalveolar rounded: (apico-)... (= not laminal) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]⁴² apicopalatal (= between the [hard] palate and the tip) ‘[ʈ_ṣ, ɖ_ṣ’
 [ʈ, ɖ]⁴³ apicopalatal rounded (with lip rounding) ‘[ʈ_ṣ^w, ɖ_ṣ^w’
 [ʈ, ɖ]⁴⁴ postalveo-palatal: (lamino-)... (between the postalveolar area and the lamina, with raising of the mediodorsum, and with a *lowered* tip) ‘[ʈ_ṣ^j, ɖ_ṣ^j’
 [ʈ, ɖ]⁴⁵ postalveo-palatal half-protruded: (lamino-)... ‘[ʈ_ṣ^(w), ɖ_ṣ^(w)’
 [ʈ, ɖ]⁴⁶ postalveo-palatal protruded: (lamino-)... (with protr., not just round.) ‘[ʈ_ṣ^w, ɖ_ṣ^w’

- [tʃ, dʒ]⁴⁷ postalveo-palatal over-rounded: (lamino-)... (with round. and protr.) ‘[tʃ^w, dʒ^w]’
 [tʃ, dʒ]⁴⁸ [tʃ, dʒ] postalveo-palatal: (lamino-)... (between the postalveolar area and the lamina, with raising of the mediodorsum, and with *raised tip*) ‘[tʃ^j, dʒ^j]’
 [tʃ, dʒ]⁴⁹ [tʃ, dʒ] postalveo-palatal half-protruded: (lamino-)... ‘[tʃ^(w), dʒ^(w)]’
 [tʃ, dʒ]⁵⁰ [tʃ, dʒ] postalveo-palatal protruded: (lami-)... ‘[tʃ^w, dʒ^w]’
 [tʃ, dʒ]⁵¹ [tʃ, dʒ] postalveo-palatal over-rounded: (lamino-)... ‘[tʃ^w, dʒ^w]’
 [tʃ, dʒ]⁵² postalveo-prevelar: (lamino-)... (with raising of the dorsum towards the prevelum, not towards the palate) ‘[tʃ^ɹ, dʒ^ɹ]’
 [tʃ, dʒ]⁵³ postalveo-prevelar half-protruded: (lamino-)... ‘[tʃ^{ɹ(w)}, dʒ^{ɹ(w)}]’
 [tʃ, dʒ]⁵⁴ postalveo-prevelar protruded: (lamino-)... ‘[tʃ^{ɹw}, dʒ^{ɹw}]’
 [tʃ, dʒ]⁵⁵ postalveo-prevelar over-rounded: (lamino-)... ‘[tʃ^{ɹw}, dʒ^{ɹw}]’
 [tʃ, dʒ]⁵⁶ postalveo-velar: (lamino-)... (with raising of the dorsum towards vel.) ‘[tʃ^ɹ, dʒ^ɹ]’
 [tʃ, dʒ]⁵⁷ postalveo-velar half-protruded: (lamino-)... ‘[tʃ^{ɹ(w)}, dʒ^{ɹ(w)}]’
 [tʃ, dʒ]⁵⁸ postalveo-velar protruded: (lamino-)... ‘[tʃ^{ɹw}, dʒ^{ɹw}]’
 [tʃ, dʒ]⁵⁹ postalveo-velar over-rounded: (lamino-)... ‘[tʃ^{ɹw}, dʒ^{ɹw}]’

fig 10.4.2. Grooved stop-strictive orograms (39).

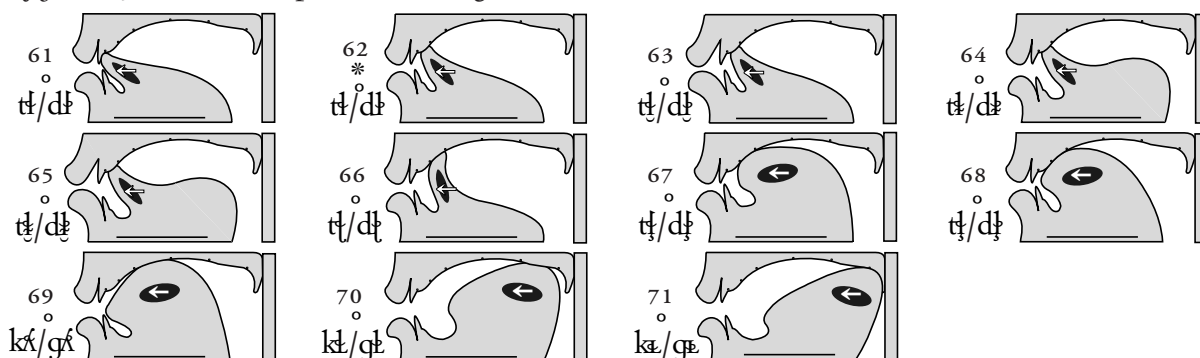


- [t̪, d̪]⁶⁰ labiodentalized postalveo-velar: (lamino-)... ‘[t̪^{ɣv}, d̪^{ɣv}]’
 [t̪, d̪]⁶¹ pre-palatal: (lamino-)... (= between the prepalate and the lamina) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁶² bilabialized pre-palatal: (lamino-)... (with vertical labialization) ‘[t̪^{ɣjβ}, d̪^{ɣjβ}]’
 [t̪, d̪]⁶³ pre-palatal rounded: (lamino-)... ‘[t̪^{ɣjw}, d̪^{ɣjw}]’.
 [t̪, d̪]⁶⁴ pro-palatal (= between prepalatal and palatal) ‘[t̪^{ɣj}, d̪^{ɣj}]’ (≠)

10.4.3. Lateral stop-strictives [K̪] (11).

- [t̪, d̪]⁶⁵ [t̪, d̪] dental (with lateral contraction of the tongue) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁶⁶ alveolar (with lateral contraction) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁶⁷ alveolar rounded (with lateral contraction) ‘[t̪^{ɣjw}, d̪^{ɣjw}]’
 [t̪, d̪]⁶⁸ velarized alveolar (with lateral contraction) ‘[t̪^{ɣjɣ}, d̪^{ɣjɣ}]’
 [t̪, d̪]⁶⁹ velarized alveolar rounded (with lateral contraction) ‘[t̪^{ɣjwɣ}, d̪^{ɣjwɣ}]’
 [t̪, d̪]⁷⁰ postalveolar (with lateral contraction) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁷¹ [t̪, d̪] postalveo-palatal (with lateral contraction) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁷² prepalatal (with lateral contraction) ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [k̪, g̪]⁷³ palatal (with lateral contraction) ‘[k̪^{ɣj}, g̪^{ɣj}]’
 [k̪, g̪]⁷⁴ velar (with lateral contraction) ‘[k̪^{ɣj}, g̪^{ɣj}]’
 [k̪, g̪]⁷⁵ uvular (with lateral contraction) ‘[k̪^{ɣj}, g̪^{ɣj}]’.

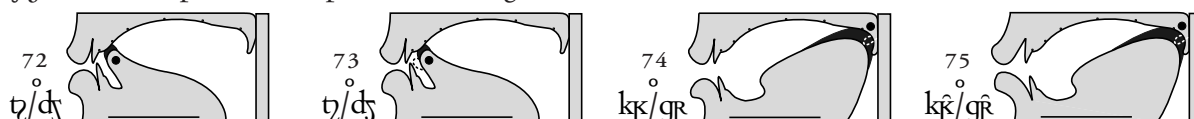
fig 10.4.3. Lateral stop-strictive orograms (11).



10.4.4. Tapped and trilled stop-strictives [KR] (4).

- [t̪, d̪]⁷⁶ *tapped* alveolar ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [t̪, d̪]⁷⁷ *trilled* alveolar ‘[t̪^{ɣj}, d̪^{ɣj}]’
 [k̪, g̪]⁷⁸ *trilled* uvular ‘[k̪^{ɣj}, g̪^{ɣj}]’
 [k̪, g̪]⁷⁹ *trilled* uvular rounded ‘[k̪^{ɣjw}, g̪^{ɣjw}]’.

fig 10.4.4. Tap & trill stop-strictive orograms (4).

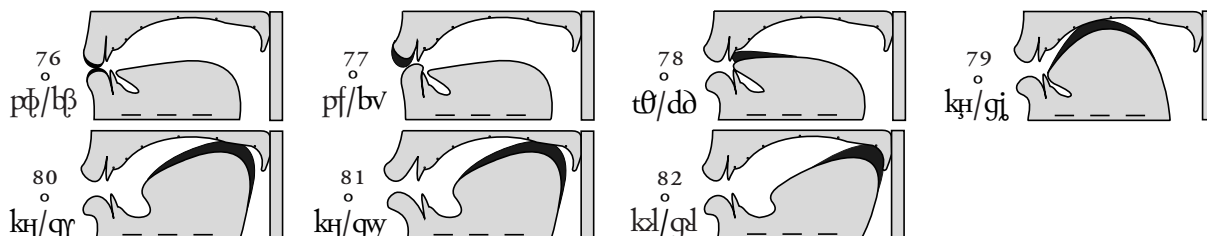


10.4.5. Stop-semi(con)strictives [Kˠ] (7, others are possible).

- [p̪, b̪]⁸⁰ [p̪, b̪] bilabial (= with semi-constrictive second element) ‘[p̪^{ɣj}, b̪^{ɣj}]’
 [p̪, b̪]⁸¹ [p̪, b̪] labiodental (= with semi-constrictive second element) ‘[p̪^{ɣj}, b̪^{ɣj}]’

- [[t̪, d̪]]⁸² [t̪, d̪] dental (= with semi-constrictive second element) ‘[t̪̥, d̪̥]’
 [[k̪, g̪]]⁸³ [k̪, g̪] palatal (= with semi-constrictive second element) ‘[k̪̥, g̪̥]’
 [[k̪, g̪]]⁸⁴ [k̪, g̪] velar (= with semi-constrictive second element) ‘[k̪̥, g̪̥]’
 [[k̪, g̪]]⁸⁵ [k̪, g̪] velar rounded (= with semi-constrictive second element) ‘[k̪̥^w, g̪̥^w]’
 [[k̪, g̪]]⁸⁶ [k̪, g̪] uvular (= with semi-constrictive second element) ‘[k̪̥^x, g̪̥^x]’.

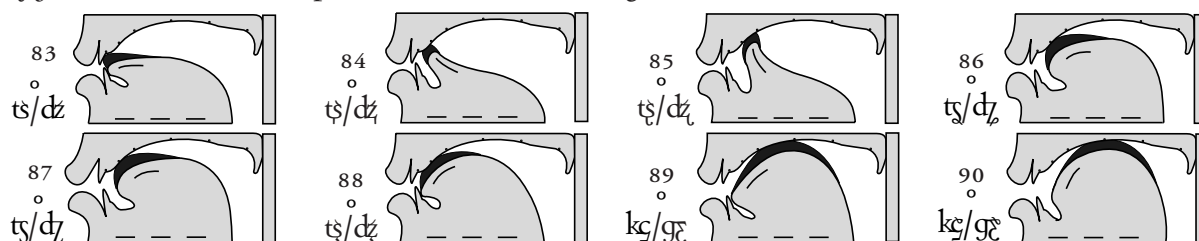
fig 10.4.5. Stop-semi-(con)strictive orograms (7).



10.4.6. *Grooved stop-semi(con)strictives* [K^s] (8, others are possible). Of course, their groove is less marked than for normal phones, and thus possible even for palatal and postpalatal phones.

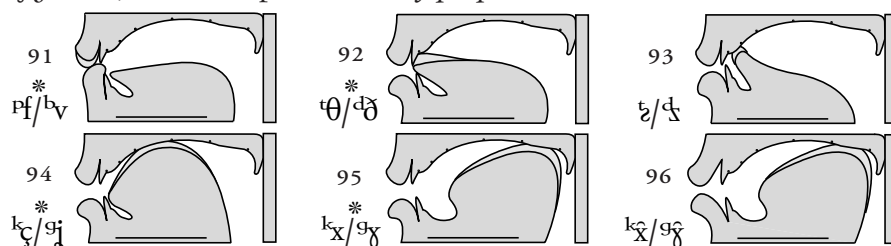
- [[t̪, d̪]]⁸⁷ [t̪, d̪] dental (= with semi-constrictive second element) ‘[t̪̥, d̪̥]’
 [[t̪, d̪]]⁸⁸ [t̪, d̪] alveolar (= with semi-constrictive second element) ‘[t̪̥, d̪̥]’
 [[t̪, d̪]]⁸⁹ [t̪, d̪] postalveolar (= with semi-constrictive second element) ‘[t̪̥, d̪̥]’
 [[t̪, d̪]]⁹⁰ [t̪, d̪] postalveo-palatal (= with semi-constrictive second element) ‘[t̪̥^j, d̪̥^j]’
 [[t̪, d̪]]⁹¹ [t̪, d̪] postalveo-palatal protruded (= with semi-constr. second elem.) ‘[t̪̥^w, d̪̥^w]’
 [[t̪, d̪]]⁹² [t̪, d̪] prepalatal (= with semi-constrictive second element) ‘[t̪̥^j, d̪̥^j]’
 [[k̪, g̪]]⁹³ palatal (almost [k̪, g̪] but with grooved & semi-constr. second el.) ‘[k̪̥^s, g̪̥^s]’
 [[k̪, g̪]]⁹⁴ postpalatal (almost [k̪, g̪] but with grooved & semi-constr. second el.) ‘[k̪̥^s, g̪̥^s]’.

fig 10.4.6. Grooved stop-semi-(con)strictive orograms (8).

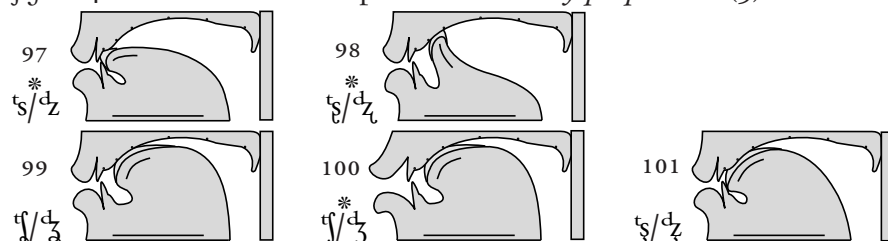


10.4.7. *Semistop-strictives by proportion* [K^x] (6, others are possible).

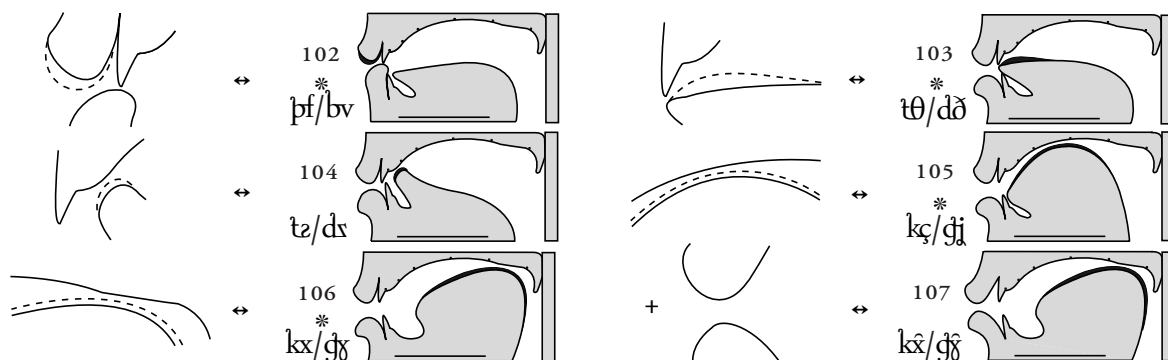
- [[p̪, b̪]]⁹⁵ [p̪, b̪] labiodental (= with reduced first element) ‘[p̪̥, b̪̥]’
 [[t̪, d̪]]⁹⁶ [t̪, d̪] dental (= with reduced first element) ‘[t̪̥, d̪̥]’
 [[t̪, d̪]]⁹⁷ [t̪, d̪] alveolar (= with reduced first element) ‘[t̪̥, d̪̥]’
 [[k̪, g̪]]⁹⁸ [k̪, g̪] palatal (= with reduced first el.) ‘[k̪̥, g̪̥]’
 [[k̪, g̪]]⁹⁹ [k̪, g̪] velar (= with reduced first element) ‘[k̪̥, g̪̥]’
 [[k̪, g̪]]¹⁰⁰ [k̪, g̪] velar rounded (= with reduced first element) ‘[k̪̥^w, g̪̥^w]’.

fig 10.4.7. *Semi-stop-strictives by proportion* (6).10.4.8. *Grooved semi-stop-strictives by proportion* [KS] (5).

- $[\text{t̥}_s, \text{d̥}_z]^{101}$ [t̥_s, d̥_z] dental (= with reduced first element) '[t̥_{s̄}, d̥_{z̄}]'
 $[\text{t̥}_s, \text{d̥}_z]^{102}$ [t̥_s, d̥_z] postalveolar (= with reduced first element) '[t̥_{s̄}, d̥_{z̄}]'
 $[\text{t̥}_j, \text{d̥}_j]^{103}$ [t̥_j, d̥_j] postalveo-palatal (= with reduced first element) '[t̥_{j̄}, d̥_{j̄}]'
 $[\text{t̥}_j, \text{d̥}_j]^{104}$ [t̥_j, d̥_j] postalveo-palatal protruded (= with reduced first element) '[t̥_{j̄}^w, d̥_{j̄}^w]'
 $[\text{t̥}_j, \text{d̥}_j]^{105}$ [t̥_j, d̥_j] prepalatal (= with reduced first element) '[t̥_{j̄}^j, d̥_{j̄}^j]'

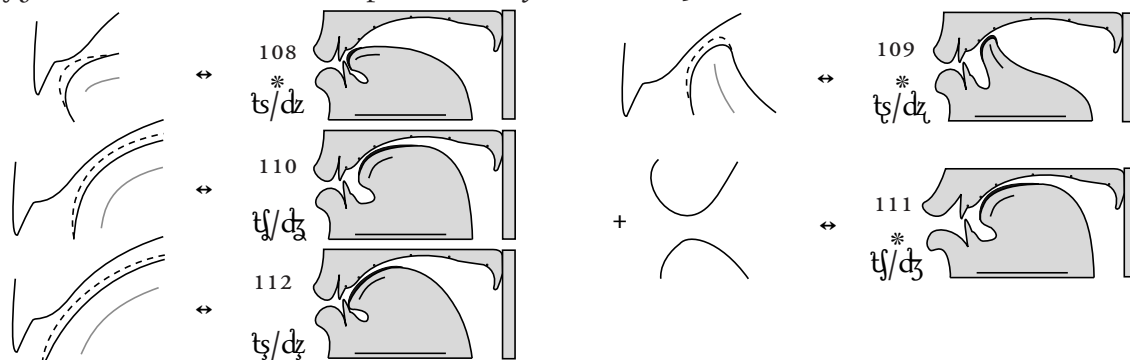
fig 10.4.8. *Grooved semi-stop-constrictives by proportion* (5).10.4.9. *Semistop-strictives by detension* [KX] (6, others are possible).

- $[\text{p̥f}, \text{b̥v}]^{106}$ [p̥f, b̥v] labiodental (= with semistopped first element) '[p̥f̄, b̥v̄]'
 $[\text{t̥θ}, \text{d̥ð}]^{107}$ [t̥θ, d̥ð] dental (= with semistopped first element) '[t̥θ̄, d̥ð̄]'
 $[\text{t̥z}, \text{d̥s}]^{108}$ [t̥z, d̥s] alveolar (= with semistopped first element) '[t̥z̄, d̥s̄]'
 $[\text{k̥ç}, \text{g̥j̥}]^{109}$ [k̥ç, g̥j̥] palatal (= with semistopped first el.) '[k̥ç̄, g̥j̄]'
 $[\text{k̥x}, \text{g̥ɣ}]^{110}$ [k̥x, g̥ɣ] velar (= with semistopped first element) '[k̥x̄, g̥ɣ̄]'
 $[\text{k̥x̥}, \text{g̥ɣ̥}]^{112}$ [k̥x̥, g̥ɣ̥] velar rounded (= with semistopped first element) '[k̥x̄^w, g̥ɣ̄^w]'

fig 10.4.9. *Semi-stop-constrictives by detension* (6).

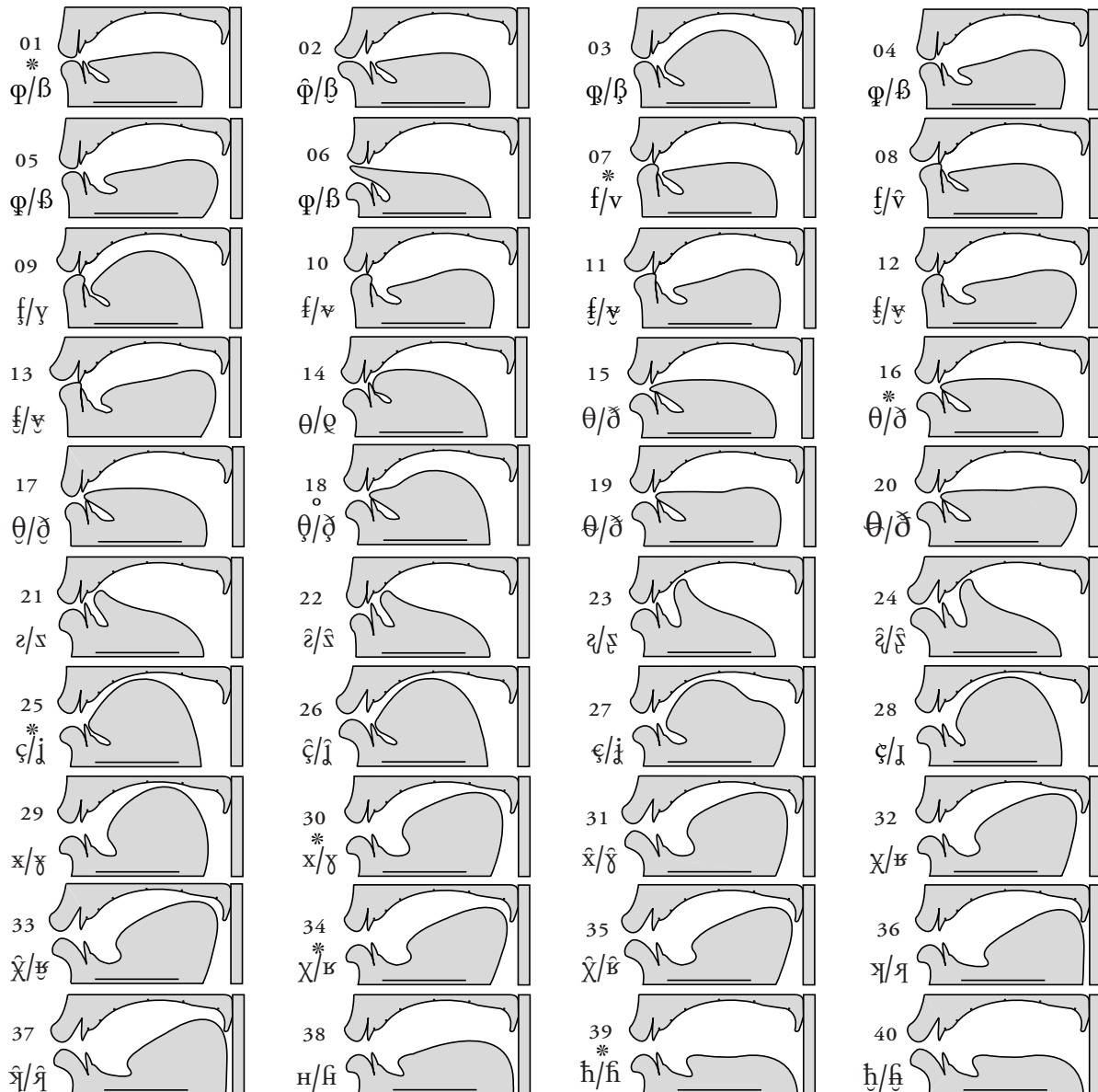
10.4.10. *Grooved semistop-strictives by detension* [KS] (5, others are possible).

- $[\text{ts}, \text{dz}]^{113}$ [ts, dz] dental (= with semistopped first element) $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]$
 $[\text{t}_{\text{S}}, \text{d}_{\text{Z}}]^{114}$ [t_S, d_Z] postalveolar (= with semistopped first element) $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]$
 $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]^{115}$ [t_S^S, d_Z^Z] postalveo-palatal (= with semistopped first element) $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]$
 $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]^{116}$ [t_S^S, d_Z^Z] postalveo-palatal protruded (= with semistopped first element) $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]$
 $[\text{t}_{\text{S}}, \text{d}_{\text{Z}}]^{117}$ [t_S, d_Z] prepalatal (= with semistopped first element) $[\text{t}_{\text{S}}^{\text{S}}, \text{d}_{\text{Z}}^{\text{Z}}]$.

fig 10.4.10. *Grooved semi-stop-strictives by detension* (5).

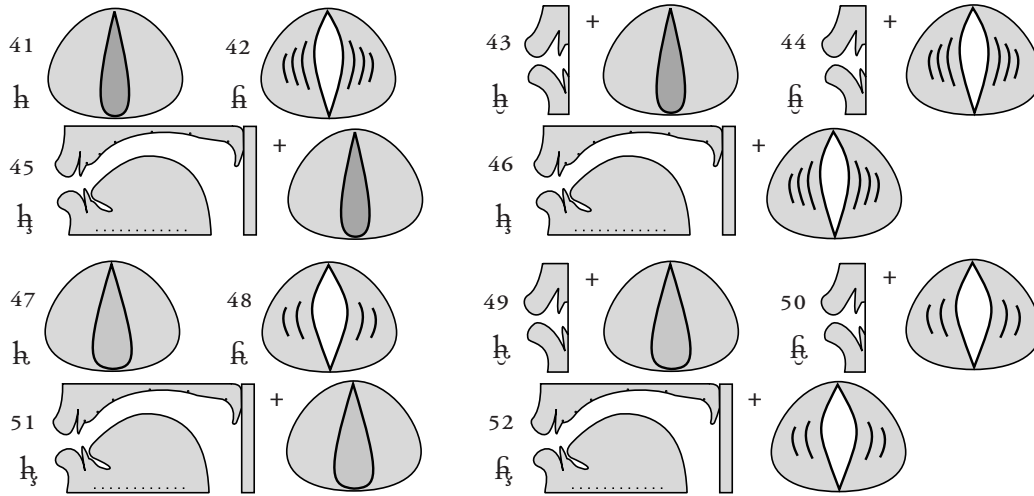
- [ɣ̠, ɣ̠]³⁷ pharyngealized uvular rounded ‘[χ^{ɣ̠w}, ʁ^{ɣ̠w}’
 [ɸ, ɸ]³⁸ prepharyngeal (= between the *upper* pharynx and root of the tongue) ‘[ɸ̠, ɸ̠]’ (≠)
 [ħ, ɦ]³⁹ pharyngeal (= betw. the *lower* phar. and the root of the t., ‘epiglottal’) ‘[ħ, ɦ]’ (≠)
 [ħ̠, ɦ̠]⁴⁰ pharyngeal rounded (‘epiglottal’ rounded) ‘[ħ̠^w, ɦ̠^w]’.

fig 10.5.1. Constrictive orograms (40).



10.5.2. *Laryngeal* constrictives [H] & semi-constrictives [H̠] (or ‘glottal’, (in International English pronunciation: [ləˈɪnpɔ̃ʒɪ, læ-, -ɔ̃ʒɪ, læɪnpɔ̃ʒɪi], or *laryngal* [ləˈɪnpɔ̃ʒɪ, læ-], 12 – cf § 10.13, too).

- [ħ, ɦ]^{41.42} [h, ɦ] laryngeal (= between vocal folds, including arytenoid cartilages) ‘[h, ɦ]’
 [ħ̠, ɦ̠]^{43.44} [h, ɦ] laryngeal rounded (with lip rounding) ‘[h̠^w, ɦ̠^w]’
 [ħ̠̠, ɦ̠̠]^{45.46} [h, ɦ] palatalized laryngeal ‘[h̠̠, ɦ̠̠]’
 [ħ̠̠̠, ɦ̠̠̠]^{47.48} [h, ɦ] laryngeal (*semiconstrictive*, with less energy and expiratory air) ‘[ħ̠̠̠, ɦ̠̠̠]’
 [ħ̠̠̠̠, ɦ̠̠̠̠]^{49.50} [h, ɦ] laryngeal rounded (*semiconstrictive*) ‘[ħ̠̠̠̠^w, ɦ̠̠̠̠^w]’
 [ħ̠̠̠̠̠, ɦ̠̠̠̠̠]^{51.52} [h, ɦ] palatalized laryngeal (*semiconstrictive*) ‘[ħ̠̠̠̠̠̠̠, ɦ̠̠̠̠̠̠̠]’.

fig 10.5.2. Constrictive (⁴¹⁻⁴⁶) and semi-constrictive (⁴⁷⁻⁵²) laryngograms (12).

10.5.3. Grooved constrictives [S] (45).

- [s, z]⁵³ prodental ‘[$\text{ṣ̌}, \text{ẓ̌} \text{’}$ ’
 [s, z]⁵⁴ dental (with a *lowered* tip) ‘[$\text{š}, \text{ž} \text{’}$ ’
 [ṣ̌, ẓ̌]⁵⁵ dental rounded (with a *lowered* tip) ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [š, ž]⁵⁶ labiodentalized dental (with a *lowered* tip) ‘[$\text{s}^v, \text{z}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁵⁷ [s, z] denti-alveolar (with a *raised* tip) ‘[$\text{š}, \text{ž} \text{’}$ ’
 [ṣ̌, ẓ̌]⁵⁸ [ṣ̌, ẓ̌] denti-alveolar rounded (with a *raised* tip) ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁵⁹ [š, ž] labiodentalized denti-alveolar (with a *raised* tip) ‘[$\text{s}^v, \text{z}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁶⁰ [s, z] uvular. dental, or denti-alv. (with a *raised* tip, or more rarely *lowered*) ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁶¹ [š, ž] labiodento-uvularized dental (with a *raised* tip), or ...denti-alveolar ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [š, ž]⁶² alveolar: (apico-) ‘[$\text{š}, \text{ž} \text{’}$ ’
 [ṣ̌, ẓ̌]⁶³ alveolar rounded: (apico-)... ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁶⁴ [ṣ̌, ẓ̌] alveolar protruded: (apico-)... ‘[$\text{š}_+, \text{ž}_+ \text{’}$ ’
 [š, ž]⁶⁵ velarized alveolar: (apico-)... ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁶⁶ [š, ž] uvularized alveolar: (apico-)... ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁶⁷ back-alveolar (apico-)... ‘[$\text{š}, \text{ž} \text{’}$ ’ or ‘[$\text{ṣ̌}, \text{ẓ̌} \text{’}$ ’
 [ṣ̌, ẓ̌]⁶⁸ back-alveolar rounded (apico-)... ‘[$\text{š}, \text{ž} \text{’}$ ’ or ‘[$\text{ṣ̌}, \text{ẓ̌} \text{’}$ ’
 [š, ž]⁶⁹ postalveolar: (apico-)... (not laminal) ‘[$\text{š}, \text{ž} \text{’}$ ’ (=)
 [ṣ̌, ẓ̌]⁷⁰ postalveolar rounded: (apico-)... ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [š, ž]⁷¹ velarized postalveolar: (apico-)... ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁷² velarized postalveolar rounded: (apico-)... ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁷³ [š, ž] uvularized postalveolar : (apico-)... ‘[$\text{š}^v, \text{ž}^v \text{’}$ ’
 [ṣ̌, ẓ̌]⁷⁴ [ṣ̌, ẓ̌] uvularized postalveolar rounded: (apico-)... ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [š, ž]⁷⁵ back-postalveolar: (apico-)... (not laminal) ‘[$\text{š}, \text{ž} \text{’}$ ’
 [š, ž]⁷⁶ apico-palatal (= between the palate and the tip) ‘[$\text{š}, \text{ž} \text{’}$ ’
 [ṣ̌, ẓ̌]⁷⁷ apico-palatal rounded ‘[$\text{š}^w, \text{ž}^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁷⁸ postalveo-palatal: (lamino-)... (with a *lowered* tip) ‘[$\text{š}_j, \text{ž}_j \text{’}$ ’
 [ṣ̌, ẓ̌]⁷⁹ postalveo-palatal half-protruded: (lamino-)... ‘[$\text{š}_j^{(w)}, \text{ž}_j^{(w)} \text{’}$ ’
 [ṣ̌, ẓ̌]⁸⁰ postalveo-palatal protruded: (lamino-)... ‘[$\text{š}_j^w, \text{ž}_j^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁸¹ postalveo-palatal over-rounded: (lamino-)... ‘[$\text{š}_j^w, \text{ž}_j^w \text{’}$ ’
 [ṣ̌, ẓ̌]⁸² [ṣ̌, ẓ̌] postalveo-palatal: (lamino-)... (with *raised* tip) ‘[$\text{š}_j, \text{ž}_j \text{’}$ ’

53 s/z	54 s/z	55 ŝ/ẑ	56 ŝ/ẑ
57 * s/z	58 ŝ/ẑ	59 ŝ/ẑ	60 s/z
61 ŝ/ẑ	62 ŝ/ẑ	63 ŝ/ẑ	64 ŝ/ẑ
65 ŝ/ẑ	66 ŝ/ẑ	67 ŝ/ẑ	68 ŝ/ẑ
69 * ŝ/ẑ	70 ŝ/ẑ	71 ŝ/ẑ	72 ŝ/ẑ
73 ŝ/ẑ	74 ŝ/ẑ	75 ŝ/ẑ	76 ŝ/ẑ
77 ŝ/ẑ	78 ŝ/ẑ	79 ŝ/ẑ	80 * ŝ/ẑ
81 ŝ/ẑ	82 ŝ/ẑ	83 ŝ/ẑ	84 ŝ/ẑ
85 ŝ/ẑ	86 ŝ/ẑ	87 ŝ/ẑ	88 ŝ/ẑ
89 ŝ/ẑ	90 ŝ/ẑ	91 ŝ/ẑ	92 ŝ/ẑ
93 ŝ/ẑ	94 ŝ/ẑ	95 * ŝ/ẑ	96 ŝ/ẑ
97 ŝ/ẑ			

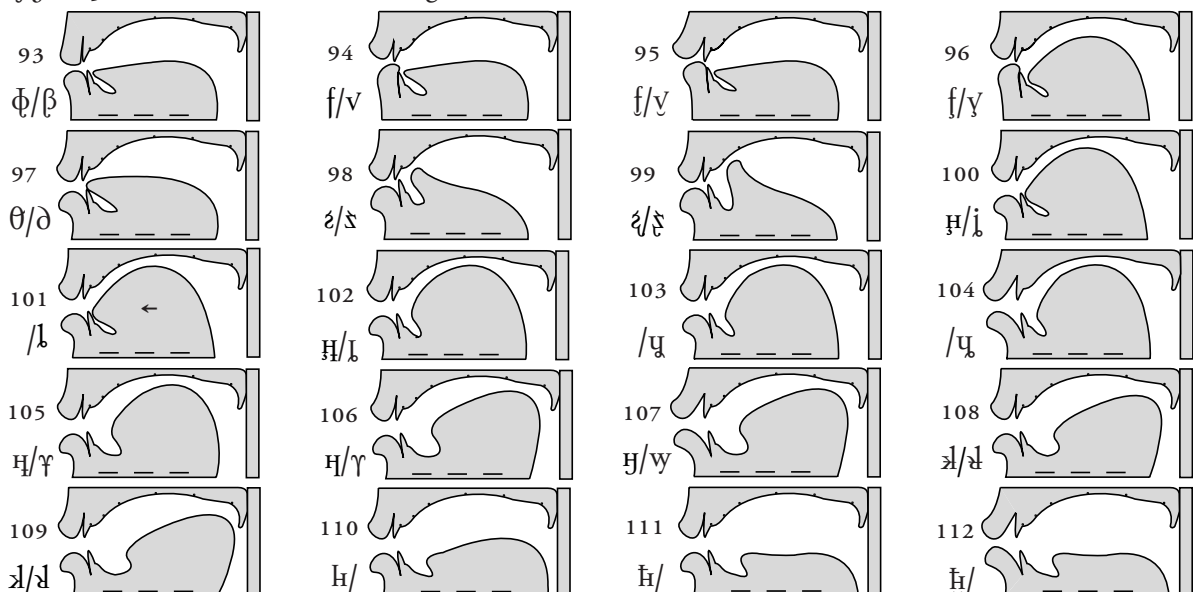
- | | |
|-----------------------------|--|
| $[\text{ʃ}, \text{ʒ}]^{83}$ | postalveo-palatal half-protruded: (lamino-)... ‘ $[\text{ʃ}_{\square}^{(w)}, \text{ʒ}_{\square}^{(w)}]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{84}$ | postalveo-palatal protruded: (lamino-)... ‘ $[\text{ʃ}_{\square}^w, \text{ʒ}_{\square}^w]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{85}$ | postalveo-palatal over-rounded: (lamino-)... ‘ $[\text{ʃ}_{\square}^w, \text{ʒ}_{\square}^w]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{86}$ | postalveo-prevelar: (lamino-)... ‘ $[\text{ʃ}_{\square+}, \text{ʒ}_{\square+}]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{87}$ | postalveo-prevelar half-protruded: (lamino-)... ‘ $[\text{ʃ}_{\square+}^{(w)}, \text{ʒ}_{\square+}^{(w)}]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{88}$ | postalveo-prevelar protruded: (lamino-)... ‘ $[\text{ʃ}_{\square+}^w, \text{ʒ}_{\square+}^w]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{89}$ | postalveo-prevelar over-rounded: (lamino-)... ‘ $[\text{ʃ}_{\square+}^w, \text{ʒ}_{\square+}^w]$ ’ |
| $[\text{ʃ}, \text{ʒ}]^{90}$ | postalveo-velar: (lamino-)... ‘ $[\text{ʃ}_{\square}, \text{ʒ}_{\square}]$ ’ |

$[\text{ɸ}, \beta]^{91}$	postalveo-velar half-protruded: (lamino-)... $[\text{ɸ}_{\text{ɹ}}^{(\text{w})}, \beta_{\text{ɹ}}^{(\text{w})}]$
$[\text{ɸ}, \beta]^{92}$	postalveo-velar protruded: (lamino-)... $[\text{ɸ}_{\text{ɹ}}^{\text{w}}, \beta_{\text{ɹ}}^{\text{w}}]$
$[\text{ɸ}, \beta]^{93}$	postalveo-velar over-rounded $[\text{ɸ}_{\text{ɹ}}^{\text{w}}, \beta_{\text{ɹ}}^{\text{w}}]$
$[\text{ɸ}, \beta]^{94}$	pre-palatal: (lamino-)... $[\text{ɸ}^{\text{j}}, \beta^{\text{j}}]$
$[\text{ɸ}, \beta]^{95}$	bilabialized pre-palatal: (lamino-... with <i>vertical</i> labialization)... $[\text{ɸ}^{\text{j}\beta}, \beta^{\text{j}\beta}]$
$[\text{ɸ}, \beta]^{96}$	pre-palatal rounded: (lamino-)... $[\text{ɸ}^{\text{jw}}, \beta^{\text{jw}}]$
$[\text{ɸ}, \beta]^{97}$	pro-palatal (= between prepalatal and palatal) $[\text{ɸ}^{\text{j}}, \beta^{\text{j}}]$ (\neq).

10.5.4. Semi-constrictives $[\text{x}]$ (18).

$[\text{ɸ}, \beta]^{98}$	$[\text{ɸ}, \beta]$ bilabial (= intermediate between constrictive and approximant) $[\text{ɸ}, \beta]$
$[\text{f}, \text{v}]^{99}$	$[\text{f}, \text{v}]$ labiodental (= intermediate between constrictive and approximant) $[\text{f}, \text{v}]$
$[\text{f}, \text{v}]^{100}$	$[\text{v}]$ labialized labiodental (= intermediate between constrictive and approx.) $[\text{v}^{\text{w}}]$
$[\text{f}, \text{v}]^{101}$	$[\text{f}, \text{v}]$ palatalized labiodental (= intermediate between constr. and approx.) $[\text{f}^{\text{j}}, \text{v}^{\text{j}}]$
$[\text{θ}, \text{ð}]^{102}$	$[\text{θ}, \text{ð}]$ dental (= intermediate between constrictive and approximant) $[\text{θ}, \text{ð}]$
$[\text{z}, \text{s}]^{103}$	alveolar (= intermediate between constrictive and approximant) $[\text{z}, \text{s}]$
$[\text{z}, \text{s}]^{104}$	postalveolar (= intermediate between constrictive and approximant) $[\text{z}_{\text{ɹ}}, \text{s}_{\text{ɹ}}]$
$[\text{ç}, \text{j}]^{105}$	$[\text{ç}, \text{j}]$ palatal (= intermediate between constrictive and approximant) $[\text{ç}, \text{j}]$
$[\text{ç}, \text{j}]^{106}$	lateralized palatal (with slight friction noise) $[\text{ç}_{\text{ɹ}}, \text{j}_{\text{ɹ}}]$
$[\text{ç}, \text{j}]^{107}$	$[\text{ç}, \text{j}]$ postpalatal (= intermediate between constrictive and approximant) $[\text{ç}_{\text{ɹ}}, \text{j}_{\text{ɹ}}]$
$[\text{ç}, \text{j}]^{108}$	palatal rounded (= intermediate between constrictive and approximant) $[\text{ç}^{\text{w}}, \text{j}^{\text{w}}]$
$[\text{ç}, \text{j}]^{109}$	pospalatal rounded (= intermediate between constrictive and approximant) $[\text{ç}^{\text{w}}, \text{j}^{\text{w}}]$
$[\text{x}, \text{ɣ}]^{110}$	$[\text{x}, \text{ɣ}]$ prevelar (= intermediate between constrictive and approximant) $[\text{x}_{\text{ɹ}}, \text{ɣ}_{\text{ɹ}}]$
$[\text{x}, \text{ɣ}]^{111}$	$[\text{x}, \text{ɣ}]$ velar (= intermediate between constrictive and approximant) $[\text{x}, \text{ɣ}]$
$[\text{x}, \text{ɣ}]^{112}$	velar rounded (= interm. between constrictive and approximant) $[\text{x}^{\text{w}}, \text{ɣ}^{\text{w}}]$
$[\text{χ}, \text{ʁ}]^{113}$	$[\text{χ}, \text{ʁ}]$ preuvular (= intermediate between constrictive and approximant) $[\text{χ}_{\text{ɹ}}, \text{ʁ}_{\text{ɹ}}]$
$[\text{χ}, \text{ʁ}]^{114}$	$[\text{χ}, \text{ʁ}]$ uvular (= intermediate between constrictive and approximant) $[\text{χ}, \text{ʁ}]$
$[\text{h}, \text{ɦ}]^{115}$	$[\text{h}, \text{ɦ}]$ prepharyngeal (= intermediate between constrictive and approximant) $[\text{h}_{\text{ɹ}}, \text{ɦ}_{\text{ɹ}}]$
$[\text{h}, \text{ɦ}]^{116}$	$[\text{h}, \text{ɦ}]$ pharyngeal (= intermediate between constrictive and approximant) $[\text{h}, \text{ɦ}]$
$[\text{h}, \text{ɦ}]^{117}$	$[\text{h}, \text{ɦ}]$ pharyngeal rounded (= intermediate between constrictive and approx.) $[\text{h}^{\text{w}}, \text{ɦ}^{\text{w}}]$

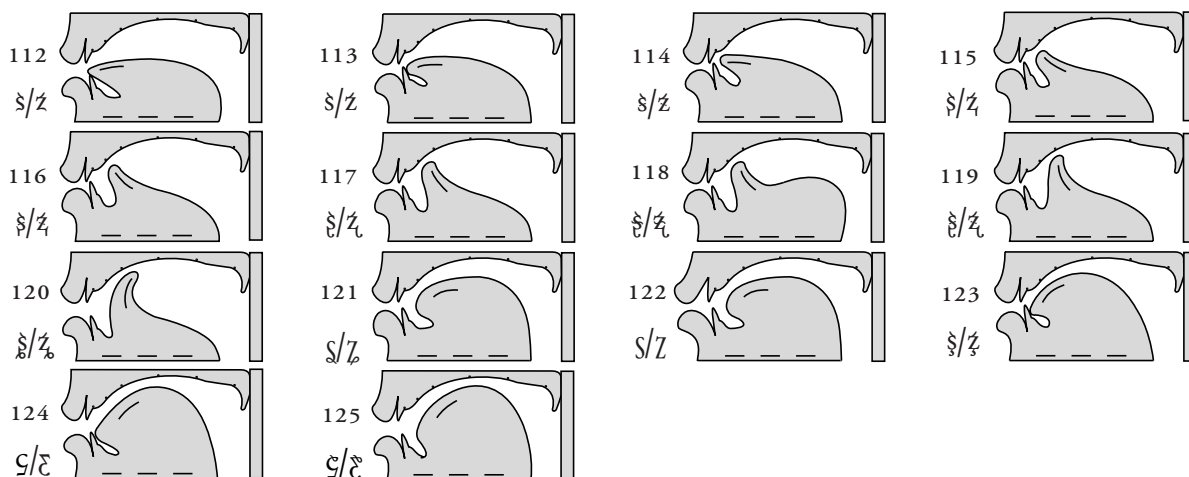
fig 10.5.4. Semi-constrictive orograms (number ¹⁰¹ is also lateralized – 20).



10.5.5. *Grooved* semi-constrictives [S] (14).

$[\text{ʃ}, \text{ʒ}]^{118}$	[s, z] prodental (= intermediate between constrictive and approximant) ‘[$\text{ʃ}^{\text{p}}, \text{ʒ}^{\text{p}}$]’
$[\text{ʃ}, \text{z}]^{119}$	[s, z] dental (= intermediate between constrictive and approximant) ‘[$\text{ʃ}^{\text{d}}, \text{z}^{\text{d}}$]’
$[\text{ʃ}, \text{ʒ}]^{120}$	[s, z] denti-alveolar (= interm. between constrictive and approximant) ‘[$\text{ʃ}^{\text{da}}, \text{ʒ}^{\text{da}}$]’
$[\text{ʃ}, \text{ʒ}]^{121}$	[s, z] alveolar (= intermediate between constrictive and approximant) ‘[$\text{ʃ}^{\text{a}}, \text{ʒ}^{\text{a}}$]’
$[\text{ʃ}, \text{ʒ}]^{122}$	[s, z] backalveolar (= intermediate between constrictive and approx.) ‘[$\text{ʃ}^{\text{ba}}, \text{ʒ}^{\text{ba}}$]’
$[\text{ʃ}, \text{ʒ}]^{123}$	[s, z] postalveolar (= intermed. between constrict. and approx.) ‘[$\text{ʃ}^{\text{pa}}, \text{ʒ}^{\text{pa}}$]’
$[\text{ʃ}, \text{ʒ}]^{124}$	[s, z] uvularized postalveolar (= interm. between constrict. and approx.) ‘[$\text{ʃ}^{\text{paw}}, \text{ʒ}^{\text{paw}}$]’
$[\text{ʃ}, \text{ʒ}]^{125}$	[s, z] backpostalveolar (= intermediate between constrict. and approx.) ‘[$\text{ʃ}^{\text{bpa}}, \text{ʒ}^{\text{bpa}}$]’
$[\text{ʃ}, \text{ʒ}]^{126}$	[s, z] apicopalatal (= intermediate between constrict. and approx.) ‘[$\text{ʃ}^{\text{ap}}, \text{ʒ}^{\text{ap}}$]’
$[\text{ʃ}, \text{ʒ}]^{127}$	[$\text{ʃ}^{\text{p}}, \text{ʒ}^{\text{p}}$] postalveo-palatal: (lamino-)... (= interm. between constr. and appr.) ‘[$\text{ʃ}^{\text{paj}}, \text{ʒ}^{\text{paj}}$]’
$[\text{ʃ}, \text{ʒ}]^{128}$	[$\text{ʃ}^{\text{p}}, \text{ʒ}^{\text{p}}$] postalveo-palatal protruded: (lamino-)... (= int. betw. con. & appr.) ‘[$\text{ʃ}^{\text{paw}}, \text{ʒ}^{\text{paw}}$]’
$[\text{ʃ}, \text{ʒ}]^{129}$	[s, z] prepalatal (= interm. between constrictive and approximant) ‘[$\text{ʃ}^{\text{pj}}, \text{ʒ}^{\text{pj}}$]’
$[\text{ʃ}, \text{ʒ}]^{130}$	palatal (almost [ç, j] but grooved & interm. betw. constrict. and approx.) ‘[$\text{ʃ}^{\text{p}}, \text{ʒ}^{\text{p}}$]’
$[\text{ʃ}, \text{ʒ}]^{131}$	postpalatal (almost [ç, j] but retracted, grooved & interm. betw. constr. and appr.) ‘[$\text{ʃ}^{\text{p}}, \text{ʒ}^{\text{p}}$]’.

fig 10.5.5. Grooved semi-constrictive orograms (14).



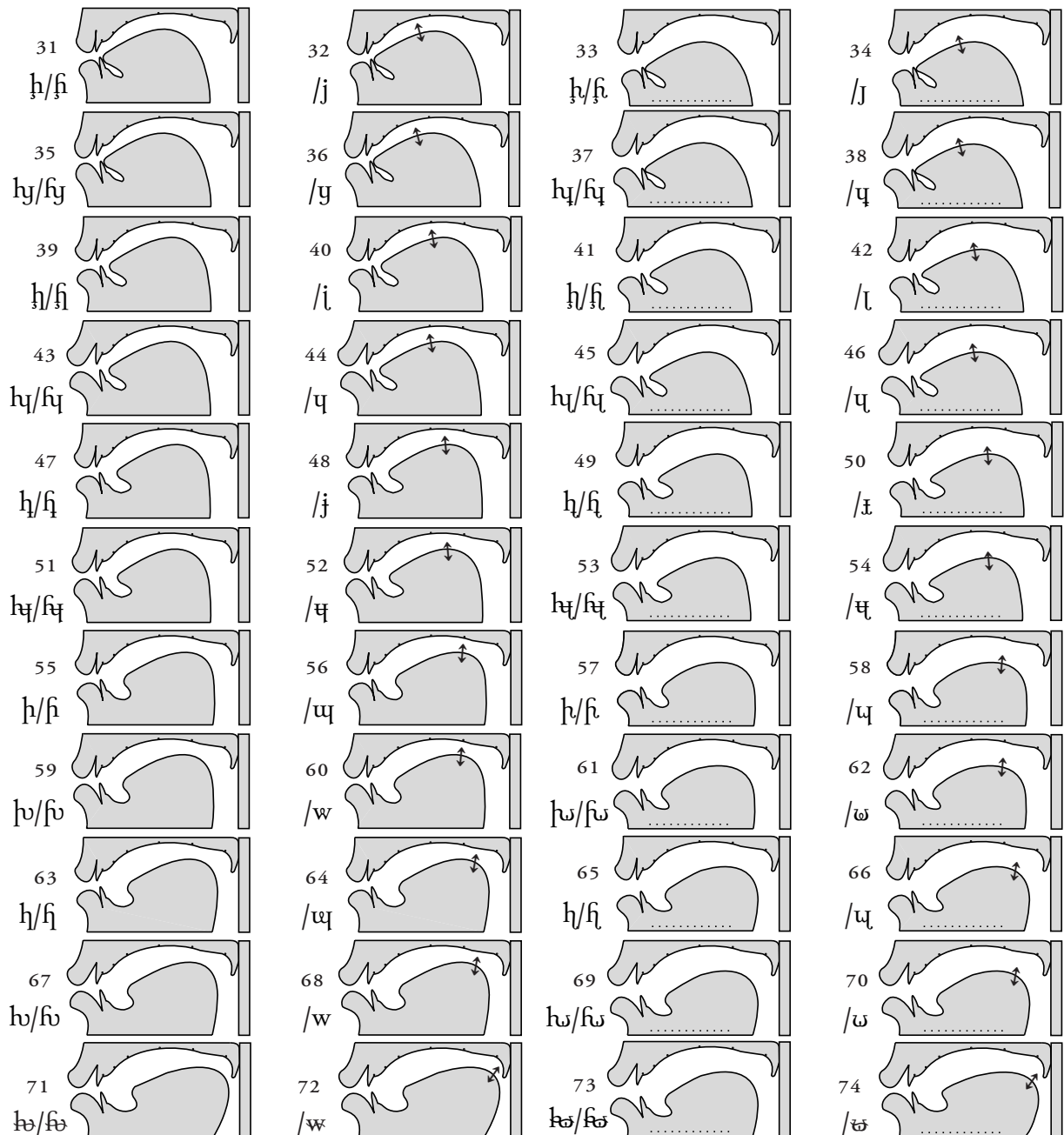
[ɕ, ʧ] ²¹	backalveolar semi-grooved ‘[$\underset{\text{̟}}{\text{ɕ}}, \underset{\text{̟}}{\text{ʧ}}$]’
[ɕ̞, ʧ̞] ²²	<i>semi</i> -backalveolar semi-grooved ‘[$\underset{\text{̟}}{\text{ɕ}}, \underset{\text{̟}}{\text{ʧ}}$]’
[ç, ʈ] ²³	postalveolar: (apico-)... (not laminal) ‘[$\underset{\text{̟}}{\text{ç}}, \underset{\text{̟}}{\text{ʈ}}$]’
[ç̞, ʈ̞] ²⁴	<i>semi</i> -postalveolar: (apico-)... (not laminal) ‘[$\underset{\text{̟}}{\text{ç}}, \underset{\text{̟}}{\text{ʈ}}$]’
[ç̠, ʈ̠] ²⁵	postalveolar rounded: (apico-)... ‘[$\underset{\text{̟}}{\text{ç}^w}, \underset{\text{̟}}{\text{ʈ}^w}$]’
[ç̥, ʈ̥] ²⁶	apico-palatal ‘[$\underset{\text{̟}}{\text{ç}}, \underset{\text{̟}}{\text{ʈ}}$]’
[ç̠̥, ʈ̠̥] ²⁷	apico-palatal rounded ‘[$\underset{\text{̟}}{\text{ç}^w}, \underset{\text{̟}}{\text{ʈ}^w}$]’
[ɸ, ɶ] ²⁸	prepalatal: (lamino-)... ‘[$\underset{\text{̟}}{\text{ɸ}}, \underset{\text{̟}}{\text{ɶ}}$]’
[ɸ̠, ɶ̠] ²⁹	prepalatal rounded: (lamino-)... ‘[$\underset{\text{̟}}{\text{ɸ}^w}, \underset{\text{̟}}{\text{ɶ}^w}$]’
[j̥, j̥] ³⁰	[j̥] uvularized palatal <i>dynamic</i> ‘[q̊]’

01 * Φ/β	02 Φ/β	03 Φ/β	04 Φ/β
05 Φ/β	06 Φ/β	07 * F/v	08 $/u$
09 \hat{F}/\hat{U}	10 $/\hat{U}$	11 \bar{F}/\bar{v}	12 F/θ
13 $/\theta$	14 $\bar{\theta}/\delta$	15 $\bar{G}/\bar{\delta}$	16 $\bar{\theta}/\delta$
17 $\bar{G}/\bar{\delta}$	18 \bar{z}/\bar{z}	19 ζ/\bar{z}	20 ζ/\bar{z}
21 ξ/\bar{z}	22 ξ/\bar{z}	23 \bar{z}/\bar{z}	24 \bar{z}/\bar{z}
25 $\hat{\xi}/\hat{z}$	26 \bar{z}/\bar{z}	27 $\hat{\xi}/\hat{z}$	28 \mathcal{H}/J
29 \mathcal{H}/\mathcal{U}	30 $/i$		

[ħ, ɸ] ³¹	palatal ‘[ħ̟, ɸ̟]’ (≠)
[/, j] ³²	palatal <i>dynamic</i> ‘[j]’ (=)
[ħ̟, ɸ̟] ³³	[j] <i>semi</i> -palatal (with very wide narrowing) ‘[ħ̟ ^j , ɸ̟ ^j]’
[/, j] ³⁴	[j] <i>semi</i> -palatal <i>dynamic</i> (with very wide narrowing) ‘[j̟]’
[hy̟, ɸy̟] ³⁵	palatal rounded ‘[ħ̟y̟, ɸ̟y̟]’ (≠)
[/, y] ³⁶	palatal rounded <i>dynamic</i> ‘[y]’
[ħy̟, ɸy̟] ³⁷	<i>semi</i> -palatal rounded ‘[ħ̟y̟, ɸ̟y̟]’ (≠)
[/, y̟] ³⁸	<i>semi</i> -palatal rounded <i>dynamic</i> ‘[y̟]’

[h, ɦ] ³⁹	postpalatal ‘[h̟̞, ɦ̟̞]’
[/, ɨ] ⁴⁰	postpalatal <i>dynamic</i> ‘[̟̞]’
[h, ɦ] ⁴¹	<i>semi</i> -postpalatal ‘[h̟̞, ɦ̟̞]’
[/, ɨ] ⁴²	<i>semi</i> -postpalatal <i>dynamic</i> ‘[̟̞]’
[hɥ, ɦɥ] ⁴³	postpalatal rounded ‘[h̟̞̠, ɦ̟̞̠]’
[/, ɥ] ⁴⁴	postpalatal rounded <i>dynamic</i> ‘[̟̞̠]’
[hɥ, ɦɥ] ⁴⁵	[ɥ] <i>semi</i> -postpalatal rounded (with very wide narrowing) ‘[h̟̞̠, ɦ̟̞̠]’
[/, ɥ] ⁴⁶	[ɥ] <i>semi</i> -postpalatal rounded <i>dynamic</i> (with very wide narrowing) ‘[̟̞̠]’
[h, ɦ] ⁴⁷	prevelar ‘[h̟̞̠, ɦ̟̞̠] or [h̟̞̠, ɦ̟̞̠]’
[/, ɨ] ⁴⁸	prevelar <i>dynamic</i> ‘[̟̞̠] or [̟̞̠]’
[h, ɦ] ⁴⁹	[ɥ] <i>semi</i> -prevelar (with very wide narrowing) ‘[̟̞̠] or [̟̞̠]’

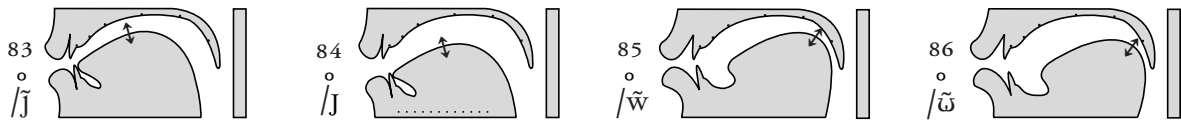
fig 10.6.2. Dorsal approximant & semi-approximant orograms (including dynamic ones – 44).



tion of a lowered velum, whereas the others are nasals with an incomplete contact. In fact, in fig 10.6.1, we have indicated double arrows as well (as in fig 5.1), to show the exact combination of the two articulation manners – by insisting and slightly exaggerating. (The same happens to other contoids –as constrictives, taps, or laterals– with added nasalization.)

- [ɿ, ʝ]⁸³ palatal *dynamic* (with a *lowered* velum) ‘[ɿ]’
 [ɿ, ʝ]⁸⁴ *semi*-palatal *dynamic* (with a *lowered* velum) ‘[ɿ]’
 [ɿ, ɰ]⁸⁵ velar rounded *dynamic* (with a *lowered* velum) ‘[ɰ]’
 [ɿ, ɰ]⁸⁶ *semi*-velar rounded *dynamic* (with a *lowered* velum) ‘[ɰ]’.

fig 10.6.4. Nasalized approximant & semiapproximant orograms (4).



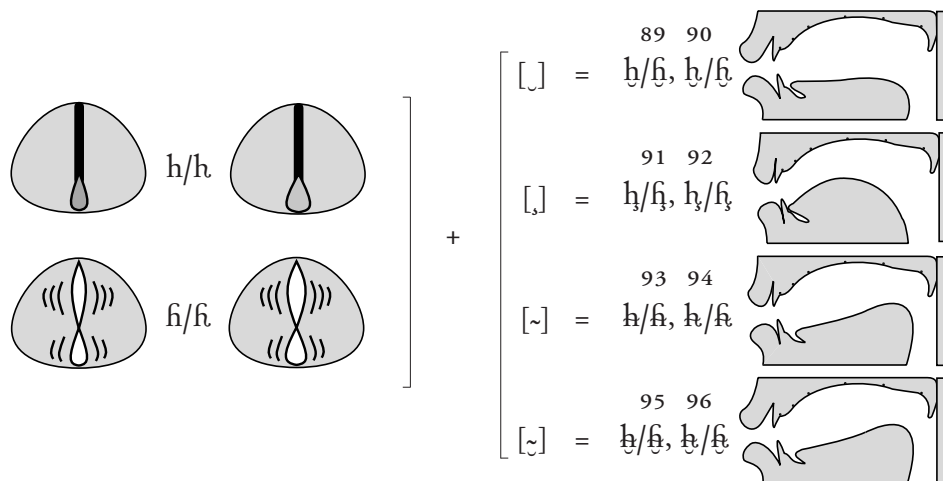
10.6.5.1. Lenited *laryngeal* approximants [H] (10, including semi-approximants, which are laxer, using less expiratory air. Others are possible).

- [h, ɦ]⁸⁷ laryngeal (= between the vocal folds, including the arytenoid cartilages) ‘[h, ɦ]’
 [h, ɦ]⁸⁸ *semi*-laryngeal (= between the vocal folds, including the arytenoid cartil.) ‘[h, ɦ]’
 [h, ɦ]⁸⁹ laryngeal rounded (= with lip rounding) ‘[h^w, ɦ^w]’
 [h, ɦ]⁹⁰ *semi*-laryngeal rounded (= with lip rounding) ‘[h^w, ɦ^w]’
 [h, ɦ]⁹¹ palatalized laryngeal (= betw. the vocal folds, including the aryten. cartil.) ‘[h^j, ɦ^j]’
 [h, ɦ]⁹² palatalized *semi*-laryngeal (= betw. the vocal folds, including aryten. cartil.) ‘[h^j, ɦ^j]’
 [h, ɦ]⁹³ velarized laryngeal (with velarization) ‘[h^ɣ, ɦ^ɣ]’
 [h, ɦ]⁹⁴ velarized *semi*-laryngeal (with velarization) ‘[h^ɣ, ɦ^ɣ]’

fig 10.6.5.1. Lenis voiced & voiceless approximant and semi-approximant laryngograms (4).



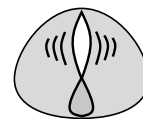
fig 10.6.5.2. Lenis voiced & voiceless approximant and semi-approximant laryngograms (with lip rounding, palatalization, velerization, and rounding & velerization – 8).



- [h , ɦ]⁹⁵ velarized laryngeal rounded (with velarization & rounding) ‘[$\text{h}_{\text{v}}^{\text{w}}$ ’
 [h , ɦ]⁹⁶ velarized *semi*-laryngeal rounded (with velarization & rounding) ‘[$\text{h}_{\text{v}}^{\text{w}}$ ’.

10.6.5.2. Laryngeal approximant with *intermediate* phonation and some coarticulations, as in § 10.6.3.1 (the difference lies in their laryngoid, shown on the right – 5).

- [h] laryngeal (with intermediate phonation) ‘[h ’
 [h^{w}] laryngeal rounded (with intermediate phonation) ‘[h^{w} ’
 [h^{j}] palatalized laryngeal (with intermediate phonation) ‘[h^{j} ’
 [h^{v}] velarized laryngeal (with intermediate phonation) ‘[h^{v} ’
 [$\text{h}_{\text{v}}^{\text{w}}$] velarized laryngeal rounded (with intermediate phonation) ‘[$\text{h}_{\text{v}}^{\text{w}}$ ’.



10.6.6. *Lateralized* apico-laminal approximants, with other coarticulations [l] (some with lip-rounding, as well – 9). Let us make it clear that *lateralized* does not coincide with *lateral* (nor with *semi-lateral*). As the first four linguograms in fig 10.9.9 (that we reproduce here, as fig 10.6.6.1) show, the mechanism is partially different: for (*bi*)*lateral* (and *semi(bi)lateral*) articulations, the lower parts of the sides of the tongue are completely moved away from the side teeth. The difference between them is that (full) laterals have a contact with the upper part of the mouth roof, while semi-laterals do not have it.

Lateralized phones, on the other hand, lack such a consistent space on both sides of the tongue. They have just a smaller space, which normal approximants lack. In addition, to be of greater help, the orograms of (semi)lateral have an arrow (bigger for full laterals), while added lateralization is shown by a simple head of an arrow (which, of course, is not present on normal approximants).

fig 10.6.6.1. Linguograms of lateral, semi-lateral, and lateralized articulations in comparison with normal approximant ones.

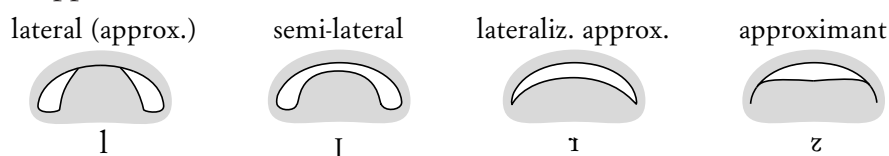
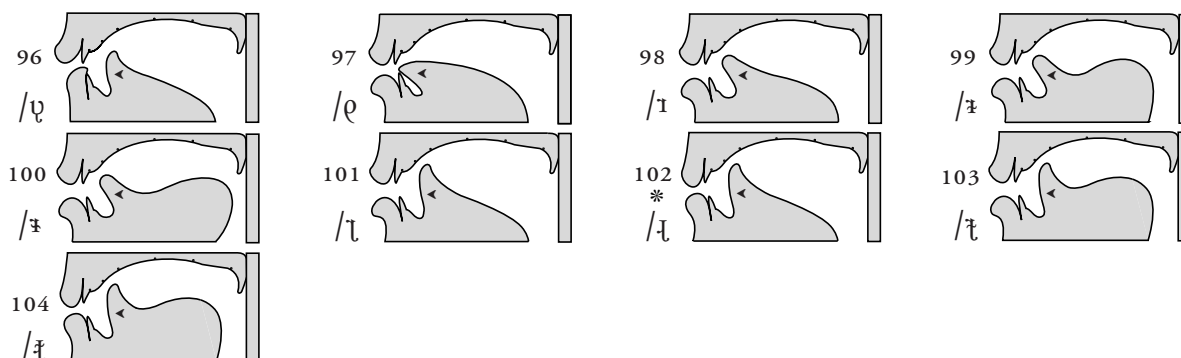


fig 10.6.6.2. Lamino-lateralized approximant orograms (9).



- [ɸ , ɸ^{w}]⁹⁶ labiodentalized postalveolar slightly rounded (with lateral contraction) ‘[ɸ^{w} ’
 [ɸ , ɸ^{v}]⁹⁷ dental, or lamino-dental (= with a *lowered* tip and with lateral contraction) ‘[ɸ^{v} ’

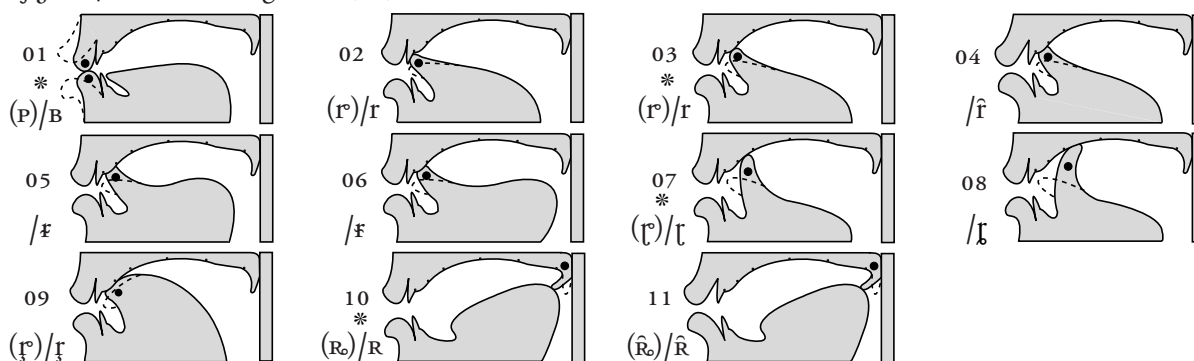
Trills, taps & flaps /R/ [R, ɹ, ɹ̥, ɹ̌, ɹ̍] (41)

10.7. These include three synopses for trills, taps, flaps; and two more, for *constrictive* trills and taps; finally, we find *lateralized* taps and flaps. The synopses of tapped laterals are with those of laterals. Our orograms clearly show that *taps* and *flaps* are two very different contoid categories.

10.7.1. *Trills* [R] (11).

- | | |
|---|---|
| $[(\mathbf{p}), \mathbf{b}]^{01}$ | bilabial ‘ $[\mathbf{b}_{\circ}, \mathbf{b}]$ ’ ($\neq, =$) |
| $[(\mathbf{r}), \mathbf{r}]^{02}$ | dental (with <i>raised</i> tip) ‘ $[\mathbf{r}_{\text{r}}^{\circ}, \mathbf{r}_{\text{r}}^{\circ}]$ ’ |
| $[(\mathbf{r}), \mathbf{r}]^{03}$ | alveolar (apical) ‘ $[\mathbf{r}_{\text{r}}^{\circ}, \mathbf{r}_{\text{r}}^{\circ}]$ ’ |
| $[/, \hat{\mathbf{r}}]^{04}$ | alveolar rounded ‘ $[\mathbf{r}^{\text{w}}, \mathbf{r}^{\text{w}}]$ ’ |
| $[/, \mathbf{r}]^{05}$ | velarized alveolar ‘ $[\mathbf{r}_{\text{r}}^{\text{v}}, \mathbf{r}_{\text{r}}^{\text{v}}]$ ’ |
| $[/, \mathbf{r}]^{06}$ | $[\mathbf{r}]$ uvularized alveolar ‘ $[\mathbf{r}_{\text{r}}^{\text{v}}, \mathbf{r}_{\text{r}}^{\text{v}}]$ ’ |
| $[(\mathbf{r}), \mathbf{r}]^{07}$ | postalveolar: (apico-)... (not laminal) ‘ $[\mathbf{r}_{\text{r}}^{\circ}, \mathbf{r}_{\text{r}}^{\circ}]$ ’ (\neq) |
| $[/, \mathbf{r}]^{08}$ | apico-palatal ‘ $[\widehat{\mathbf{r}}, \widehat{\mathbf{r}}]$ ’ (\neq) |
| $[(\mathbf{r}), \mathbf{r}]^{09}$ | prepalatal: (lamino-)... ‘ $[\mathbf{r}_{\text{r}}^{\text{j}}, \mathbf{r}_{\text{r}}^{\text{j}}]$ ’ |
| $[(\mathbf{r}), \mathbf{r}]^{10}$ | uvular ‘ $[\mathbf{r}_{\text{r}}, \mathbf{r}_{\text{r}}]$ ’ ($\neq, =$) |
| $[(\hat{\mathbf{r}}), \hat{\mathbf{r}}]^{11}$ | uvular rounded ‘ $[\mathbf{r}^{\text{w}}, \mathbf{r}^{\text{w}}]$ ’. |

fig 10.7.1. Trill orograms (11).



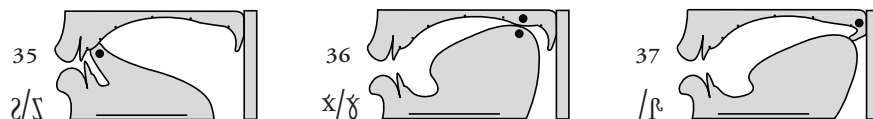
10.7.2. *Taps* [Я] (11).

- | | |
|-------------------------------|--|
| $[\text{ʃ}, \text{ɹ}]^{12}$ | bilabial ‘[$\text{b̥}/\text{w̥}$]’ |
| $[\text{ʃ}, \text{v}]^{13}$ | labiodental ‘[v]’ (=) |
| $[(\text{ʃ}, \text{ɹ})]^{14}$ | dental (with <i>raised</i> tip) ‘[$\text{ʃ}_\text{d}^\circ, \text{ɹ}_\text{d}^\circ$]’ |
| $[(\text{ʃ}, \text{ɹ})]^{15}$ | alveolar (with <i>raised</i> tip) ‘[$\text{ʃ}_\text{a}^\circ, \text{ɹ}_\text{a}^\circ$]’ |
| $[\text{ʃ}, \text{ɹ̠}]^{16}$ | alveolar rounded ‘[ɹ^w]’ |
| $[(\text{ʃ}, \text{ɹ})]^{17}$ | velarized alveolar ‘[$\text{ʃ}_\text{v}^\circ, \text{ɹ}_\text{v}^\circ$]’ |
| $[(\text{ʃ}, \text{ɹ})]^{18}$ | uvularized alveolar ‘[$\text{ʃ}_\text{u}^\circ, \text{ɹ}_\text{u}^\circ$]’ |
| $[(\text{ʃ}, \text{ɹ})]^{19}$ | postalveolar: (apico-)... (not laminal) ‘[$\text{ʃ}_\text{p}^\circ, \text{ɹ}_\text{p}^\circ$]’ |
| $[\text{ʃ}, \text{ɹ̥}]^{20}$ | apico-palatal (palatal and apical, not laminal) ‘[ɹ_p°]’ |
| $[(\text{ʃ}, \text{ɹ})]^{21}$ | prepalatal: (lamino-)... ‘[$\text{ʃ}_\text{p}^\circ, \text{ɹ}_\text{p}^\circ$]’ |
| $[(\text{ʃ}, \text{ɹ})]^{22}$ | uvular ‘[$\text{ʃ}_\text{u}^\circ, \text{ɹ}_\text{u}^\circ$]’ |

10.7.5. *Constrictive taps* [R*] (3).

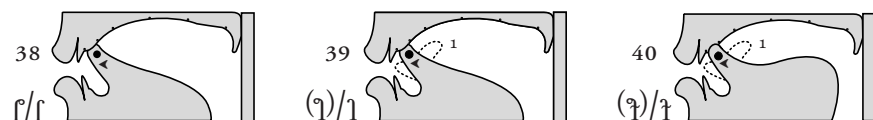
- [ɭ, ʁ]³⁵ alveolar (with raised tip and narrowing which produces friction noise) ‘[$\underset{\cdot}{\underset{\cdot}{\text{f}}}, \underset{\cdot}{\underset{\cdot}{\text{f}}}]$ ’
 [ʁ̤, ʁ̥]³⁶ velar (with friction noise) ‘[$\overset{\circ}{\underset{\cdot}{\text{R}}}, \overset{\circ}{\underset{\cdot}{\text{R}}}]$ ’
 [ʁ̥, ʁ̥]³⁷ uvular (with friction noise) ‘[$\overset{\circ}{\underset{\cdot}{\text{R}}}]$ ’.

fig 10.7.5. Constrictive tap orograms (3).

10.7.6. *Lateralized taps & flaps* [ɹ] (3).

- [(ɹ), ɹ]³⁸ alveolar *tap* (with *raised* tip) ‘[$\underset{\cdot}{\underset{\cdot}{\text{f}}}, \underset{\cdot}{\underset{\cdot}{\text{f}}}]$ ’
 [(ɹ), ɹ]³⁹ alveolar *flap* (with *raised* tip) ‘[$\underset{\cdot}{\underset{\cdot}{\text{f}}}, \underset{\cdot}{\underset{\cdot}{\text{f}}}]$ ’
 [(ɹ), ɹ]⁴⁰ velarized alveolar *flap* (with *raised* tip) ‘[$\underset{\cdot}{\underset{\cdot}{\text{f}}}, \underset{\cdot}{\underset{\cdot}{\text{f}}}]$ ’.

fig 10.7.6. Lateralized orograms: tap and flap.



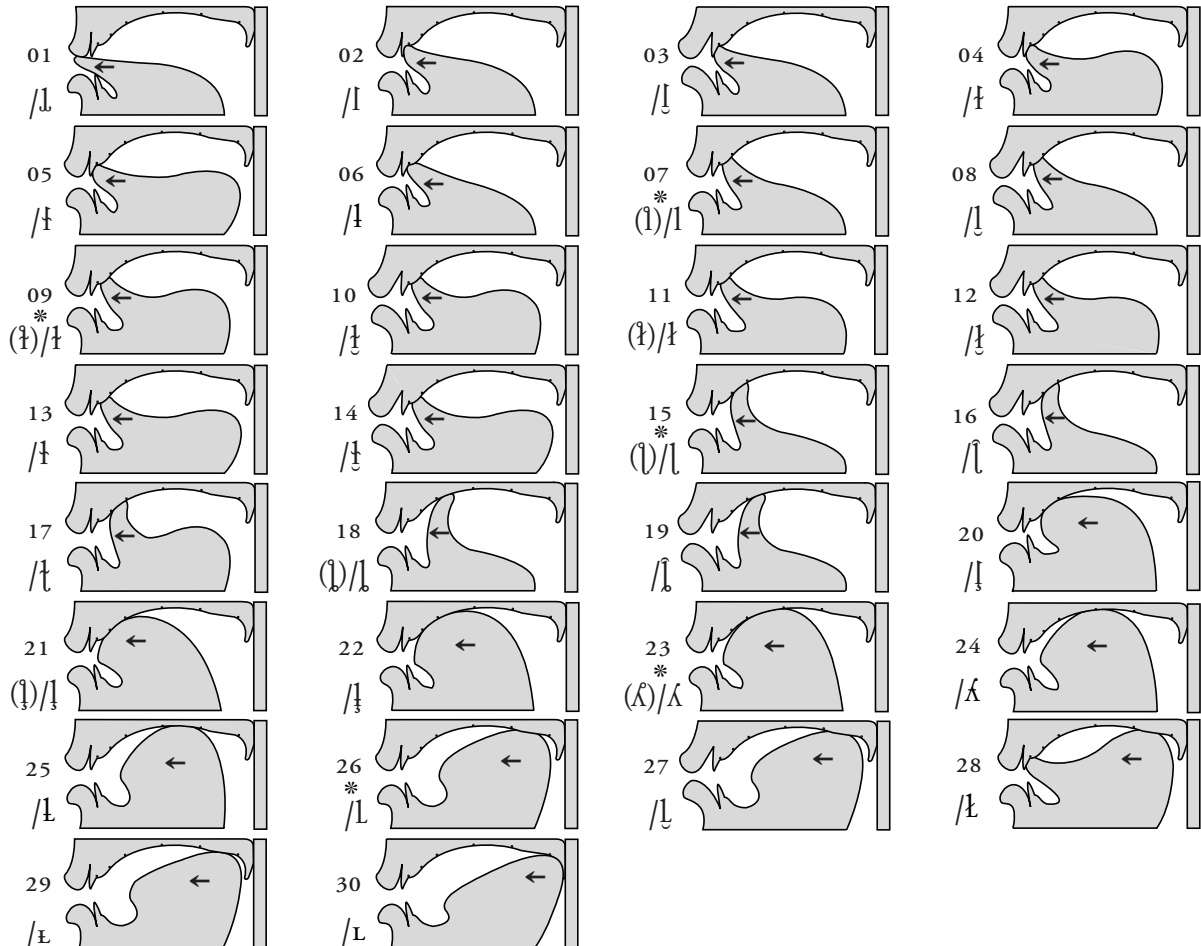
Laterals /L/ [L, ɫ, ɮ, ɭ, ɬ] (67)

10.8. These include five synopses for (bi)laterals, *unilaterals*, constrictive laterals, lateral taps; semi-laterals; finally, the symbol for a diaphone is added, [ɭ] (which can be called either ‘lateralized tap’ or ‘tapped lateral’, for oscillations between [ɾ, ɭ, ɭ, ɭ]).

10.8.1. *Laterals* [L] (30).

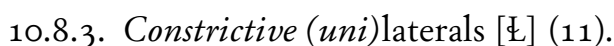
[ɭ, ɭ] ⁰¹	labial-apical (= between the upper lip and the tip of the tongue) ‘[ɭ]’
[ɭ, ɭ] ⁰²	[ɭ] dental, or predental (with <i>raised</i> tip) ‘[ɭ]’
[ɭ, ɭ] ⁰³	[ɭ] dental rounded ‘[ɭ ^w]’
[ɭ, ɭ] ⁰⁴	[ɭ] velarized dental ‘[ɭ ^ɣ] or [ɭ ^ɰ]’
[ɭ, ɭ] ⁰⁵	(or [ɭ]) [ɭ] uvularized dental ‘[ɭ ^ʁ] or [ɭ ^{ʁ̥}]’
[ɭ, ɭ] ⁰⁶	[ɭ] denti-alveolar (= intermediate between the teeth and the alveoli) ‘[ɭ]’
[ɭ, ɭ] ⁰⁷	alveolar (= between the alveoli and the tip of the tongue) ‘[ɭ, ɭ]’
[ɭ, ɭ] ⁰⁸	alveolar rounded ‘[ɭ ^w]’
[ɭ, ɭ] ⁰⁹	velarized alveolar ‘[ɭ ^ɣ], [ɭ ^ɰ] or [ɭ ^{ɰ̥}]’
[ɭ, ɭ] ¹⁰	velarized alveolar rounded ‘[ɭ ^{ɣw}] or [ɭ ^{ɰw}]’
[ɭ, ɭ] ¹¹	<i>semi</i> -velarized alveolar (with reduced velar narrowing than [ɭ]) ‘[ɭ ^{ɣ̥}], [ɭ ^{ɰ̥}] or [ɭ ^{ɰ̥̥}]’
[ɭ, ɭ] ¹²	<i>semi</i> -velarized alveolar rounded ‘[ɭ ^{ɣw̥}] or [ɭ ^{ɰw̥}]’

fig 10.8.1. (Bi)lateral orograms (30).



10.8.2. Unilaterals $[\mathcal{L}]$ (10).

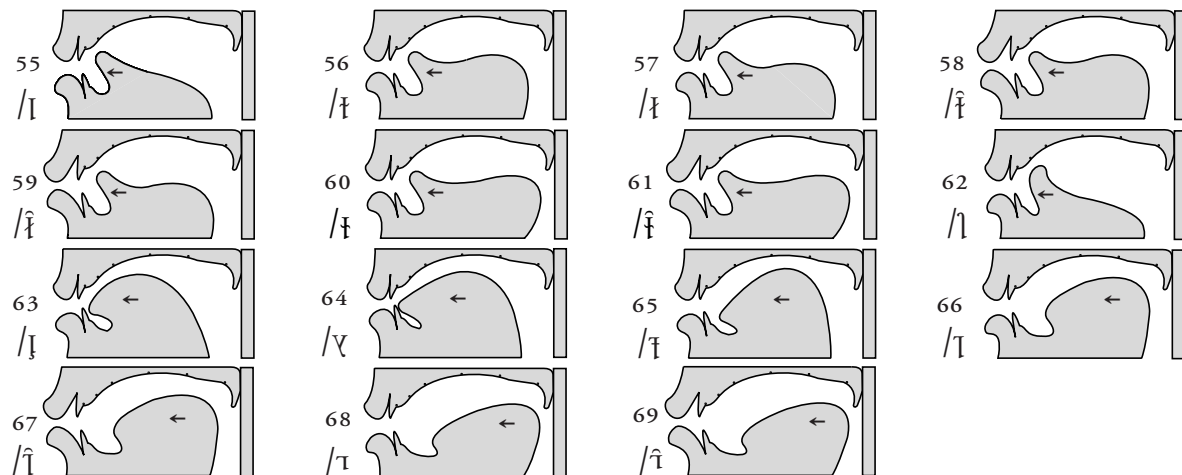
fig 10.8.2. Unilateral orograms (10).



$[\text{t}, \text{t}']^{41}$	$[\text{t}, \text{t}']$ dental, or predental (with friction noise) ‘ $[\text{t}_n, \text{t}_n']$ ’
$[\text{t}, \text{t}']^{42}$	alveolar (with friction noise) ‘ $[\text{t}, \text{t}']$ ’

$[\text{ɭ}, \text{ɭ̃}]^{67}$	$[\text{ɭ}]$ velar rounded (with lateral contraction) ‘ $[\text{ɭ}^{\text{ɤw}}]$ ’
$[\text{ɭ}, \text{ɭ̃}]^{68}$	$[\text{ɭ}]$ uvular (with lateral contraction) ‘ $[\text{ɭ}]$ ’
$[\text{ɭ}, \text{ɭ̃}]^{69}$	$[\text{ɭ}]$ uvular rounded (with lateral contraction) ‘ $[\text{ɭ}^{\text{ɤw}}]$ ’.

fig 10.8.5. Semi-laterals, or lateralized approximants (15).



10.8.6. As already pre-empted in § 10.8, we also give the ‘diaphone’ $[\text{ɭ}]$ (ie either a ‘lateralized tap’ or a ‘tapped lateral’ (or something else), for possible oscillations between $[\text{ɭ}, \text{ɭ̃}]$ and $[\text{ɭ}, \text{ɭ̃}]$). Of course, our symbol is the combination of $[\text{ɭ}]$ and $[\text{ɭ̃}]$. As a matter of fact, it is no easy task to try to show it with a suitable orogram, given its particular nature. We leave the task of devising possible *offIPA* ‘transcriptions’ to the imagination of careful readers.

fig 10.8.6. Orogram of the alveolar lateralized tap, or tapped lateral, diaphone.

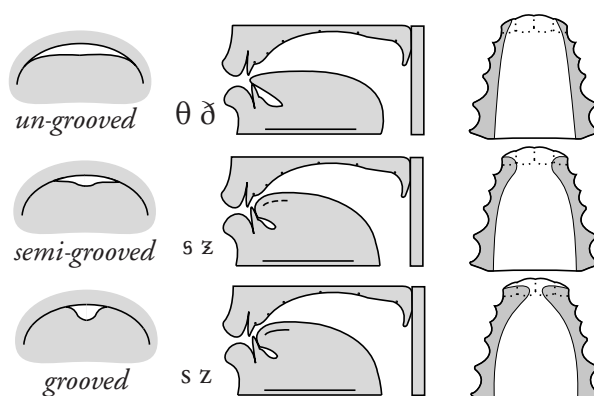


Appendix

Intermediate contoids: semi-grooved

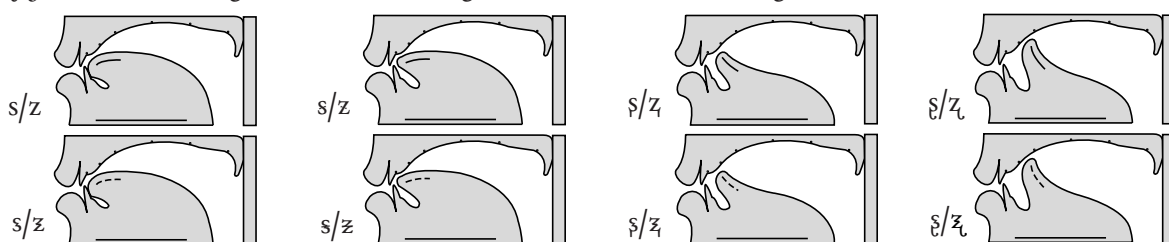
10.9.1. *Semi-grooved* constrictives & stop-strictives can also occur. There follows an illustration showing the difference between *un-grooved*, *semi-grooved* and *grooved* dental constrictive contoids, as a necessary exemplification.

fig 10.9.1. Comparison between plain (un-grooved, or 'slit'), semi-grooved, and grooved dental contoids.



Now, for comparison, we show the orograms of grooved and semi-grooved dental, denti-alveolar, alveolar and postalveolar constrictives. As can be seen, it is no easy job to draw them by hand or in print at reduced dimensions, especially for voiceless ones. However, we can rely on them, if needed.

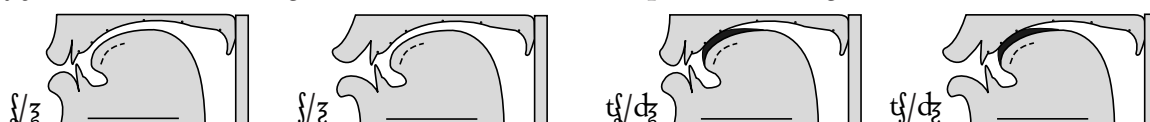
fig 10.9.2. Some grooved and semi-grooved constrictive orograms.



Here, we just show the two most frequent semi-grooved stop-strictives and their correspondent constrictives (but, of course, others are possible).

In certain societies, semigrooved contoids are often (though not always) associated with gay-male lisp.

fig 10.9.3. Some semi-grooved constrictive and stop-strictive orograms.

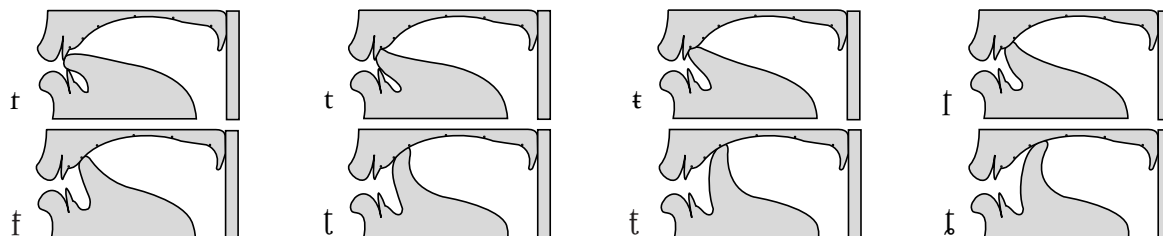


Comparisons between similar contoids

10.9.2. For *nasals*, to closely examine their many articulatory possibilities, we can consider the position of German, as it emerges mainly from § 5.2.1-7 of *HPr*. We have indicated many coarticulatory combinations, by using both (more) ‘normal’ and (more) ‘special’ symbols. Certainly, this has been done not for the sake of useless pedantry, but rather to fully describe native speakers’ ‘spontaneous and automatic’ phonetic reality, in order to allow even non-native speakers to use what natives actually do. In fact, for the 3 nasal phonemes of German, /m, n, ŋ/, we have 6 taxophones, [m, m̥, n, n̥, ŋ, ŋ̥], and some special ones, [[ɱ, ɱ̥, ɳ]] (if necessary, [[ɳ̥]], too). For the 2 intense (‘syllabic’) nasals, /ṁ, ṇ/, we have 6 more normal taxophones, [ṁ, ṁ̥, ṇ, ṇ̥, ṅ, ṅ̥], and 9 special ones [[ɱ̃, ɱ̥̃, ṇ̃, ṇ̥̃, ṅ̃, ṅ̥̃, ɲ̃, ɲ̥̃, ɳ̃]] (if necessary, [[ɳ̃]], too). They are all given in fig 10.2.1-2 (with others).

10.9.3. For *stops*, let us carefully observe the characteristics of some (voiceless) phones, belonging to the apical group (predental, dental, denti-alveolar, alveolar, postalveolar, apico-palatal), [t̪, t̪, t̪, t̪, t̪]. We find the last five respectively in: Spanish *tú* [tu], German *Tod* [t̪ox̥t̪], English *tat* [t̪hæt̪], Hindi *ṭaṭ* [t̪aṭ̪], and Tamil *ṭii* [t̪ii]. The first orogram in fig 10.9.4 adds the predental articulation which in Malayalam opposes /t̪/ [t̪] (and, in traditional pronunciation, also /t̪/ [t̪], which in modern pronunciation merges into /t̪/ [t̪]; thus, they can both become [t̪]): *muttu* [m̪ut̪u], *muttu* [m̪ut̪u], *muttu* [m̪ut̪u]. Others are possible (fig 10.9.4).

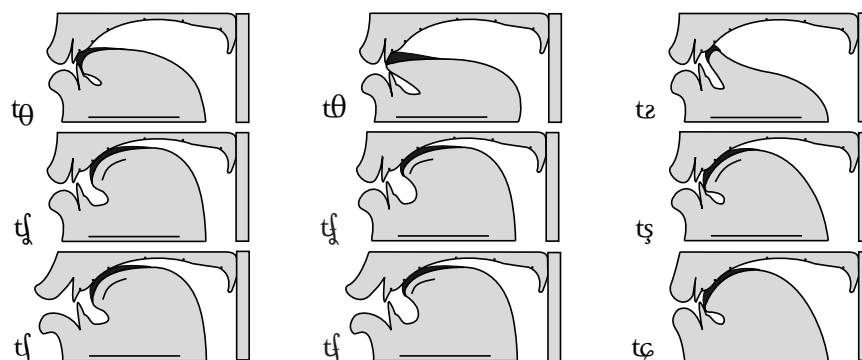
fig 10.9.4. Comparisons between some (voiceless) stops: prodental, dental, denti-alveolar, alveolar, back-alveolar, postalveolar, back-postalveolar, apico-palatal.



10.9.4. For *stop-strictives*, let us expressly consider some groups, in order to see their nuances well, since too often they are described badly. For simplicity, we will see voiceless phones only. The first three we consider are (prodental, dental, and alveolar) un-grooved contoids, [t_θ, t_{θ̥}; t_ɛ]. We find the first two in regional Italian pronunciations from Trentino (in north-eastern Italy), for /ts/: *marzo* ['mɑrt_θθ, -t_θθ] (for neutral Italian ['mɑrtso]), and [t_ɛ], in Sicily, for /tr/: *tre* ['t_ɛɛ, 't_ɛɛɛ] (this is the ‘legendary’ –and ‘phonetic-fiction’– ‘cacuminal’ sequence ‘*tr*’, for ['tre]).

It is useful to also consider the grooved triple set, with no lip-rounding nor lip-protrusion – postalveo-palatal with a lowered or raised tip, and prepalatal: [t̪], [t̪̞], [t̪̝], as in typical pronunciations in northern Italy, for /tʃ/: *cera* [ˈt̪ɕe.ra, t̪̞ɕ-, t̪̝ɕ-], /tʃera/. Let us also consider the pair with lip-protrusion: [tʃ], as in neutral Italian [ˈtʃe.ra]; [tʃ̟], as in English *chain* [ˈtʃheɪn] /ˈtʃeɪn/ and German *deutsch* [ˈdɔʏtʃ] /ˈdɔʏtʃ/. Finally, let us observe [t͡ɕ], as well, with vertical labialization (not rounding or protrusion), as in Chinese *jī* [ˈt͡ɕi] /ˈt͡ɕi/.

fig 10.9.5. Comparisons between some (voiceless) stop-strictives.



10.9.5. In addition, it is worthwhile considering the set of eight *grooved constrictives*. For instance, [s, s, ʃ, ʃ], can occur respectively in neutral Italian, regional Italian (of upper-southern and northern parts), and regional Italian (of other northern parts), as in *sí* ['si, 'si, 'ʃi, 'ʃi] /'si/ (or of variants of Spanish; while neutral Castilian Spanish uses [ʃ], neutral American Spanish [s]). English speakers can actually use any of these four contoids, but the neutral one is [ʃ], although generally transcribed with [s]: *sixty* ['sɪksʃi] ['sɪksʃi] /'sɪksti/. Look at fig 10.9.6.2-3, too.

fig 10.9.6.1. Comparisons between some (voiceless) grooved constrictives: prodental, dental, denti-alveolar, alveolar, back-alveolar, postalveolar, back-postalveolar, apico-palatal.

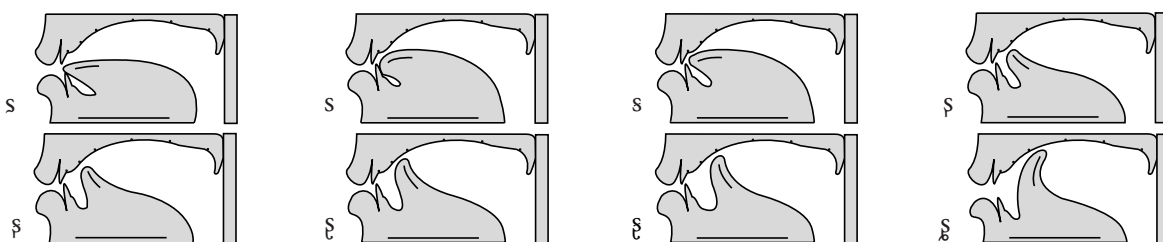


fig 10.9.6.2. Comparisons between some (voiceless) grooved semi-constrictives: prodental, dental, denti-alveolar, alveolar, back-alveolar, postalveolar, back-postalveolar, apico-palatal.

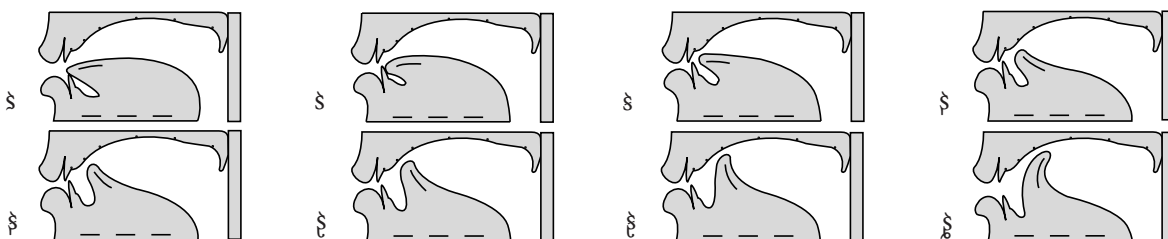
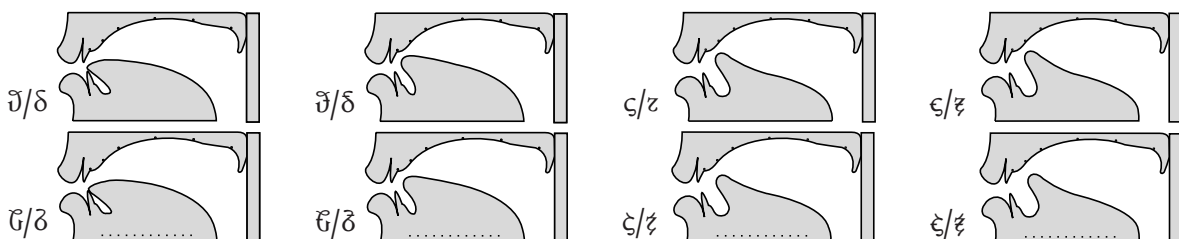


fig 10.9.6.3. Comparisons between some (voiceless and voiced) approximants and semi-approximants: dental, denti-alveolar, alveolar, back-alveolar.



10.9.6. As far as *median approximants* are concerned, that is those produced within the phonetic space of vocoids (cf fig 8.1), it is very important to also observe some realizations with greater or lesser space between the dorsum and the palate, up to constrictive phones, by considering the following areas: (*prepalatal*,) *palatal*, *postpalatal*, *prevelar*, *provelar*, *velar* (and *uvularized velar*, too). We will present the voiced contoids in a synoptic way (whereas their articulations can be found in previous sections). It is to be noted that the median approximants (and semi-approximants) in this table are dynamic contoids (rather than static ones – cf fig 10.9.14-15). Besides, the high *vocoids*, that we show below the table, are there to help to connect them with the contoids.

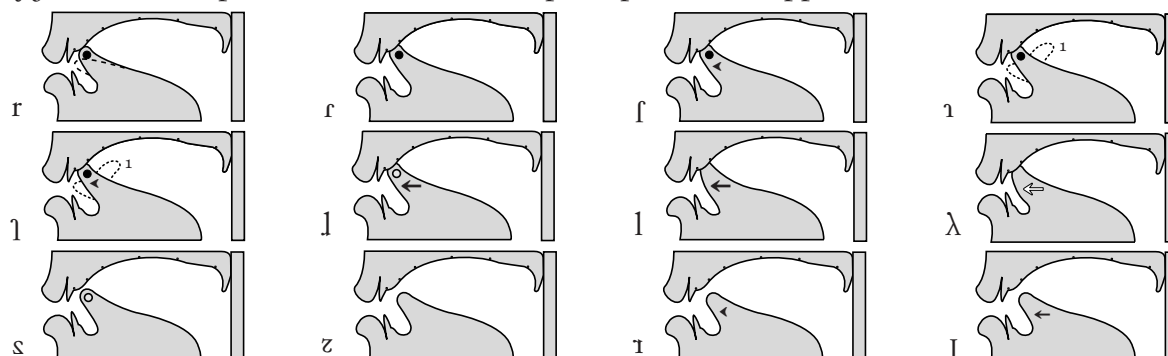
fig 10.9.7.

Comparisons between
voiced median approx-
imants (& similar near-
by contoids).

	pre-palatal	palatal	postpalatal	pre-velar	pro-velar	velar	velarized alveolar	pre-palatal rounded	palatal rounded	postpalatal rounded	pre-velar rounded	pro-velar rounded	velar rounded	velarized alveolar r.	uvularized velar r.
constrictive		j̥	ɹ̥	ʃ̥		ʒ̥			ɰ̊		ʍ̊		ʁ̊		
semi-constrictive		j̞	ɹ̞	ʃ̞		ʒ̞			ɰ̞	ɯ̞	ʍ̞	w̞	w̞		
approximant	ɻ	j	ɹ	ʃ	ɰ	ʒ		ɣ	ɥ	ɸ	ɹ̥	w	w		ʁ̥
semi-approxim.		J	ɹ̄	ʃ̄	ɰ̄	ʒ̄			ɸ̄	ɸ̄	ɹ̄	ω	ω		ʁ̄
semi-lateral	I̥	Y̥		T̥		ɬ̥							ɦ̥	ɦ̥	
<i>high vocoids</i>	i	ɪ	ɨ	ʉ	(III)			ɤ	ɥ	ɸ	ɹ̥	u	u		

10.9.7. It is important to also consider some alveolar contoids, which can be difficult to distinguish. For the speakers of certain languages (mostly spoken in the Far East, as the various Chinese languages, and Japanese and Korean) they are a severe difficulty, since these differences are not present in the phonemic systems of those languages (cf fig 10.13 & § 9.33). Those Spanish accents which (really or presumably) neutralize the patterns /rC, lC/ can have [r, ɾ, l, ɭ] (with apical contact, cf § 10.8.6, as well), or [s, z, ɾ, ɭ] (with no such contact). The difference between the last three phones (and orograms) is fairly small: [z] lacks any lateral contraction,

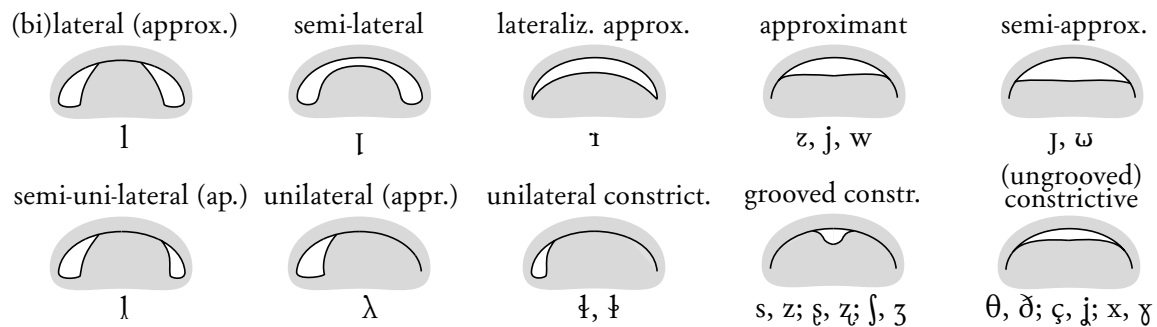
fig 10.9.8. Comparisons between trills, taps, flaps, laterals, approximants (& combinations).



which is present in [ɹ] (as an added feature), and in [ɹ̥] (as a fundamental feature coupled with the lack of any apical contact). It is important to pay careful attention to the size of the arrows, too. The possible alveolar *semi-tap*, [ɹ̥] is intermediate between [ɹ] and [z], with which it can actually alternate (and might –indeed– work as a diaphone, as well, cf § 10.8.6).

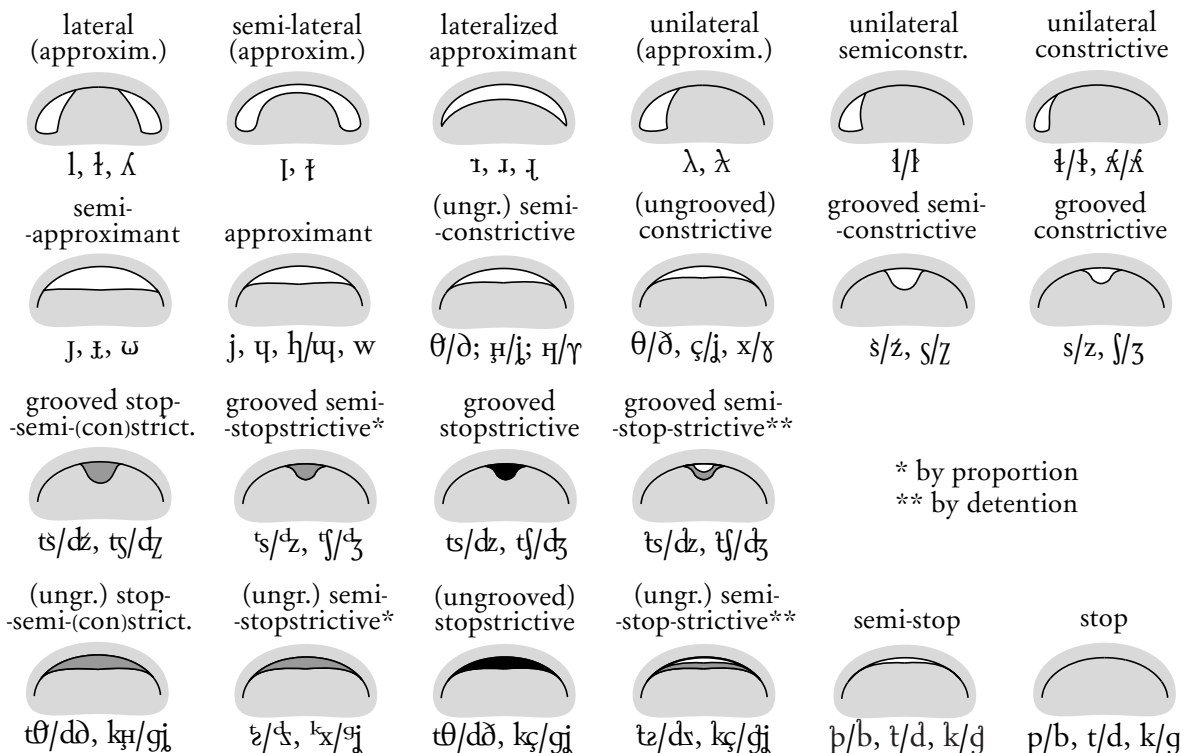
10.9.8. fig 10.9.9 shows some diagrams of frontal orograms, or *linguograms*, in order to help to visualize the slight mechanism which contributes to differentiate similar phones. Those in the middle concern the last three phones we have seen; the two on the sides highlight other interesting relations.

fig 10.9.9. Linguograms (or frontal orograms) showing a different perspective.



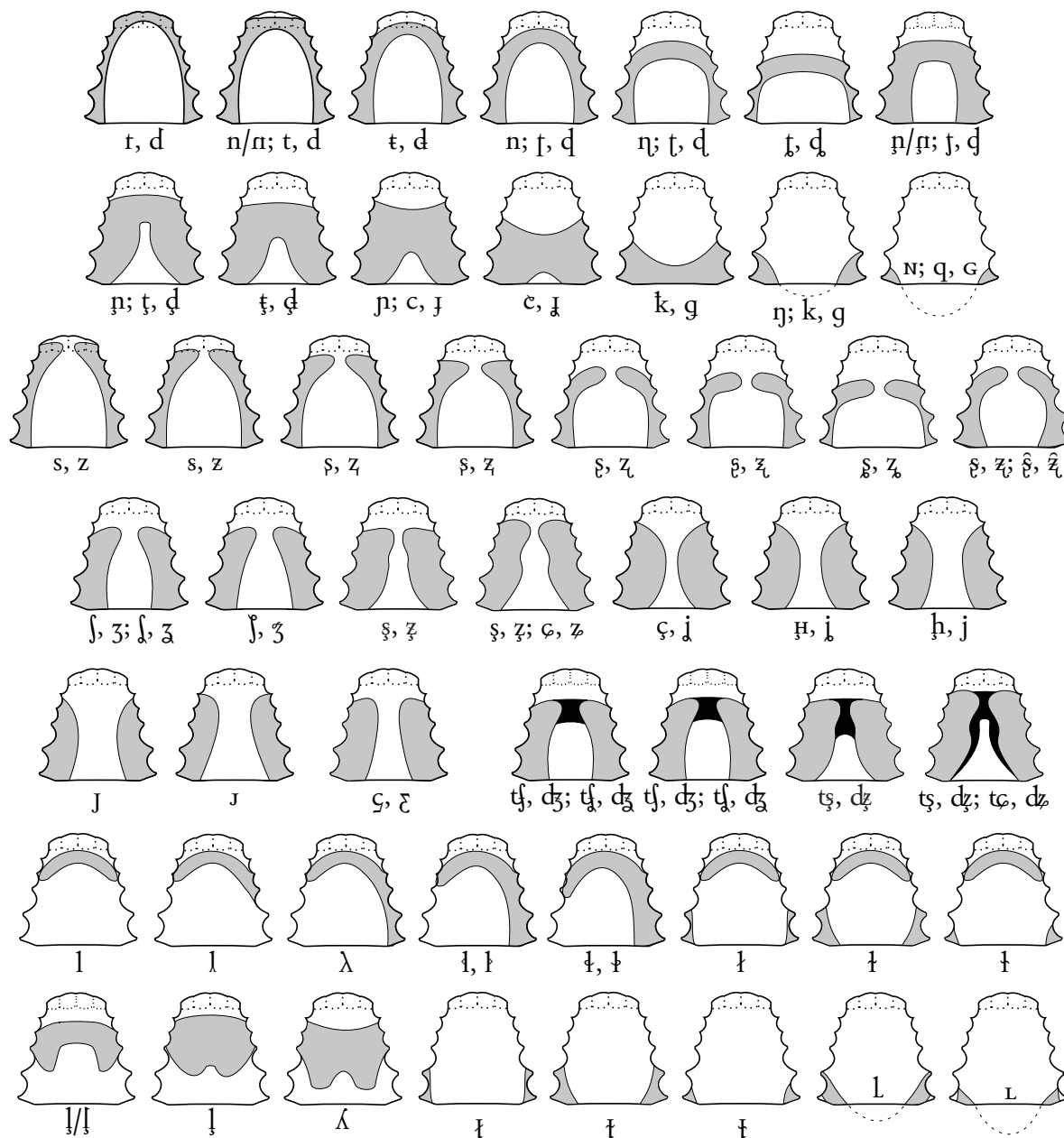
10.9.9. Here we add some more linguograms to better show the difference between certain (categories of) contoids already dealt with in this chapter. It is very important to accurately connect every linguogram to its articulatory characteristics.

fig 10.9.10. Further linguograms showing a different perspective for given contoid classes.

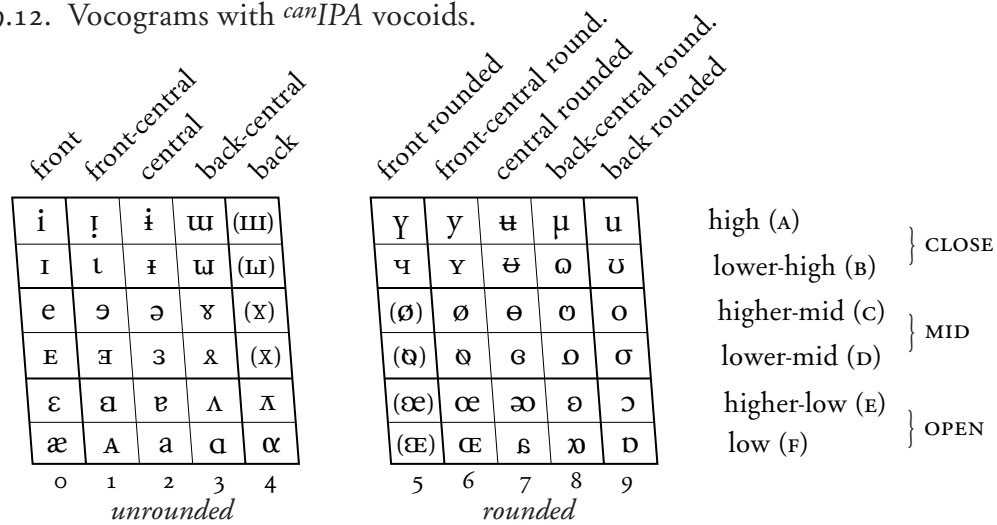


10.9.10. Palatograms are also very important to help to recognize some articulatory peculiarities which can make a real difference between similar phones. Thus, it is fundamental to accurately inspect all palatograms we are presenting here.

fig 10.9.11. Further different palatograms to be compared very attentively.

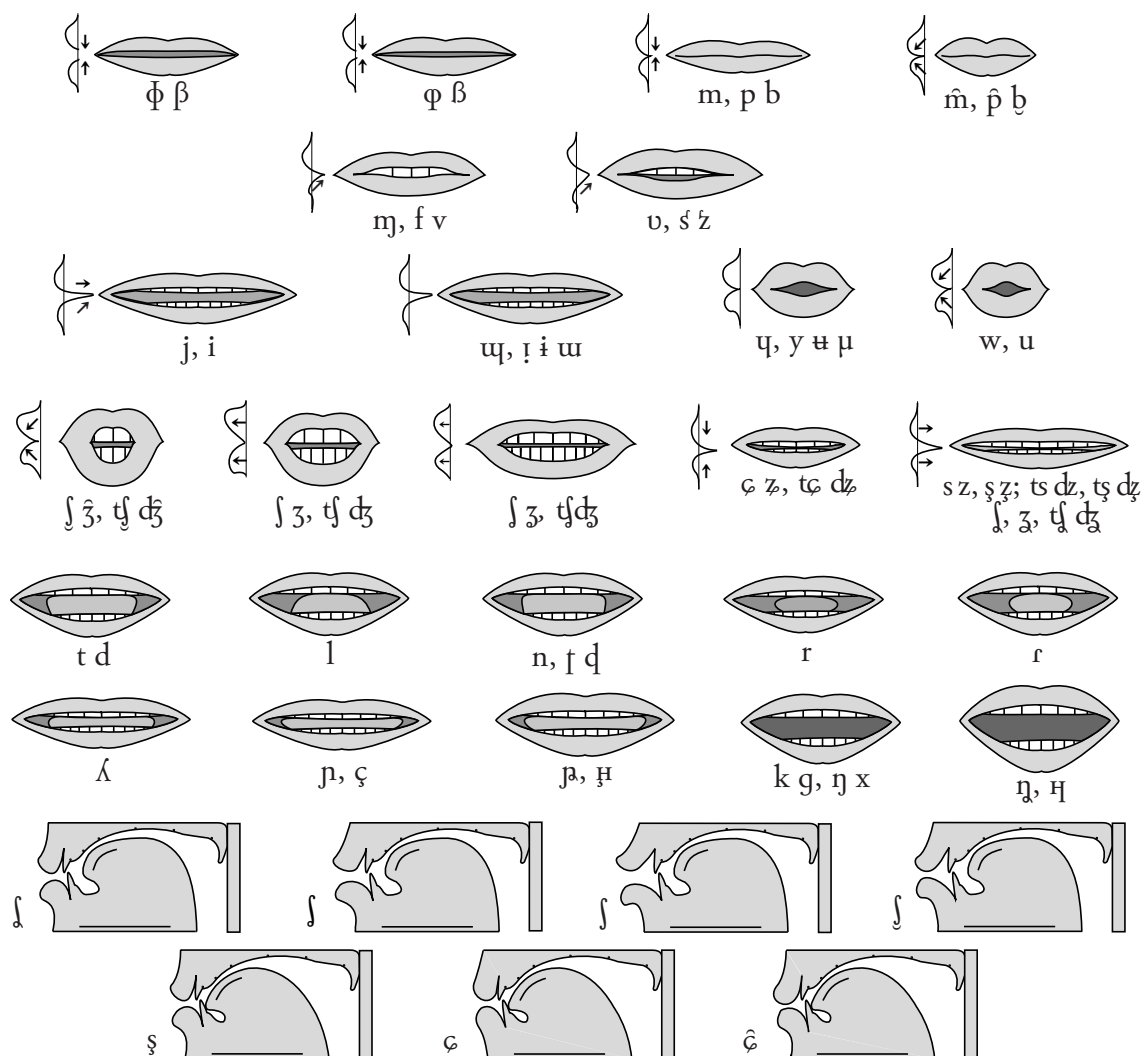


10.9.11. We also show the palatograms of all principal vocoids, because even comparisons between these two categories of phones can be very illuminating. But, first, let us show them in their vocograms (as in § 8)

fig 10.9.12. Vocograms with *canIPA* vocoids.fig 10.9.13. Palatograms of *canIPA* vocoids.

10.9.12. Here is an expanded version of fig 9.1, which can complete this overview, to continue making useful comparisons between phones and some of their nuances.

fig 10.9.14. Contoid labiograms (and seven orograms for the lips again).



'Aspiration' & coarticulation

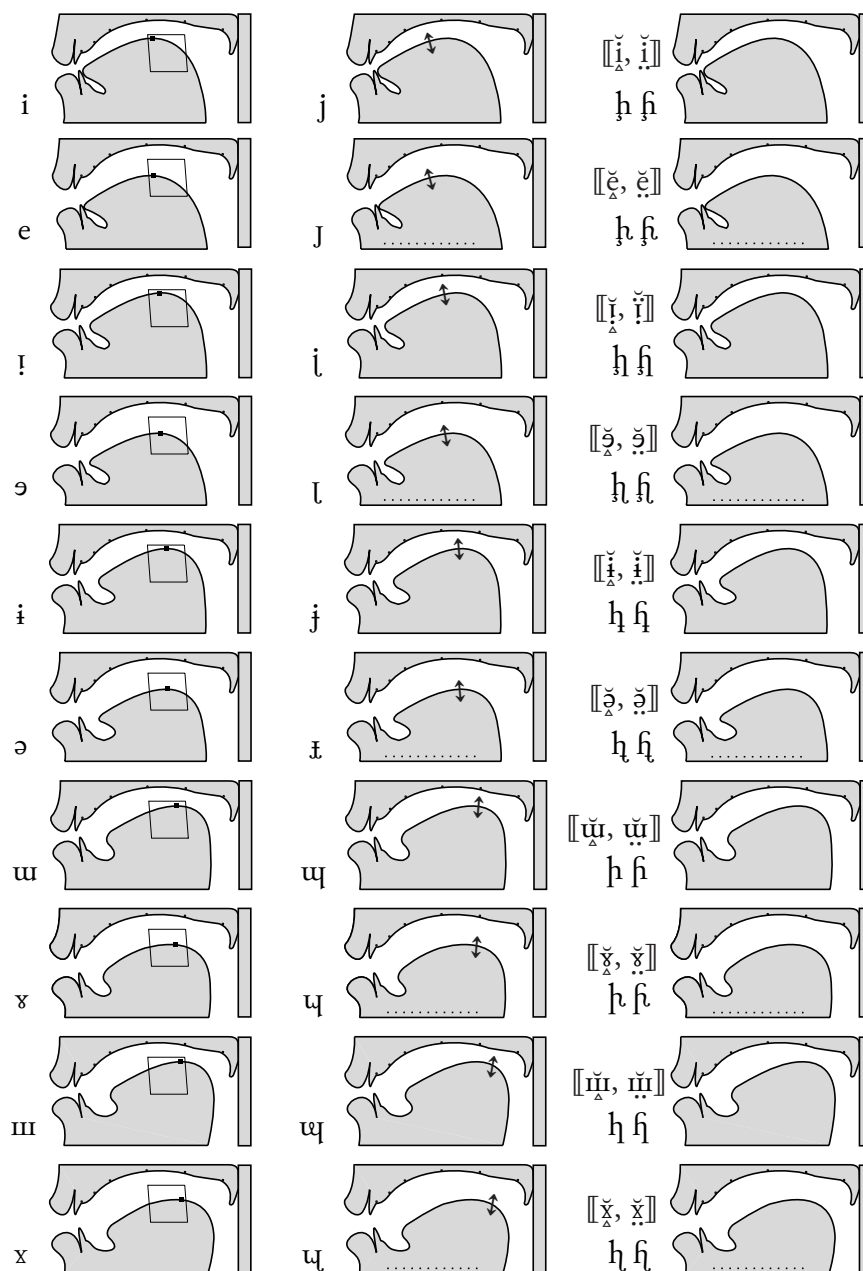
10.9.13. Certainly, it will not be in vain to also reflect upon different possible degrees of '[h]' in various languages, either as a phoneme, /h/, or as an element of 'aspiration', either phonetic, for /C/, or phonemic, for /Ch/. As a matter of fact, it could be very important to be able to adequately distinguish, not only between (voiced or voiceless) laryngeal approximants, [h, h̥], but also between laryngeal constrictives, [h̥, h̥̥] (cf § 10.6.4 & 10.5.2). And, in addition to a possible intermediate phonation type, [h̥̥] (cf § 10.6.4.2), we can also find the corresponding semi-constrictive, [h̥̥, h̥̥̥] (formerly [h̥̥, h̥̥̥]), and semi-approximant, [h̥̥̥, h̥̥̥̥] (formerly [h̥̥̥, h̥̥̥̥]), contoids – which are produced by using a lesser amount of air than the respective constrictive or approximant phones. However, the special symbols are not yet in great use.

This reflection can show that the VOT theory (= voice onset time – ie the time that elapses between some articulatory events, mostly the release of a stop and the

point at which the vocal folds begin to vibrate) is a very weak one, since not only time, but also tension is important in the transitions from a phone to another.

Unfortunately, as we know quite well, *offIPA* is nothing more than a phonemic alphabet (in spite of its official name: ‘International Phonetic Alphabet’, with some vague and curious definitions, too. It only has two voiceless and voiced ‘fricative’ (meaning *approximant*) sounds, /h, ɦ/ (beside oldfashioned, or provincial, ‘/ʌ/’ – i.e. [hʷ, ɦʷ] – mostly for English *wh*–). In addition, let us notice that generally *offIPA* indicates any kind of ‘aspiration’ as /Ch/ – and also [Ch], even for voiced ‘aspiration’.

fig 10.9.15. Orograms of some unrounded vocoids and their corresponding dynamic & (more) static approximants & semi-approximants.

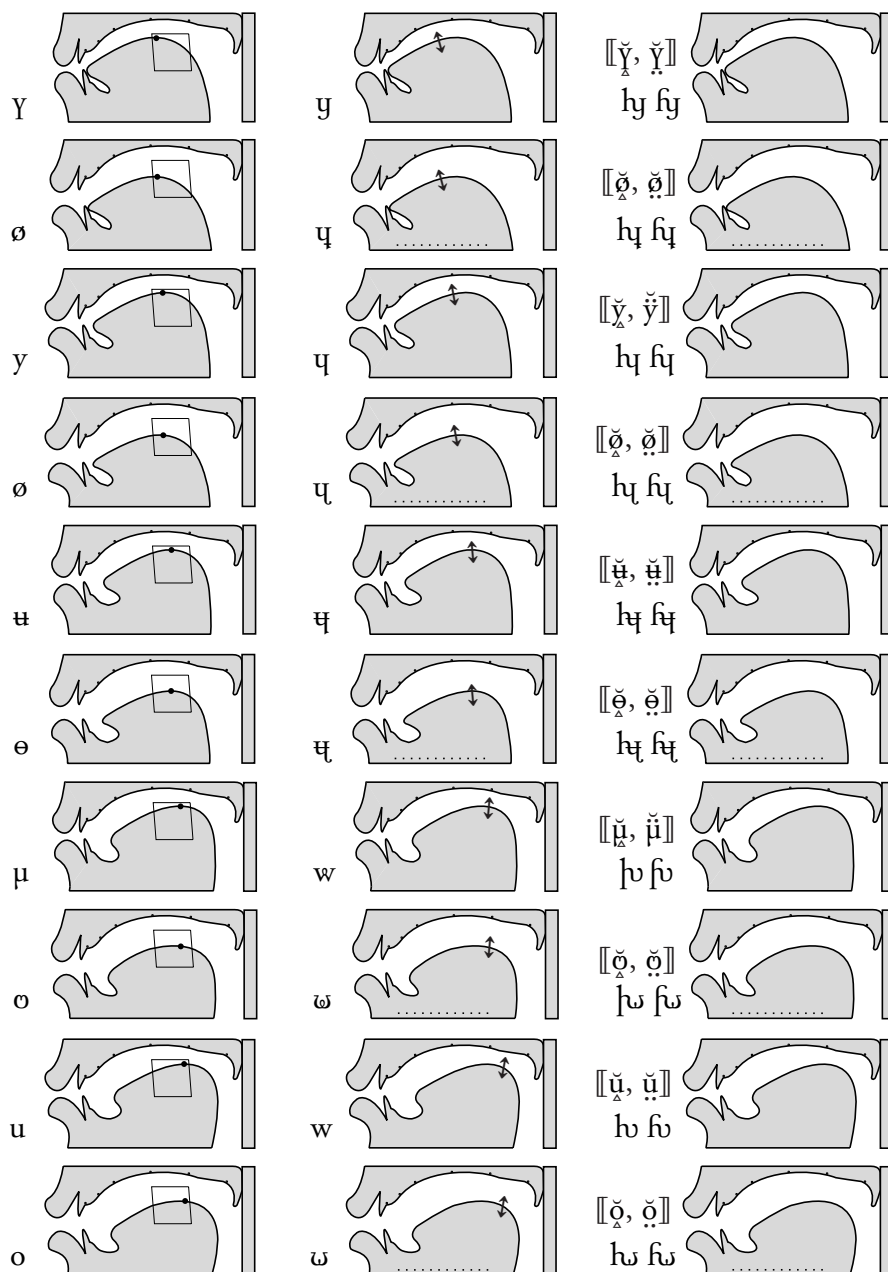


10.9.14. What corresponds to /h/ [h] & /Ch/ [Ch]? Is it correct to represent the ‘aspirate’ /h/ as [h]? In fact, the *offIPA* current representation –/h/ [h]– is quite phonemic, but generally a satisfactory one, indeed.

The same is true for a general *canIPA* representation. As a matter of fact, even within *canIPA*, this is more than sufficient, due to normal automatic coarticulation. Of course, when the effect of coarticulation is stronger, *canIPA* shows it adequately (taking particular aims into consideration, as well), as we will see below, for more or less important nuances.

It would not be convenient to continuously notate expressly that we have (pre-velar) [k] /k/ before front vowels. But –if we want to be realistic– we have to in-

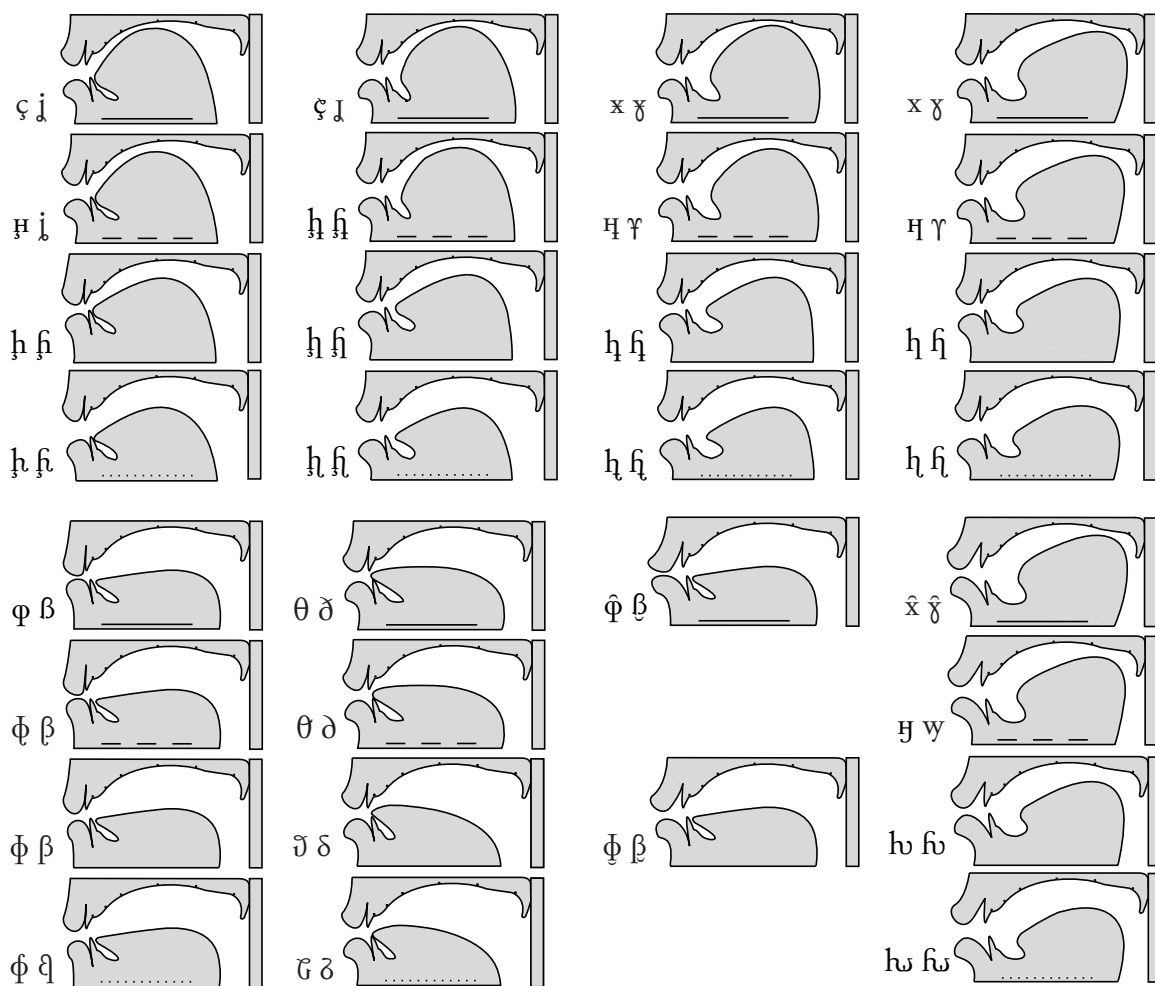
fig 10.9.16. Orograms of some rounded vocoids and their corresponding dynamic & (more) static approximants & semi-approximants.



dicating a palatal [c] (or a postpalatal [c̟]) realization, when it realizes the (velar) /k/ phoneme, either before front vowels, or at the end of a word, as it happens in neutral French pronunciation: [ci, 'mɛc] *qui, mec*. Of course, strictly speaking, a transcription like [ki] would not represent a natural /ki/ sequence in any real language. That is, a true *velar* stop, [k], would not be possible in any human language, in front of a true *palatal* vocoid like [i], because –by assimilation– the actual articulation of /k/ necessarily becomes prevelar, [k̟]. In fact, if we actually find something like [ki], the only possible natural phonemic sequence is /qi/, as in Arabic [qɪʃʕāni] *qīšʕānī*, which would rather be [kɪʃʕāni]. But, again, even in *canIPA Natural Phonetics*, it is better to simply transcribe [qɪ], because assimilation does the rest properly.

10.9.15. Going back to /hV/ sequences, we have (using examples for international-English pronunciation): [hiɪt] *heat*, [hiɪt] *hit*, [hæf] *hat*, [hɛf] *hut*, [hɒt] *hot*, [huɪt] *hoot*, [hɜɪt] *hurt*. These transcriptions are quite sufficient for any human being. However, they would not be enough for a talking machine, unless a suitable adaptation is used, simply to take account of (natural) assimilation. In fact, to be

fig 10.9.17. Palatal, postpalatal, prevelar, velar & laryngeal possible taxophones (with bilabial rounding, too). They can belong to the constrictive, semi-constrictive, approximant or semi-approximant classes (according to our Natural Phonetics conventions).



true, in any /hV/ sequence, /h/ is realized as a voiceless (non-intense, or ‘non-syllabic’, $[\text{C}]$) contoid, perfectly corresponding to the vocoid that follows /h/, $[\text{V}]$. These are all *canIPA* conventions that go far beyond poor *offIPA*.

This distinction between contoids and vocoids is fundamental, so the ‘proper’ *canIPA* transcription of the above examples would, then, be: $[\text{hii}], [\text{h}], [\text{æ}], [\text{e}], [\text{ɔ}], [\text{uu}], [\text{ə}], [\text{ɪ}]$ (or perhaps, by convention, $[\text{V}]: [\text{hii}], [\text{h}], [\text{æ}], [\text{e}], [\text{ɔ}], [\text{uu}], [\text{ə}], [\text{ɪ}]$). And so on, for any further vocoids (and in any other languages). But it is perfectly clear that a notation like [h] is not only sufficient, but also remarkably simpler. In fact, otherwise, we should have further systematic symbols even for /hC/ sequences, like Burmese /hm, hn, hp, hŋ, hw, hl/ [hm, hn, hp, hŋ, hw, hl], ie $[\text{hm}], [\text{hn}], [\text{hp}], [\text{hŋ}], [\text{hw}], [\text{hl}]$.

10.9.16. Furthermore, many languages have phonemic sequences like /Ch/, or at least phonetic ones, [Ch]. Let us see a few (international-English) examples: $[\text{phli:z}]$ *please*, $[\text{khju:u}]$ *crue*, $[\text{thwa:es}]$ *twice*, which should be rendered as: $[\text{p}^{\text{h}}\text{li:z}], [\text{k}^{\text{h}}\text{ju:u}], [\text{t}^{\text{h}}\text{wa:es}]$ (and other more cumbersome combinations). Thus, it is very clear that the notation with [h] is the more convenient (and even *natural*) one: [hV, hC, Ch]. This is a serious problem only for talking machines, not for human speakers (and hearers).

In German, ‘aspiration’ is generally stronger than in English, cf: $[\text{ph}^{\text{h}}\text{lat}]$ ($[\text{p}^{\text{h}}\text{lat}]$) *Platz*, as compared with $[\text{phlæn}]$ $[\text{p}^{\text{h}}\text{læn}]$ *plan*. This can be indicated –and even more clearly, indeed– while keeping the [h]-notation, as we have just seen. In Danish, an even stronger ‘aspiration’ occurs for /tʰ/, which shows its strength changing a stop into a stop-strictive: $[\text{t}^{\text{h}}\text{h}]$.

10.9.17. In Mandarin Chinese, ‘aspiration’ is distinctive and still somehow stronger. In fact, according to stress, we find, for instance: /ph/ $[\text{p}^{\text{h}}, \text{ph}, \text{ɔp}]$; while the ‘un-aspirated’ counterpart is: /p/ $[\text{p}, \text{b}, \text{ɔb}]$, and so on. As can be seen, we have /ph/ $[\text{p}^{\text{h}}]$ (a sequence of a stop and a true constrictive laryngeal contoid), while, in completely unstressed syllables, we find $[\text{ɔph}]$ $[\text{p}]$, ie a non-aspirated taxophone for an ‘aspirated’ phoneme.

Other languages, mostly Indian ones, such as Hindi, can oppose voiceless /Ch/ sequences to voiced ones: $[\text{C}^{\text{h}}, \text{C}^{\text{h}}]$. On the other hand, in Mandarin Chinese, the ‘aspirate’ /h/ has three different ‘normal’ voiceless taxophones: $[\text{h}^{\text{h}}, \text{h}^{\text{h}}, \text{h}^{\text{h}}]$ (respectively: uvular semiconstrictive, uvular approximant, and velar approximant). In Korean, both /h/ and /Ch/ have $[\text{h}] + [\text{i}, \text{j}], [\text{h}] + [\text{u}, \text{w}], [\text{h}] + [\text{w}]$. Guarani has tautosyllabic /Vh/ sequences as $[\text{ih}], [\text{uh}], [\text{uh}]$.

10.9.18. Even without having to invent all possible (‘un-diacritical’) symbols for the assimilatory taxophones seen above (and their possible extensions), *canIPA* has a number of phones and symbols to adequately account both for coarticulation *assimilation* and for gradation *tension*.

In fact, not only the ‘aspirate’ /h/, but also ‘aspirated’ consonants (such as /kh, tʰh, sh/) can vary, first of all, because of differences in their tension. Thus, any /h/ (alone or in combinations) can range from true *constrictives* $[\text{h}, \text{h}]$ (and semi-

An intermediate lip position for some grooved contoids: half-protrusion

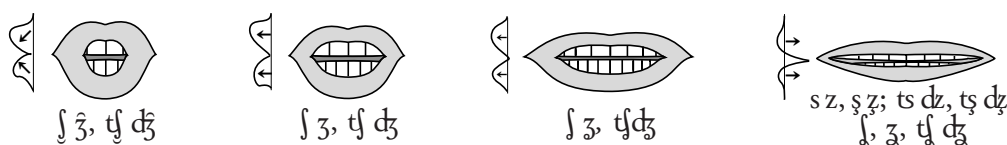
10.9.21. Sometimes, it might be important, or even necessary, to distinguish not only between protruded and non-protruded (or spread) lip positions for some grooved stop-strictives or constrictives. In fact, in addition to the over-rounded lip position, also a half-protruded position is possible (and recognizable, too, in spite of complex coarticulation adjustments, due to rounded or spread vocoids that may occur in contact with these contoids).

They can be seen in fig 10.4.2 and fig 10.5.3, by a lucky chance lined up, set by set, for a more useful comparison: 47-51-55-59, 46-50-54-58, 45-49-53-57, 44-48-52-56, and: 81-85-89-93, 80-84-88-92, 79-83-87-91, 78-82-86-90.

Thus, fig 10.9.18 shows these four lip positions, which are the only articulatory difference between the diphonic pairs that we show, here, through their appropriate symbols: [t̥, d̥; t̥, d̥; t̥, d̥; t̥, d̥], [t̥, d̥; t̥, d̥; t̥, d̥; t̥, d̥], [t̥, d̥; t̥, d̥; t̥, d̥; t̥, d̥], [t̥, d̥; t̥, d̥; t̥, d̥; t̥, d̥] & [ʃ, ʒ; ʃ, ʒ; ʃ, ʒ; ʃ, ʒ], [ʃ, ʒ; ʃ, ʒ; ʃ, ʒ; ʃ, ʒ], [ʃ, ʒ; ʃ, ʒ; ʃ, ʒ; ʃ, ʒ].

Of course, the same is true—at least for three positions—of the stop-semi-strictive and semi-constrictive contoids (not shown in fig 10.4.6 and fig 10.5.5): [t̥, d̥; t̥, d̥; t̥, d̥; t̥, d̥], [ʃ, ʒ; ʃ, ʒ; ʃ, ʒ; ʃ, ʒ]. Let us also note that only some among the most frequent symbols are indicated below the labiograms in fig 10.9.18. Arguably, further contoids are possible, as well.

fig 10.9.18. Comparison between four important lip positions.



A couple of semiconstrictive laterals (& an alveolar semi-uni-lateral)

10.9.22. As we know, constrictive laterals, like [ɭ, ɭ], can be used even as phonemes, for instance in Zulu and (only the voiceless one) in Welsh. They are also frequently used as a well-known speech defect, for /s, z/ (and, sometimes, for /ʃ, ʒ/, and possible connected stop-strictives). They are generally realized as alveolar and palatal, [ɭ, ɭ], [ɭ, ɭ]. Sometimes, the defect is milder, perhaps, in an attempt to solve the problem and avoid the broader realizations, by trying to form the necessary groove on the lamina. In fact, we can hear semiconstrictive contoids: [ɭ, ɭ], [ɭ, ɭ] (cf fig 10.9.10-12). For instance, *Miss* ['mɪɭ], *cash* ['kʰæɭ]; Italian *passo* ['paɭlo], *pesce* ['peɭʃe]. An alveolar voiced semi-uni-lateral can also be found, [ɭ].



11. Phonic peculiarities

Intense (or ‘syllabic’) contoids

11.1. Particularly nasal, lateral, and trill contoids (but others, too) can often become *intense* (which does not mean ‘double, long’). They are articulated with relatively greater muscular tension, articulatory energy, and expiratory pressure. This kind of intensity is denoted by placing a short vertical stroke below the symbol (or above, if there is little space below).

Such intense contoids can become nuclei for syllables in appropriate contexts – namely close to, or between, less perceptible contoids (according to the scale of syllabicity). After vocoids, instead, they do not form another syllable in any way (unless there is an increase in their stress prominence, as can happen with vocoids).

Traditionally, though, these (more) intense contoids –for want of a better term– are defined as ‘syllabic’ (even when they are not syllabic nuclei), just to emphasize that they are different from normal –or ‘non-syllabic’– contoids.

We will now consider several examples. In (British & American) neutral English: *suddenly* [ˈsʌdn̩li, ˈsʌ-], *dictionary* [ˈdɪkʃn̩əri, -ən̩eɪi, -n̩eɪi]), *from there* [fɹɒmˈðɛːz, fɹɒmˈðɛːɹ̩], *compel* [kəmˈpʰɛt̩, kəm-], *I can go* [aɪkənˈgɔːo, -oːo], *rifle* [ˈɹaəf̩l̩, ɹ-], *till then* [tɪl̩ˈðɛn̩, tɪl̩-], *temporary* [ˈtɛmp̩ɹ̩j̩, -p̩ɹ̩j̩, ˈtɛmp̩ɹ̩eɪi, -p̩ɹ̩eɪi], *literal* [ˈlɪt̩əl̩, ˈlɪt̩ɪl̩, ˈlɪəɪl̩, ˈlɪɹ̩l̩].

And: *that was me* [ˈðæp wəzˈmɛɹ̩i], *a cup of tea* [wɪkʰɛp ɹ̩ˈtɪhri, -ʌp]; German: *kommen* [ˈkʰɔmm̩], *reisen* [ˈɾaezn̩], *fliegen* [ˈfliːg̩h̩], *Esel* [ˈʔeːzl̩], *Mutter* [ˈmʊt̩ɾ̩]; Czech: *osm* [ˈʔɔsm̩, -sum], *vlk* [ˈvɛlk̩], *prst* [ˈpɹst̩]; Dutch: *zonder* [ˈzond̩ɤ, -d̩ɤ]; Mandarin Chinese: *shí/shǐ* [ˈʃ̩ʈ̩] (less frequent a variant than [ˈʃ̩ʈ̩]); Japanese: *gen'an* [ˌgɛn̩ˈɐ̃n̩].

It is possible, and more advisable, to use intense consonants in phonemic transcriptions as well. Among other reasons, they are more clear, and less ambiguous, than transcriptions such as [ˈsʌdn̩, ˈlɪtl̩], to indicate [ˈsʌdn̩, ˈlɪt̩l̩, -ɹ̩] *sudden, little*.

Coarticulation

11.2. The ‘speech chain’, or in other words, actual speech, ie spoken language, is not constituted by disconnected single phones, as might be deduced from seeing the individual symbols making up a sentence or a rhythm group. To be true, there is no interruption or pause even between words, although they are separated by spaces in writing (and in old-style phonemic/phonetic transcriptions).

While speaking, the articulatory organs are continually in movement, and they pass from one position to another. As it happens, there are never *positions*, or *moments* when the articulators are entirely static – this can be seen in x-ray films as well. Even during the articulation of long phones, there are differences in the posi-

tioning of the articulators, in muscular tension, and in direction, so that movement is present here, as well.

The movement from one sound to another is by the shortest path, dulling a bit the characteristics of the two sounds which are most in contrast with each other. Moreover, in part for reasons of inertia and elasticity, the characteristics of the preceding phone are preserved. At the same time, for reasons of adaptation, the characteristics of the following phone are anticipated. This important cohesion between the different elements, in fact, constantly delays and anticipates information regarding the structure of the phones surrounding each other phone in the speech chain. This phenomenon, which (at the beginning) is not immediately obvious, is called COARTICULATION.

The articulatory movements necessary to produce a particular phone in isolation can be considered a *target* to be reached. In the speech chain, the different targets follow one another. The targets exert influences on each other, according to the speed and length of the utterance, as well as the characteristics of each single target. In fact, the more the targets are different and independent from each other, the more the articulators are, on the one hand, free to move on their own, and on the other, required to take up positions not unduly distant from each other.

Modifications

11.3. In order to articulate *p*, *b*, *m*, for example, the tongue has no precise role. It is therefore free to move into position for any phone which follows, such as for example [pr, pɾ, pɹ, pɿ, pʁ, pʁ̥, pʁ̥̥, pl, pj, pw, pi, pa, pu]. In fact, each one of these [p]'s, strictly speaking, could be shown (although –definitely– not in transcriptions for descriptive and teaching purposes) with a *subscript*: [p_r, p_ɾ, p_ɹ, p_ɿ, p_ʁ, p_{ʁ̥}, p_{ʁ̥̥}, p_l, p_j, p_w, p_i, p_a, p_u] (fig 11.1 gives several frequent coarticulations).

In the same way, the lips have no specific role in most contoids. Therefore, they can freely move into the position for the lip shape of the following vocoids, such as *rounded* or *spread*: [bu, ba, bi; su, sa, si; nu, na, ni; lu, la, li; ku, ka, ki]. Here, as well, we show the labial coarticulation anticipating the following phones through subscripts, in order to focus attention on the phenomenon: [b_u, b_a, b_i; s_u, s_a, s_i; n_u, n_a, n_i; l_u, l_a, l_i; k_u, k_a, k_i].

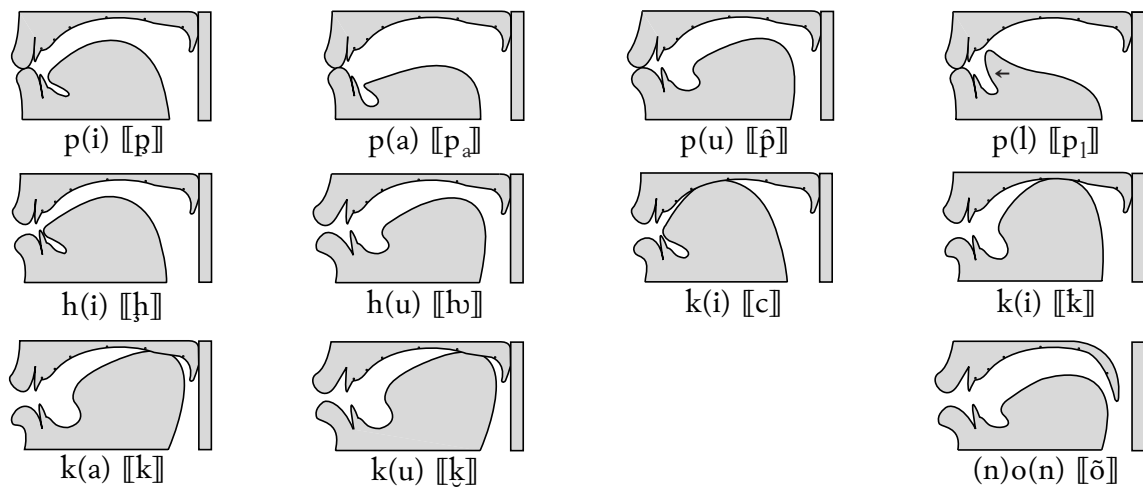
Clearly, the subscript [u] refers, by anticipation, both to lip rounding and to lifting the back of the tongue towards the velum (or soft palate), to a greater or lesser degree according to the level of independence of the articulators involved. By the same token, [i] refers to spreading of the lips and the corners of the mouth, and to lifting the back of the tongue towards the (hard) palate. The subscript [a] has a coarticulatory component as well, which consists in a neutral lip position (neither rounded, nor spread) and in a much greater opening of the jaw than what takes place in [i] or in [u]. It has neither the front or back tongue movement of these last two, given that it is low central.

In the case of [h], which is laryngeal, the coarticulatory possibilities are even more abundant and common, because the tongue and the lips are both completely independent of the articulation. In fact, in sequences of the form [hV], we ac-

tually have $[\text{YV}]$, where the first symbol placed in *superscript* stands for a plain ‘non-syllabic’ and voiceless vocoid, corresponding in position to the (voiced) vocoid which follows. Thus, the tongue and the lips have the same position, while the articulation is that of a contoid, since it is less static than that of a vocoid. This is the same relationship we encounter between $[\text{i}, \text{u}]$ and $[\text{j}, \text{w}]$ (approximants) or better yet, $[\text{j}, \text{ɰ}]$ (semiapproximants) seen in fig 5.1.

Therefore, we have: $[\text{hi}, \text{he}, \text{hɛ}, \text{ha}, \text{hɔ}, \text{ho}, \text{hu}]$ $[\text{h}_i\text{i}, \text{h}_e\text{e}, \text{h}_\varepsilon\text{ɛ}, \text{h}_a\text{a}, \text{h}_\text{ɔ}\text{ɔ}, \text{h}_o\text{o}, \text{h}_u\text{u}]$, and similarly: $[\text{hæ}, \text{hɒ}, \text{hə}; \text{hm}, \text{hɪ}, \text{hr}, \text{hl}]$ $[\text{h}_\text{æ}\text{æ}, \text{h}_\text{ɒ}\text{ɒ}, \text{h}_\text{ə}\text{ə}; \text{h}_m\text{m}, \text{h}_\text{ɪ}\text{ɪ}, \text{h}_r\text{r}, \text{h}_l\text{l}]$. The same goes, often, for $[\text{Vh}]$ – it corresponds to $[\text{VY}]$: $[\text{ih}, \text{eh}, \text{ɛh}, \text{ah}, \text{ɔh}, \text{oh}, \text{uh}]$ $[\text{i}_h\text{i}, \text{e}_h\text{e}, \text{ɛ}_h\text{ɛ}, \text{a}_h\text{a}, \text{ɔ}_h\text{ɔ}, \text{o}_h\text{o}, \text{u}_h\text{u}]$...

fig 11.1. Automatic coarticulations, which are more or less marked according to languages.



In conclusion, the lips are always subject to coarticulation, within a syllable. Therefore, in words like the following we will actually have almost (with ^a = *American*, and ^b = *British* neutral accents) *whole/hole* $[\text{h}_o\text{ɔ}^\text{a}\text{ɔ}^\text{b}, \text{h}_o\text{ɔ}^\text{a}\text{ɔ}^\text{b}]$, *holy* $[\text{h}_3\text{ɔ}^\text{a}\text{li}^\text{b}, \text{h}_3\text{ɔ}^\text{a}\text{li}^\text{a}]$, *wholly* $[\text{h}_3\text{ɔ}^\text{a}\text{li}^\text{b}, \text{h}_3\text{ɔ}^\text{a}\text{li}^\text{a}]$, *follow* $[\text{f}_\text{ɔ}\text{ɔ}^\text{b}\text{-}3\text{ɔ}^\text{b}, \text{f}_\text{ɔ}\text{ɔ}^\text{a}\text{-}3\text{ɔ}^\text{a}]$, *fall* $[\text{f}_\text{ɔ}\text{ɔ}^\text{b}, \text{f}_\text{ɔ}\text{ɔ}^\text{a}]$, *law* $[\text{l}_\text{ɔ}^\text{b}, \text{l}_\text{ɔ}^\text{a}]$.

$[\text{ɔ}]$, which has intrinsic lip protrusion (being *protruded*), naturally has less protrusion before $[\text{i}, \text{ɪ}, \text{e}, \text{æ}, \text{ɐ}/\text{ʌ}, \text{ɜ}, \text{ɛɪ}, \text{aə}, \text{aɒ}, \text{ə}, \text{ɜ}^\text{ɪ}]$. Instead, when preceding $[\text{ɰu}/\text{ɰu}, \text{ɰ}, \text{ɜ}^\text{ɜ}, \text{ɰ}, \text{ɜ}, \text{ɜ}^\text{ɜ}]$, there is a bit more protrusion, even though it does not reach the point of $[\text{ɔ}]$; just as before non-rounded V it does not become $[\text{ɔ}]$.

In the case of consonant articulations which are simply *bilabialized*, with bilabialization (not rounding, nor protrusion), there is a similar, but less obvious mechanism. In fact, in the case of Japanese, $[\text{s}]$ followed by $[\text{i}, \text{jV}]$ is pronounced as $[\text{ɕ}], [\text{ɕi}, \text{ɕjV}]$, not $[\text{ɕi}, \text{ɕjV}]$, since the lips are not spread, with the corners of the mouth pulled back (as happens with Slavonic languages), but are rather neutral, for reasons of coarticulatory compensation and adjustment.

In any case, if these coarticulations are automatic, they should normally not be marked except in points where they are explained while describing systematically the phonic structure of a language. Therefore, coarticulation is not marked in front of rounded V, unless it is of a stronger or additional level. A case of this sort oc-

curs in Mandarin Chinese, in the case of *mǒ* [ʈṃṣṳ], but not in *mǔ* [mṳṳ] (cf English *more* [ˈmɔː/ˈmɔːɹ], *moo* [ˈmʊu/ˈmʊu]).

11.4. Given that, as we have indicated, these phenomena are automatic, once they have been fully understood, it is better not to mark them in any way – neither with superscripts, nor with diacritics. It would rather be important to mark the contrary, that is when the coarticulation does *not* occur, even when the elements which normally cause it are present; or instead, if the coarticulation should reach *excessive* levels.

When [k] is followed by [j, i, ɪ, ʊ], it is not articulated as a velar, but rather as a *prevelar*, as in *queue*, *sticky*, *key*, *kit* [ˈkhjʊu/-ʊ, ˈʃtʰki, ˈkhrɪ, ˈkhtʰ]. This is also true in the case of checked (especially final) syllables, when preceded by [ɪ, ʊ]: *antique*, *tick* [æntʰhɪk, ˈtʰk]. However, given that this fact is predictable and automatic, there is no real need to use a special symbol (which would be [k̟]).

On the other hand, if one should actually hear (or produce) a sequence of a true velar stop and a high front vocoid, [ki], it is quite likely that we have a realization of [q], fronted due to coarticulation. In such cases, the sequence can therefore be transcribed without problems as [qi]. This is a practical solution, because there are a great number of nuances involved in the fronting of [q, k] followed by phones which are progressively fronter and higher. Three symbols ([q, k, k̟]) would be insufficient to be fully accurate regarding phenomena which, in any case, do not require undue attention (once their frequency and normality have been understood adequately). It is only appropriate to be particularly rigorous on this point in the preliminary phase of analyzing a new (oral) text, in an unknown language. On the other hand, if the stop is articulated in a fronter (palatal or postpalatal) place in front of [i], then this fact should be indicated in the transcription: [ci, ci], even if there is no phonemic relevance or importance.

Along the same lines, if the stop is (post)palatal in final position: [c, ɕ], instead of velar: [k], then this fact should be marked. This is in fact less ‘normal’ and less predictable, respect to most languages, as a realization of the velar stop (even though in French, Swedish, and Persian –for instance– we do have palatals (or postpalatals) in this context: French *flic* [flic], *mec* [ˈmɛc], *qui* [ˈci], *quai* [ˈce; ˈcɛ]; Swedish *bruk* [ˈbrʉyc]; Persian *yak* [jɒc]).

Variations

11.5. A good transcription will not note explicitly anything which is normal (and inevitable), just as it does not, in fact, mark the normal levels of stress (ie weak), of tone (ie middle), and of length (ie short). Instead, it will show all of the other, less universal characteristics, even if a large number of languages is in agreement on particular matters. Phonetic transcriptions, in order to be useful, should represent the differences of sound belonging to different phones, even if these are similar and near, and not actually distinctive, phonemic.

From a phonetic point of view, even small nuances which are perceptible, per-

haps mostly unconsciously, are important for good descriptions and for teaching and learning good pronunciation. These nuances include many of those elements which determine the nature of a regional or foreign accent. Therefore, all taxo-phonetic (ie combinatory allophonic) differences, which occur in practice, and are not automatic and predictable for *non-native* speakers, should be transcribed.

Let us consider some examples: English: *dried* ['dɹaɪəd] (British), *width* ['wɪdθ], *has to* ['hæsɪ], *has she* ['hæʒi, -ʃi]; Italian: *banco* ['banːko], *lancio* ['lanːtʃo], *un pane* [umˈpane], *gonfio* ['gomːfjo].

Contoids with particular offsets

11.6. The production of phones occurs in three concatenated phases: the onset, the hold, and the offset (these concepts could even be indicated by more complex terminology as well, although this would be decidedly less useful). The *onset* is naturally the start of the phone. It forms the prelude to the *hold*, the central and usually most characteristic phase. From here, we have the *offset*, which moves into the production of another phone, with its own three phases.

The *OFFSET* of a contoid can occur without being audible. In fact, if phonation ends after the *HOLD*, the offset ends up coinciding with the silence of a pause. By the same token, if during the hold of a contoid, the organs move into position directly for the next contoid, the articulation passes from one hold to another, while leaving out the interruption due to the offset of the first contoid and the onset of the second. This phenomenon is particularly evident when the contoids are stops – in fact, the first of the two stops then has an incomplete (and silent) offset. To consider the point, fig 11.2 could be useful; there the phenomenon is shown applied to the English sequences [pɪ, kɪ], where there is an intermediate phase with an articulation with two occlusions.

Geminate articulations ('doubled' consonant) are of this type, and are also homorganic – they have the same place and manner of articulation, and the same phonation type, as well. Therefore, geminate consonants are realized as geminate contoids without an offset (whether articulatory or auditory). To be rigorous, these articulations could be shown with the diacritic [ː], as in: *bookcase* ['bʊkːkheɪs], *big girl* ['bɪgːgɜːl, 'gɜːl, 'gɜːl]; and in taxo-phonetic geminates as well: *good girl* ['gʊdːgɜːl, 'gɜːl, 'gɜːl]. In Italian we have: *ecco* 'here/there' ['ekːko], *fatto* 'done/made' ['fatːto], *carro* 'cart' ['karːro], which are different from *eco* 'echo' [ɛko], *fato* 'fate' [fatto], *caro* 'dear/expensive' [karo].

In any case, in English (and in other languages) we have *unexploded* stops (ie with *inaudible release*) even when followed by a stop of another place of articulation: *walked* ['wɔːkɪ, 'wɔːkɪ], *robbed* ['rɒbɪd, 'rɒbɪd]. In English, normally, stops are unexploded in final position as well (except in cases of precision or emphasis): *rob* ['rɒb, 'rɒb], *Bob Dylan* ['bɒb, 'dɪl-ən, ['bɒb].

The same is true of stopstrictives in Italian, as well: *faccia* ['fatʃːtʃa], *mezzo* ['mɛdzːdzo] (cf § 9.15). However, in English things are different. In fact, there stopstrictives are always exploded (also because they are in combinations and always

belong to different lexemes): *Dutch cheese* [ˈdʌtʃ* ˈtʃɦrɪz, ˈdʌtʃ*], *judge Jones* [ˈdʒɛdʒ* ˈdʒɔːnz, ˈdʒʌdʒ* ˈdʒɔːnz], *a large channel* [əˈlɑːdʒ* ˈtʃhænɪ, əˈlɑːdʒ*]; finally, *switched* [ˈswɪtʃ*ɪ], *judged* [ˈdʒɛdʒ*ɪ, ˈdʒʌ-].

With other geminate contoids, even continuous ones, the situation remains the same, too. In fact, in completely rigorous transcriptions all of the Italian geminates would be marked with the diacritic showing lack of explosion: *sanno* [ˈsanːno], *ballo* [ˈbalːlo], *passo* [ˈpasːso]; including cases like the borrowing from English *status symbol* [ˈstɑːtʌsː ˈsɪmːbɒl], which would sound quite strange if pronounced [ˈstɑːtʌs* ˈsɪmːbɒl] (with offset between the two [s]’s).

In Korean, the final contoids of words have inaudible offsets, since phonation ends before releasing the hold phase, and expiratory air is blocked during the articulation: *nat* [ˈnat̚] (which is also the pronunciation of *nath*, *nas*, *nac*, *nach*, words of different meaning, and distinguished in the morphonological orthography, in spite of their actual phonemic neutralization). Instead, in Vietnamese and other oriental languages, final [p̚, t̚, k̚, t͡ʃ̚] &c are maintained different, although they are unexploded.

fig 11.2. Unexploded stops in sequences, with juxtaposition of the articulations.



11.7. An interesting case occurs when a stop is followed by a nasal or lateral contoid, especially when the combination is homorganic. In fact, without releasing the contact between the articulators, a *nasal* or *lateral explosion*, respectively, is produced (cf fig 11.3).

In a NASAL EXPLOSION, the velum is simply lowered while maintaining the occlusion in the mouth. The result is a nasal contoid, whether a normal one or an intense one, as in: *cotton* [ˈkʰɒt̚ŋ, ˈkʰaɪ̯ŋ, ˈkʰaʔ̚ŋ], *beatnik* [ˈbiːt̚nɪk̚]; in German: *sieben* [ˈziːb̚m̩], *bitten* [ˈbɪt̚n̩], *sagen* [ˈzaːɡ̚ŋ]; in Italian: *etnico* [et̚ˈnɪko]. There should be no break in the contact between the tongue and the palatal vault (or between the lips).

In a LATERAL EXPLOSION, the tongue passes from the position of the stop to that of the lateral contoid by simply contracting the tongue body. In this way, expiratory air is allowed to pass along the sides of the tongue, producing a lateral, all without breaking the contact with the middle part of the tongue (in our examples, the tip of the tongue is against the alveolar ridge or the upper teeth): *little* [ˈlɪt̚l̩, ˈlɪɹ̩], *lately* [ˈleɪt̚li], *medal* [ˈmed̚t̩]; German: *Mantel* [ˈmant̩]; Italian: *atlante* [at̩ˈlanːte].

It is not indispensable to mark *nasal* or *lateral* explosion with the diacritic shown. It is enough to know exactly how and when it happens, and to learn and be able to teach the correct pronunciation. It would be more useful to mark cases where the transition might not be so (immediate) and direct, thus creating a true separation between the elements. In this case, the phenomenon will be denoted

generically by [C_{*}] (ie *open transition*), or with more details, according to the possibilities, with [Cə, Cə, Cə, Ch, Ch, Cφ]...

For example, in *non-neutral* Italian pronunciation, instead of [lɔpsikɔːlogo, 'subːdolɔ, op'tsjɔːne, 'tekːniko, seg'menːto], *lo psicologo, subdolo, opzione, tecnico, segmento*, we can find sequences with heterosyllabic stops with audible explosions: [lɔpːsɪkɔːlogo, 'subːdolɔ, opːtsjɔːne, 'tekːniko, segːmenːto], with [Cə].

While in *regional* pronunciations, there can be full actual vocoids: [lɔpəssikɔːlogo, 'subːbədɔːlɔ, ɔppətsjɔːnɛ, 'tekːkənɪko, seggə'menːdɔ] (Upper South), [lɔpɪssɪkɔːlɔgɔ, 'subːbɪdɔːlɔ, ɔppɪtsjɔːnɛ, 'tekːkɪnɪko, segːgɪ'menːtɔ] (Lower South), [lɔppɪssɪkɔːlɔggo, 'subːbuddɔːlɔ, ɔppɔtsiːɔːnɛ, 'tekːɪnnɪko, seggɛ'mɛnto] (Sardinia).

Or they can be assimilated: [lɔssikɔːlogo, 'sudːdolɔ, ɔtsjɔːne, 'tɛnːniko, sem'menːtɔ] (Center). The same happens, in a typical Italian pronunciation of English, to forms such as: *cab, good, look, rubbed, offset, with me* ['kɛbː, 'gudː, 'lukː, 'rabːdː, 'ɔfːsɛtː, wɪðːmi], instead of ['kʰæbː, 'gʊdː, 'lʊkː, 'rʌbːdː, 'ɔfːsɛtː, wɪðːmi].

fig 11.3. Lateral and nasal explosions (respectively on the left/right).



Prenasalization

11.8. Certain languages, particularly in Africa, use contoids (and consonant phonemes) whose manner of articulation is modified by a particular type (of articulation): [ːb, ːd, ːg, ːdʒ, ːz, ːj, ːr, ːɹ]. We have here single segments, which, even when occurring between two syllabic nuclei, belong entirely to a single one of the two syllables (usually beginning the second). Their length is comparable to that of other common segments (or only slightly longer).

Their articulation (cf fig 11.14) is characterized by the lowering of the velum during the onset, and possibly even during the first part of the hold (the different possibilities give impressions of more or less nasality). During the second part of the hold and the offset, instead, the velum is raised, thus excluding resonance from the nasal cavity. The second phase has therefore the articulation and timbre of the basic contoid in question.

Generally, prenasalized contoids are voiced, and –most commonly– stops; but also stopstrictives, constrictives, and approximants (without excluding other man-

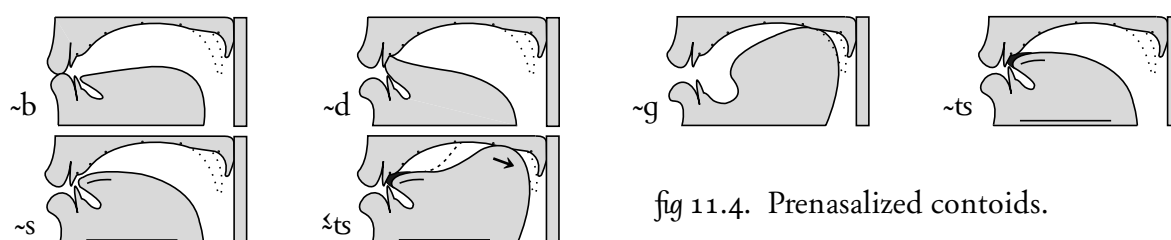


fig 11.4. Prenasalized contoids.

ners, such as trills and taps). Examples from Swahili: *nenda* [ˈnɛ̃ːɖa], *mwenzi* [ˈmʊɛ̃ːzi], *mbuzi* [ˈbuːzi], *mvinyo* [ˈviːɲɔ], *njia* [ˈɖʒia], *ngoma* [ˈɡɔ̃ːma].

‘Aspiration’ (cf § 10.13, as well)

11.9. Many languages use ‘aspirated’ contoids in ways which are, to a greater or lesser extent, distinctive. In other words, sometimes the aspiration is the only feature (and is therefore essential, ie phonemic), at other times it works together with others (then it is redundant, ie phonetic); cf fig 11.5. More commonly stops, but also stopstrictives and constrictives, can involve various levels of ‘aspiration’. The aspiration can, in fact, be sometimes more audible, and sometimes less. The normal level consists of a voiceless phone followed by the voiceless lenis laryngeal approximant: [ph, kh, tʃh, sh] (this last, naturally, has nothing to do with the English digraph *sh*, which represents /ʃ/ [ʃ]; just as the first sequence, [ph], is not related to *ph* /f/ [f]; the same is true of *th* /θ, ð/ [θ, ð]).

If ‘aspiration’ is more strongly audible, it typically involves sequences with a voiceless laryngeal *constrictive* as a second element, [pʰ], or possibly a *non-laryngeal approximant*, such as [pʰ, pʰ̥]... (all of the possibilities should be analyzed, listening carefully). If followed by front vocoids (or velar rounded ones), this stronger ‘aspiration’ can consist in the voiceless palatal or velar rounded approximants, respectively: [pʰ, pʰ̥]. With a voiced (or intermediate) phone, ‘aspiration’ generally involves the voiced (lenis) laryngeal approximant: [bʱ, bʱ̥].

‘Aspiration’ can be phonetic, as in English: *pin* /ˈpɪn/ [ˈpʰɪn:], and German: *zehn* /ˈtseːn/ [ˈtʰseːn]; or it can be phonological, as in (Mandarin) Chinese: *cā* /ˈtʃa/ [ˈtʰʃa] ‘to rub’ (cf *zā* /ˈtsa/ [ˈtʰsa] ‘to tie’), Hindi: *pañkh* /ˈpɛ̃kh/ [ˈpʰɛ̃kh] ‘wing’ (cf *pañk* /ˈpɛ̃k/ [ˈpɛ̃k] ‘mud’), *ghaal* /ˈgʱaal/ [ˈgʱaal] ‘confusion’ (cf *gaal* /ˈgaal/ [ˈgaal] ‘cheek’).












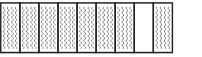
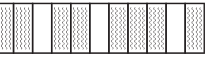


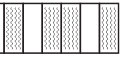














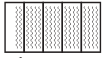

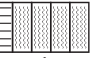
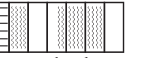


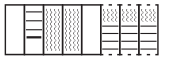
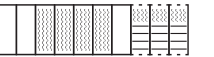


























As can be seen from the transcriptions above, it is appropriate to treat the two types of ‘aspiration’ as sequences, either exclusively phonetic ones, or phonetic and phonemic as well, respectively, composed of [C] + [h] and /C/ + /h/. This is the reason why we have put the term ‘aspiration’ in quotation marks, since, logically, it is not different in any way from other consonant sequences such as: [C] + [j, w, l] or /C/ + /j, w, l/...








We have already eliminated the useless formalistic complication of VOT. Similarly, ‘preaspiration’ is simply the preceding sequence, taken in backwards order. It occurs in some languages, including Icelandic: *petta* [ˈθɛhta], *takk* [ˈtʰahk] (in the last example we have both types of ‘aspiration’ together).




In regional variants of Spanish, we have the improperly so-called ‘aspiration’ of /sC, sʰ/, which we represent here generically as [hC, hʰ] (but for variations, see the part on Spanish in HPr, § 6): *estas casas* /estasˈkasas/ [ɛhtaˈkaˈsah] (cf the neutral pronunciation of Spain [ɛstaˈkaˈsaʃ], or American Spanish [ɛstaˈkaˈsas]).

In § 4.1.7-12, and in fig 4.4, we have seen the positions of the glottis for the different phonation types, including the paraphonic ones. Let us consider now the examples of fig 11.5, using the same icons already shown in fig 4.4. The differences

fig 11.5. Different phonation types exemplified by some languages: American & British *English* (with mediatic British variants); *Italian* (with two regional variants: Naples & Rome); *French*; (Lusitanian) *Portuguese*; *German*; (Mandarin) *Chinese*; *Hindi*; *Japanese*; *Icelandic*; *Burmese*; *Korean*.

 [pʰaə] <i>pie</i>	 [sʰpaə] <i>spy</i>	 [b̥aə] <i>buy</i>	 [b̥iːb̥] <i>bib</i>	 [pʰlɛɪ] <i>play</i>	 [hɛˈdʃɪp] <i>headship</i> ([American & British] English)			
 [ˈækʃɪ, ˈækʃɪ] <i>actor</i>	 [ˈwɪks, ˈwɪks] <i>wicks</i> (British English)				 [ˈɛʔktʃə] <i>actor</i> (mediatic British English)	 [ˈwɪʔks] <i>wicks</i> (mediatic British English)		
 [ˈfaːva] <i>fava</i>	 [unˈɡwanːto] <i>un guanto</i>	 [unˈkanˈtanːte] <i>un cantante</i>	 [ˈsudːɪ, -dːə] <i>sud</i>	 [ˈesːɪ, -tːə] <i>est</i>	 [saˈpete] <i>sapete</i> (Ital.)			
 [ilˈkappɔːto] <i>il cappotto</i>	 [ilˈkʌpˈpɔːto] <i>il cappotto</i> (NA)	 [unˈɡʌnˈdʌnːde] <i>un cantante</i> (NA)	 [sʌˈbɔːɪde] <i>sapete</i> (NA)	 [sʌˈbɛːde] <i>sapete</i> (RM)	(reg.)			
 [pʰjɛ] <i>pied</i>	 [pʰwɔ] <i>poids</i>	 [pʰɥi] <i>puis</i>	 [pʰlɔ] <i>plat</i>	 [pʰœpl] <i>peuple</i>	 [pʰɪsm] <i>prisme</i>	 [ˈkatʃ] <i>quatre</i> (French)	 [ˈaʎtu] <i>alto</i> (Lus. Port.)	
 [pʰaen] <i>Pein</i>	 [b̥aen] <i>Bein</i>	 [ˈliːpʰlɪç] <i>lieblich</i>	 [ʔaːbɪ] <i>aber</i>	 [ʔapˌbɪlt] <i>Abbild</i>	 [b̥ɛɪkˌdɔɪf] <i>Bergdorf</i> (Germ.)			
 [pʰaɛ] <i>pāi</i>	 [pʰaɛˌʃɔʃɔ] <i>pāishǒu</i>	 [tʰɪnˌbuˌtɔtɔ] <i>tīngbudǒng</i>	 [pʰaɛ] <i>bái</i>	 [b̥aɛˌtʃaɪ] <i>báicài</i>	 [pʰaˌbɛ] <i>bàba</i> (Chinese)			
 [kaan] <i>kaan</i>	 [kʰaan] <i>khaan</i>	 [gaan] <i>gaan</i>	 [gʰaan] <i>ghaan</i>	 [ɕːmãẽː] <i>mãẽ?</i> (Hindi)	 [tɕiːtɕi] <i>chichi</i> (Jap.)	 [tʰahk] <i>takk</i> (Icel.)		
 [kʰɛ] <i>khé</i>	 [shuː] <i>shu</i>	 [pʰjiː] <i>phyi</i>	 [hmaː] <i>hma</i>	 [hniː] <i>hníng</i>	 [hn] <i>hlè</i> (Burmese)	 [hlɛː] <i>hlè</i> (Burmese)		
 [pʰul] <i>phur</i>	 [iːpʰul] <i>iphur</i>	 [p̥uː] <i>ppur</i>	 [iːp̥uː] <i>ippur</i>	 [p̥ul] <i>bur</i>	 [iːbul] <i>ibur</i>	 [shal] <i>shal</i>	 [s̥aː] <i>sal</i>	 [jeːsan, -z̥-] <i>yezan</i> (Korean)

between voiceless ([f, s, h] ) and voiced ([v, z, ɦ, m, a] ) phones are fairly evident, even in the case of the voiceless lenis type ([f, ɸ, h, ɸ̥, ḁ] ) or the voiced lenis ([v, z̥, ɦ̥, ḁ] ). We also have the mixed (or ‘intermediate’, [v̥, z̥̥, ɦ̥̥, m̥̥, ḁ̥] ) phonation, which contains a voiceless part at the beginning ([v̥a] ) or in the middle ([ḁv̥a] ) or at the end ([v̥ḁ]

There is, moreover, the glottal stop, by itself ([ʔ] ) , or simultaneously pronounced with a voiceless stop or stopstrictive ([p̚, t̚]). Additionally, we have the creaky type of phonation, frequently used for voiced phones in various Eastern languages, such as Chinese ([m̰, a̰] ) , and falsetto, used at least on entire syllables, as in Hindi ([*ma] ) – cf the relative chapters in *HPr*.



Non-pulmonic consonants

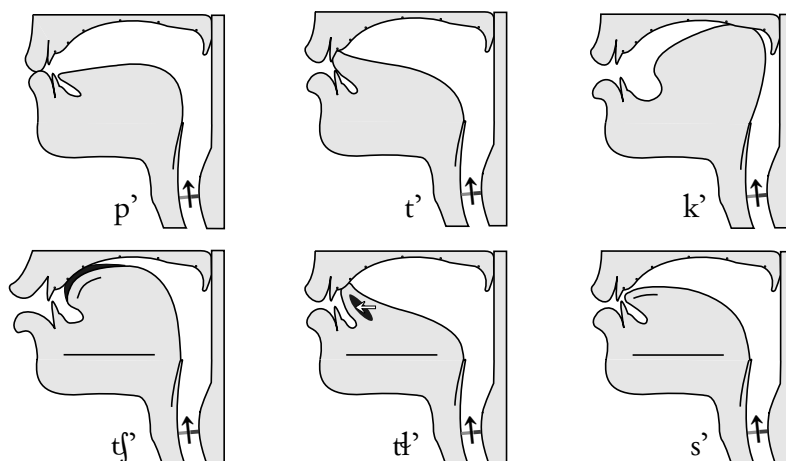
11.10. All of the consonant (and vowel) articulations encountered so far are ‘normal’, in the sense that it is expiratory air (originating in the lungs, and passing through the trachea) which makes them possible. For this reason, they can be called PULMONIC articulations. We will now, instead, see three consonant groups which are produced through the aid of a NON-PULMONIC source of air (even if possibly more limited).

Ejective consonants

11.11. EJECTIVE (sometimes also called ‘egressive’, or ‘explosive’) consonants are the combination of normal consonant articulations with raising of the closed larynx (cf fig 11.16). The existence of this movement can be verified by observing the upward movement of the ‘Adam’s apple’. Besides raising the larynx with the glottis closed, the degree of jaw opening is diminished too, as the lower jaw is raised.

All of these actions compress the air contained between the closed larynx and the point of the mouth where the occlusion or constriction occurs. For this reason, the offset of the contoid is accompanied and characterized by a fairly brusque and perceptible explosion. The glottis is then immediately opened, and the articulation moves on the next phone or to a pause.

fig 11.6.
Ejective
contoids.



The more extensive and energetic the movements of the larynx, the lower jaw, and the tongue are, the more perceptible will be the characteristic explosion (and vice versa). Generally, ejective contoids are voiceless, and more often they are stops or stopstrictives, although they can be ordinary constrictives, as well. (If they are ‘voiced’, they are almost always devoiced stops.) They are especially used distinctively, as phonemes, in African, Asian, and American languages. They are denoted by an apostrophe placed after the symbol in question: [p', t', tʃ', s'].

Here are some examples – Hausa: *kasà* /k'a.sa/ [k'ɛ.sa], *tsahì* /s'a.hi/ [s'ɛ.hi, 'ts'ɛ-] (stress is marked only in phonetic transcriptions, since this is a language with ton[em]es, in which the phonetic stress is generally on syllables with non-low tonemes); Quechua: *k'asa* /k'asa/ [k'a.sa]; Georgian: *q'op* /q'op/ [q'ɔp].

Injective consonants

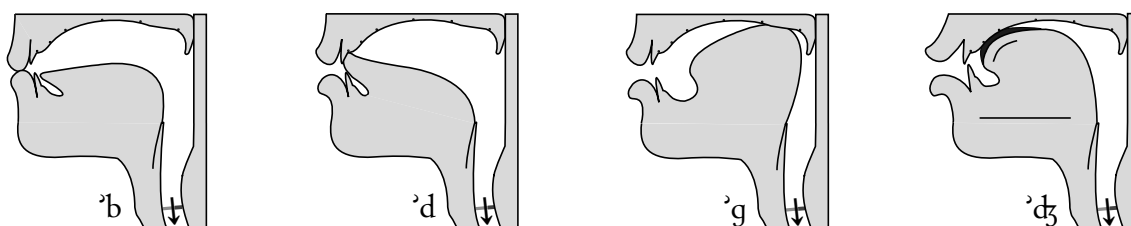
11.12. INJECTIVE (also called ‘ingressive’, or ‘implosive’) consonants are the combination of normal consonant articulations with the lowering of the larynx. The larynx is closed, but less tightly than in the case of ejective consonants (cf fig 11.7). With respect to the ejectives, there is also a corresponding difference in the direction of the movement of the ‘Adam’s apple’, since the larynx is lowered, as is the lower jaw. Due to these actions, the air contained in the oral cavity becomes rarefied.

Consequently, during the offset of the contoid, a certain amount of external air enters, for an instant, into the mouth. The result is an implosion, and thereby an attenuation of energy, compared with normal phones. The auditory effect is opposite to that of ejective contoids. Injectives are mainly stops and stopstrictives.

In the various languages which use them distinctively (ie African, Asian, Oceanic, and American) the voiced ones are more common. In voiced injectives, voicing is produced because while the larynx is lowered, the glottis (the space between the vocal folds) is not tightly closed, and so the vocal folds can vibrate. We denote injectives by preceding the symbols by a (vertically) *flipped* apostrophe: [b', d', g', dʒ']. In fact, we have here (as with the ejectives) an additional mechanism which occurs in combination with normal articulations. If the vocal folds vibrate only during the offset of the phone, the voicing is not complete, but rather only partial: [b̥', d̥', g̥', dʒ̥'].

The official IPA notation uses, instead, rather special symbols: ‘[ɓ, ɗ, ɠ, ɟ]’, derived from a phonetically-based alphabet which was devised intentionally to write

fig 11.7. Injective contoids.



African languages which lacked a preceding writing tradition. However, this alphabet was never fully used, and in any case was restricted to certain particular languages. For these reasons, people have often thought it more ‘practical’ to return to the normal letters of the traditional Latin alphabet, with diacritics and digrams added when necessary.

Some examples – Swahili (the variants given are international and traditional, respectively): *bwana* [ˈbʷaːna, ˈbʷaːnɐ], *dege* [ˈdɛːˈgɛ, ˈdɛːˈgɛ], *jiko* [ˈd͡ʒiːkɔ, ˈjiːko]; Hausa: *ɓaràà* [ˈbɛːraː], *ɗafà* [ˈdɛːfa]; Vietnamese: *bà* [ˈbaa], *đực* [ˈdʊk].

Dejective consonants (or ‘clicks’)

11.13. DEJECTIVES (or *clicks*) are the ‘strangest’ new type, and they are produced with non-pulmonic air which has been drawn into the oral cavity from outside. These contoids contain, first of all, a *characterizing* occlusion, formed in some place between the lips or the palate (with contact of the tongue tip or blade). At the same time, there is another occlusion, the *activating* one (which is so called because it activates the *dejective mechanism*, cf fig 11.8), produced between the back of the tongue and the prevelum. Dejectives are appropriately indicated by placing the symbol [ʘ] in front of the relevant articulatory symbol, as will be seen in the following sections.

The back of the tongue moves rapidly backwards, while staying in contact with the palatal vault (this fact is shown by using broken lines in the orograms), and it is lowered further in the center (in the case of articulations formed with the front part of the tongue). Consequentially, there comes to be greater space between the two occlusions, and the intervening air becomes therefore rarefied.

In the meantime, the tongue slides back farther still, until reaching the velar place, and the mediumdorsum is lowered farther, too. At this point, we have the offset of the front articulation (the *characterizing* one), and external air comes into the mouth, producing a sharp snap. Finally, the postdorsal occlusion (the *activating* one) is released. In the case of a bilabial characterizing articulation, the expanded oral space extends from the lips to the (pre)velum.

We will give some examples from Zulu, after introducing all the characteristics of dejectives. Among these characteristics, the most complicated ones are the accompaniments (which will be treated at the end of § 11.16).

11.14. In many languages, certain dejective contoids are used phonostylistically. For example, when children throw a *kiss*, or when an actress does the same to the audience, this is nothing other than a bilabial dejective (ie voiceless bilabial rounded stopstricive), [ʘp̚]. The same movement is produced when we drink a liquid through a straw. When we wish to express *disappointment*, or *impatience*, we may produce a dental dejective (ie voiceless [slit] stopstricive), [ʘt̚]. We may communicate *disapproval* if we repeat the sound twice (perhaps shaking our heads, as well): [ʘt̚ʘt̚] or [ʘt̚ʘt̚].

The peoples of southwestern Europe (and Africa) often express *negation* by us-

ing this dental dejective contoid as a phonosymbol, accompanied by raising one's head (or with horizontal shaking, singly or repeatedly; or without any shaking, as one moves northwards). The postalveolar dejective (ie voiceless stop), [ʈ], is often used to express *appreciation* for a beverage, such as a good wine. The noise of a *horse's hooves* is usually imitated by repeating continually the apicopalatal dejective (ie voiceless stop), [t͡ʃ].

To *get a horse moving*, wagoners and horsemen often use an alveolar dejective (ie voiceless lateral stopstrictive) [t͡ɬ], which children associate with the image of a horse, even when they are very young. In order to *call a cat*, we often repeat sequences of two dejectives [p͡pʰ p͡pʰ, ʈʰ ʈʰ] (already mentioned), or the prepalatal (ie voiceless stop), [t͡ʃʰ t͡ʃʰ].

On the other hand, in order to get someone's attention, without causing too much notice (among many people, or in places where there is silence), we do not produce a dejective. Here the normal sound is a voiceless bilabial stop, possibly either normal (pulmonic) or ejective, completed as follows: [p͡pʰ, p͡pʰʰ, p͡pʰʰ, p͡pʰʰʰ].

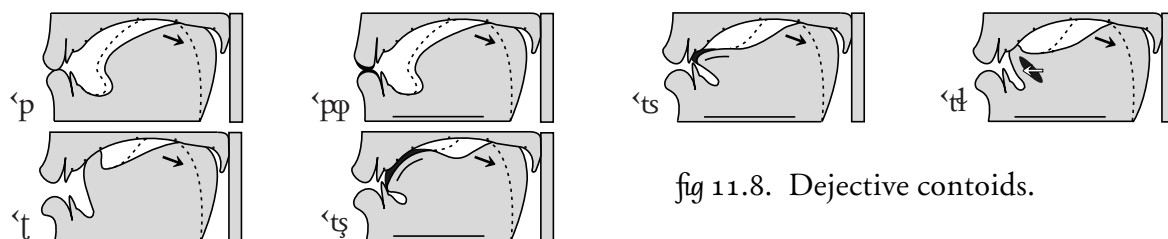


fig 11.8. Dejective contoids.

11.15. Only languages of southern Africa (such as Nama/Hottentot, Zulu, Xhosa, and southern Sotho, which can be seen in the phonosyntheses of 18 in *NPT*) use dejective contoids distinctively (ie as true consonant phonemes). In these languages, they are generally at the beginning of syllables, and they occur combined fluently with other phones which are produced with pulmonic air.

The basic *phonation* type is voiceless; however *voicing* can also occur (through vocal fold vibration; the voicing can be complete or partial), or *nasalization* (through lowering the velum).

The *manners* of articulation used are *stops* and *stopstrictives* (including *lateral stopstrictives* as well), naturally together with the dejective mechanism, which is shown by simply adding the diacritic [ʰ] in front of the current symbol. If the contoid is nasalized, we use [ʱ], thus avoiding the necessity of introducing new nasal symbols for stopstrictives as well, which would be used only for dejectives. In fact, the diacritic [ʱ] implies both the dejective mechanism ([ʰ]) –activated by the back of the tongue against the (pre)velum– together with lowering of the velum itself, which characterizes nasalized ([Ṽ]) and prenasalized articulations ([~C]).

There are four *areas* of articulation which can be used phonemically for dejectives: *labial* and (referring here to the lower articulation) *coronal*, *apical*, and *pre-dorsal*. The number of actual *places* of articulation is definitely much greater: sixteen (16), including labialization in many cases, which combined with the manners mentioned, give twenty-six different basic types (26). With voicing and nasal-

We have, therefore, the following – *bilabial*: [‘p, ʔp, ‘b, ʔb], [‘pp, ʔpp, ‘bβ, ʔbβ] (and *bilabial rounded*: [‘p̠, ʔp̠, ‘b̠, ʔb̠], [‘pp̠, ʔpp̠, ‘b̠β, ʔb̠β]), *labiodental*: [‘pf, ʔpf, ‘bv, ʔbv]; *dental* (with lowered or raised tip, respectively: [‘t̠, ʔt̠, ‘d̠, ʔd̠] or [‘t̠̥, ʔt̠̥, ‘d̠̥, ʔd̠̥]), grooved *dental*: [‘ts, ʔts, ‘dz, ʔdz] (and grooved *dental rounded*: [‘t̠̥s, ʔt̠̥s, ‘d̠̥z, ʔd̠̥z]), grooved *labiodentalized dental*: [‘ts̠, ʔts̠, ‘dz̠, ʔdz̠] (also *dental–bilabial*: [‘tp, ʔtp, ‘cb, ʔcb]).

11.16. After the release (or offset) of the front occlusion, instead of passing directly to the following vocoid, there can be a segmental ‘back’ accompaniment (in the actual languages which use dejectives phonologically). This segment can be velar, uvular, or laryngeal, and can be furthermore combined with labialization.

The possible accompaniments for dejective phon(em)es are the following: *velar* [ɰ, ɲ; k, k', g, ~g; kx, kx', gɣ, ~gɣ; x, x', ɣ; ɰ, ɰ]; *uvular* [ɴ, ɳ; q, q', ɢ, ~ɢ; kχ, kχ', gɣ, ~gɣ; kɣ, kɣ', ɣɣ, ~ɣɣ; ɣ, ɣ', ɣ, ~ɣ; ɣ, ɣ', ~ɣ, ɣ]; *laryngeal* [ʔ, ɦ, ɦ, ɦ, ɦ]. All of these can also have *rounded* variants, shown by adding [ʷ]; while for the velar approximants, the symbols [ɰ, ɰ] are used. For example, in the case of /ʔw, ʔw/, the primary articulation is [ʔ, ɦ], because here there is not only lip rounding, but also velarization, which is perceptible in the moment of the velar offset, because the back of the tongue remains raised, as happens during velarization.

Leaving aside the disharmony and insufficiency of these five symbols ('[O, |, !, ‡, ||]' – much more appropriately used, if ever, for prosodic values than for articulatory ones), we find it more logical to use the diacritic ([^ʔ]) to represent the *mechanism* (with [^ʔ] for supplementary nasality), but to maintain the regular symbols (distinguishing voiceless and voiced, too) for the twenty-six types of articulations found. These conventions make for a more realistic description, to which the accompaniments mentioned above can be added when necessary.

In this way, we avoid masking phonic reality and losing the relationships with the pulmonic articulations. In fact, notwithstanding the particular mechanism (involving the postdorsum of the tongue), the characterizing articulations remain fundamental throughout. For this reason, using ‘special’ symbols is completely out of place, especially considering that these symbols have nothing in common with the others.

Let us now see some examples from Zulu: *icicì* /iˈt̪iˈt̪i/ [ɪˈt̪ɪɪˈt̪ɪ], *qinà* /ˈt̪i.na/ [ˈt̪ɪɪ.na], *uxâmù* /uˈt̪a.mu/ [uˈt̪a.a.mu], *chàchà* /ˈt̪haˈt̪ha/ [ˈt̪ɪh.aˈt̪ɪh.a], *qhàqhà* /ˈt̪haˈt̪ha/ [ˈt̪ɪh.aˈt̪ɪh.a], *xhùmà* /ˈt̪hu.ma/ [ˈt̪ɪhu.ɪ.ma], *gcìnà* /ˈd̪i.na/ [ˈd̪ɔɪɪ.na], *gqùmà* /ˈd̪u.ma/ [ˈd̪ɪu.ɪ.ma], *gxilà* /ˈd̪i.la/ [ˈd̪ɪɪ.la], *kancanè* /kaˈs̪a.ne/ [kaˈs̪d̪a.a.nɛ], *nqênà* /ˈs̪ɛ.na/ [ˈs̪d̪ɛ.a.na].

Nasalization of vocoids

11.17.1. Most vocoids are produced orally. By this we mean that the air comes out through the mouth (after passing through the articulatory channel, formed by the tongue, the palatal vault, and the pharynx), since the velum is raised. Instead, in order to produce nasal(ized) vocoids, air has to come out through the nasal cavity as well. Phones like [a, b] are oral, while [ã, m] are nasal(ized). When producing [m], air comes out through the nose *only*; for [ã], the air comes out of the mouth *as well* (cf fig 11.9, which contrasts [i, a, u] and [ĩ, ã, ũ]). Therefore [m] is a *nasal* phone, but, rigorously, [ã] is merely *nasalized*. Should it become important to denote semi-nasalized vowels, this would be possible by writing [a̠]; on the other hand, however, a transcription like [ḡ, ḃ] would only indicate a nasalized C (for C's, nasalization is without a doubt less important and not phonemic, unless we are dealing with actual nasal contoids). In these examples, the diacritic was placed below the symbol exclusively because there is no room to put it on top of the symbol. Let us note, however, that in official IPA practice [̣] is –unfortunately– used to indicate creaky voice, while [̃] –of course– indicates nasalization.

11.17.2. Here we take a look at the four French phonemes /*ẽ, œ, õ, ô*/, and we will also consider the taxophones which are stress-dependent (for details, even in cases where a single symbol is used, cf ¶ 4 of HPr): *bien* /bjẽ/ [bjã], *bientôt* /bjẽˈto/ [bjãˈto], *brun* /brœ/ [brœ̃], *lundi* /lœ̃ˈdi/ [lœ̃ˈdi], *bonbon* /bõbõ/ [bõbõ], *pendant* /põdõ/ [põdõ]; in Parisian and mediatic pronunciation, we have: [bjã, bjãˈto, brœ̃, lœ̃ˈdi, bõbõ, põdõ].

In the Parisian pronunciation of the *banlieues*, the ‘suburbs’ (outlying areas): [bjã, bjãˈto, brœ̃, lœ̃ˈdi, bõbõ, põdõ]; in ‘refined’ Parisian pronunciation: [bjæ̃, bjæ̃ˈto, brœ̃, lœ̃ˈdi, bõbõ, põdõ]; in Canadian neutral pronunciation (fig 4.15-15 of HPr give further more or less marked variants, which are not shown here): [bjẽẽ, bjẽẽˈto, brœ̃, lœ̃ˈdi, bõbõ, põdõ].

There is a practical and effective way to check whether the reader has succeeded in producing true nasalized vowels, instead of sequences of vocoids followed by nasal contoids.

First, pronounce a very long [m:]; while continuing to pronounce the [m:], block the passage of air through the nose by lightly squeezing the nostrils shut with the thumb and index finger. Immediately the production of sound is interrupted, since in nasal contoids, the only place where air escapes is through the nose. Try with [n:] as well – the result is the same.

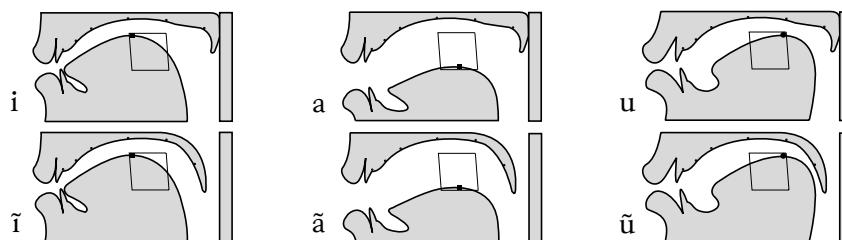
Now, pronounce the French word *on* /*õ*/ [õ], drawing it out more than normal: [õ:], and repeating it as well. Squeeze on the nostrils, and if the sound continues without any interruption, that means the reader is actually producing [õ] (at least, in terms of the mechanism; as for the exact quality of the vocoid, it will be necessary to check with the vocogram and by listening carefully).

However, if while squeezing the nostrils, the same thing happens that happened with [m:], [n:] – namely, if (at a certain point) the sound and flow of air become blocked, then this means that, instead of [õ], the reader is actually producing [on], or [oŋ], or at most, [õn], or [õŋ].

Therefore, it is necessary to learn to pronounce the sound so that it does not become interrupted, and so that it remains at all times with the same timbre. The reader could possibly begin by closing the nose and trying to produce any vocoid, not to mention [õ]! But it is important to make sure that the result is not simply [o]. The first thing to remember is that the timbre of nasalized vocoids is always darker (than corresponding non-nasalized vocoids), because –in cases like [õ]– the resonator of the nasal cavity comes into play, modifying the sound wave. Moreover, while pronouncing voiced nasal phones, such as [m, n], or voiced nasalized ones, such as [õ, ã], the outer walls of the nostrils vibrate, as can be felt by touching the nostrils with the fingers (naturally, without blocking the passage of air through them, as in the preceding exercise).

This vibration is considerably reduced in the case of non-nasal phones, since then the velum is raised, thereby cutting off the nasal cavity from being an active resonator. If we compare [õ:] (or also [n:]) with [o:], the fingers manage to perceive a noticeable difference.

fig 11.9.
Vocoid
nasaliza-
tion.



11.17.3. Moreover, there are still other possible tests. If, while producing [o, a], we close our lips (by bringing them together, or by putting a hand over our mouth), the resulting sound is [b'] – or else possibly something paraphonic, representable by <[ɸ']>. Instead, if we are truly producing [õ, ã], then when we intentionally close our lips, we produce [m̃] (or [m̃], for [õ]; and [m̃] for [ã]; or else, if we put a hand over our mouth, [m̃]). Therefore, the sound continues in this case, passing out through the nose (even though the timbre is modified by the operation of the lips or the hand).

Devoicing vocoids

11.18. In certain languages, some vocoids can be partially devoiced, phonetically, [i̥, ḁ, u̥], or totally devoiced, [ḭ, a̰, ṵ], as will be seen in several chapters of *HPr* (especially [cf fig 11.5] in Japanese, but also in Lusitanian Portuguese, French, and Russian). Very few languages have been described with voiceless vowel *phonemes*, among which Comanche (USA, Oklahoma), and Ik (Western Africa). In these cases, it is always possible to analyze the voiceless vowels phonologically as sequences of the form /hV, Vh/. Here is an example from Comanche (Shoshone): *noribakiki'u* ['nɔriβaki₁ki₂ʔu₂] 'he came to pack his bags' and *noribakiki'u* ['nɔriβaki₁ki₂ʔu₂] 'he packed his bags and came'. This example could be interpreted as /kiki-/ vs /khi-ki-/ or /kihki-/.

Vocoids in unstressed syllables

11.19. In unstressed syllables, it is natural that the phonetic space of the vocoids is somewhat reduced in size, given that there is less (general and, particularly, articulatory) tension present. Therefore even languages such as Spanish or Italian, which do not reduce their unstressed V, have an inevitable tendency towards 'reduction'. On the vocogram, this reduction corresponds, more or less, to what is seen in fig 11.10, namely /i, e, ε, a, ɔ, o, u/ [i, e, ε, a, σ, o, u] 'tend to move towards' [ɪ, ə, ʌ, ɐ, ɒ, ɔ, ʊ], without however reaching them. In fact, this 'movement' is rather fictitious, in the sense that what actually happens is that in unstressed syllables, there is reduction mainly in the degree of jaw opening (and somewhat in the movement of the back of the tongue in a front-back direction, too). However, the relationship between the elements remains exactly the same as what it was before (just as if one spoke with a mouth of smaller dimensions, even without reaching the difference between the mouth of a child and one of an adult).

The ear automatically compensates for these small and inevitable differences, without letting itself be fooled. In this respect, it is different from machines, which 'obtusely' (in a manner characteristic only of machines) computes physical differences. These physical measurements are given as simple numbers, out of context, without any means for calibrating and reinterpreting the data. Thus the machine tends to fail in reassigning the new realizations to the appropriate phonemes and phones. We see clearly here the difference between *natural phonetics* (ie auditory/articulatory and functional), and *artificial phonetics* (ie acoustic).

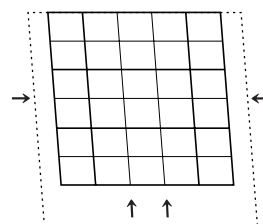
Naturally, other languages, among which even English and certain regional pronunciations of Italian (and dialects of Italy), can have true reductions and even neutralizations of vocoids in unstressed syllables. These reductions can actually reach the points [ɪ, ə, ʌ, ɐ, ɒ, ɔ, ʊ], and even arrive at [ə, ɜ, ɐ]. However, these realizations are noted immediately as being different, and, as was mentioned above, they make up an element of certain regional accents and dialects, as well as certain languages. In such cases, but only in such cases, these realizations should be marked appropriately in transcriptions, as of course happens in English with /ə/: *about* [ə'baʊt], *again* [w'ɡeɪn:] (near velars), *sofa* [sɜʊfə/'sɒʊfɹ] (prepausal).

The supremacy of the ear (a well-trained one, or one of a native speaker which responds to relevant phonological oppositions) is still more obvious when comparing *different voices*, belonging to people with phonoarticulatory apparatuses of different dimensions and shapes. Even using the *bark* acoustic measurements it is (still) not possible to rival the incredible work of the human ear, which is capable of normalizing (phonetically and phonologically) the utterances of different people, and also of a single person, in *different types* of speech, with respect to variables such as speed, precision, and spontaneity.

The possibility of making seriously useful acoustic comparisons is complicated further by the fact that acoustic analyses depend dramatically on the skill of the analyst, on the quality of the apparatuses and computer programs employed, and also on the specific way the research is organized. Measurements, unfortunately, are subject to the evident limits of certain programs and the ways these are used, as well as the choice of questions considered, without mentioning differences in aims and hypotheses. For these reasons, any comparison with the acoustic data of someone else (with different informants) is a very risky undertaking, which can lead to surprising and misleading conclusions. The important thing is not to take as gospel truth everything which ‘science’ offers us (given all the limits and weaknesses to which we have briefly but incompletely referred).

fig 11.10.

Reduction in the size of the articulatory space for vocoids in unstressed syllables.



Vocoids in singing

11.20. First of all, it is necessary to point out that ‘normal’ language, from a phonetic point of view, is *spoken language*, such as what can be heard on the radio or television. Instead, while singing –and particularly in opera singing– the physical structuring of the phonoarticulatory apparatus becomes modified. The change is particularly important for vowels, which are central to the syllables in words (within phrases and sentences).

In fact, the oral cavity is usually more open during singing than in normal speech. This occurs for fairly evident reasons of professional technique: in order to obtain more impressive results, and in a way which is physio-pathologically less risky (above all, to avoid serious damage to the vocal folds).

In fact, the *operatic position* involves a deformation of the vocogram in the following ways (whether advisably or not): (1) the mouth is generally more open, given that the jaw is lower; (2) the lips are consequently never spread for [i, ɪ, e, ɛ, æ], even though they are still at least somewhat rounded for the back vocoids [u, ʊ, o, ɔ, ɒ]; (3) the tongue is correspondingly raised, in order to compensate for the lowering of the jaw (thus bringing the dimensions almost back to those of

speech, but with a slight lowering, thus moving down and back by one box in the vocogram), as can be seen in comparison with the original vocogram; (4) the vocogram is therefore not so much ‘deformed’ as lowered and drawn back, with regard to the original.

fig 11.11 gives the ‘opera’ vocogram, together with its boxes, placed in relationship with the normal vocogram of speech. There, it is easy to see how the ‘opera’ vocogram is slid downwards and backwards, and slightly enlarged.

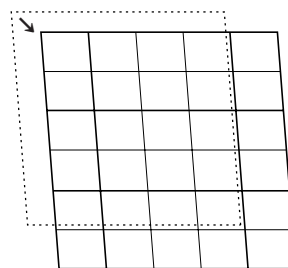
Considering the figure attentively, we see that the column of front *vocoids* such as [i, ɪ, e, ɛ, æ], coincides in practice with the next column, whose phones would be represented, rigorously by the symbols [ɪ, ʊ, ə, ɜ, ɔ, ʌ]. Actually, they are those vocoids, but in a square which is relatively lower and farther back, within the mouth.

The important thing is to remember that the lips can never be spread – it is in fact physiologically impossible, given the four differences mentioned above. Therefore, a more realistic representation would show this absence of spreading, by at least using a dot placed underneath the ‘normal’ symbols (as a mnemonic diacritic): [ị, ɪ̣, ẹ, ɛ̣, æ̣].

As it happens, it is a fact that this position is typically surpassed, while singing, moving past the spread position (of speaking) [i, ɪ, e, ɛ, æ], and the neutral one (now seen) [ị, ɪ̣, ẹ, ɛ̣, æ̣], to reach a half-rounded position [i̠, ɪ̠, e̠, ɛ̠, æ̠] (which could be considered halfway between [i, ɪ, e, ɛ, æ] and [y, ʏ, ø, œ, ɶ], of French and German, &c). The reasons are, as before, technical ones having to do with the necessities of maintaining an appropriate sound for a greater length of time. This characteristic is undoubtedly paraphonic (cf § 14.1-2), and it is denoted by ⟨̠⟩, added to the normal symbols: ⟨̠ [i, ɪ, e, ɛ, æ]⟩; or (although not necessarily) it can be added to symbols with the diacritic: ⟨̠ [ị, ɪ̣, ẹ, ɛ̣, æ̣]⟩ (since ⟨̠⟩ is enough by itself to imply the particular articulatory differences seen here).

fig 11.11.

Difference in production of vocoids between speaking and singing.



Abolition of the term (and concept of) ‘retroflexion’

11.21. Natural Phonetics excludes any so-called ‘retroflex(ed)’ contoids; while, contoids such as [ɳ; ʈ; ɖ; ʂ; ʐ; ʑ] are postalveolar by nature (and [ɭ] is slightly rounded as well); in addition, [ɳ; ʈ; ɖ; ʂ; ʐ; ʑ] are (sub)apico-palatal (cf fig 10.2.1 & 10.3.1 & 10.5.3 & 10.6.1 & 10.6.5).

The concept and term of ‘retroflexion’ are highly misleading, since they can neither explain anything, nor can they describe any phonic reality.

Furthermore, if they are applied to vocoids, they are even more misleading. As a matter of fact, the device which is used for what is incorrectly defined as ‘retroflex(ed) vocoids’ is not real *postalveolarization* (as it is called in more correct terms). Instead, it is lateral contraction of the body of the tongue, with a simultaneous –and unavoidable– retraction of the lamina (of the tongue), near the postalveolar zone, but with no actual (nor intentional) approaching. On the contrary, the lateral contraction (of the body of the tongue) with no retraction of the lamina, produces semi-lateralized approximants, such as [ɭ, ʎ] (cf fig 10.8.5).

The space in the mouth where the supposed ‘retroflex vocoids’ (that is *laterally contracted* ones) can be produced is very limited. Actually, it corresponds to the space of the following intense (‘syllabic’) contoids [ɹ, ʀ] (prevelar), [ʁ, ʁ̥] (uvularized velar, cf fig 10.6.6 for both pairs, respectively approximant and semi-approximant in each pair), with more or less marked lip-rounding. Less often, that space corresponds to the intense postalveolar contoids, [ɻ, ʁ̥], or to the velarized postalveolar ones, [ɻ̥, ʁ̥] (with or without rounding, cf fig 10.6.5 – the second element of each pair is unrounded), or even to [ɻ̥] (cf fig 10.6.1) as in Mandarin Chinese: *shī/shī* /ʃ̥ɻ̥/ [ʃ̥ɻ̥].

In addition to these intense contoids, which can form syllabic nuclei, we also find sequences of V + some of these contoids (either intense or not). We will only give the following examples *fur*, *fear*, *far*, from neutral American English, [fɹ̥, ʃr̥ɹ̥, ʃɑɹ̥], mediatic American English, [fʁ̥, ʃvʁ̥, ʃɑɹ̥], and International English, [fɹ̥, ʃvɹ̥, ʃɑɹ̥]; all of them are diaphonemically /ʃəɹ̥, ʃvəɹ̥, ʃɑɹ̥/.

Generic symbols (for phonic categories)

11.22. It might prove useful, sooner or later, to have symbols available which do not directly represent particular segments, but rather whole phonic categories. For this task, phonetic and phonemic formulae can be used, and the resulting symbols can be employed, for example, on the edges of vocograms or tables. We therefore provide a list of appropriate symbols of this type.

fig 11.12 gives a schematic presentation of the *seven* fundamental manners of articulation, for contoids. Also given are useful groupings and subdivisions, including the distinction between *obstruents* and *sonants* (however, the *mixed* manners of articulation, typical of approximants, and even more of trills and laterals, are not included).

The category of *obstruent* contoids includes *stops* (but not nasals, even though these could technically be considered stops with added nasalization), *stopstrictives*, *constrictives* (including constrictive trills and constrictive laterals), and *approximants* (only the peripheral ones). The *sonants* (or *sonorants*) comprise, on the other hand, central and lateralized *approximants*, besides *nasals* and *trills* (together with *taps* and *flaps*), and *laterals* (including *unilaterals* and lateral taps).

In various languages, for any manner of articulation (rarely trills, taps and flaps), phonetically *semi*-... articulations are possible (ie less tense – with no full contact, for nasals, stops, stopstrictives and laterals, as well).

KR	trill(ed)/tap(ped) stop-strictive C	-V-	V within a word, word-internal V
Π	lexeme		pause
π	grammeme	:	potential pause
Ψ	rhythm group		longer pause
ψ	reduced rhythm group	┌┐	(low) parenthesis
\$	phono-syllable	└┘	(mid) parenthesis
\$	reduced phono-syllable	┌┐	quotation
\$	'light' syllable	.	<i>emic</i> conclusive intoneme
\$	'heavy' syllable	?	<i>emic</i> interrogative intoneme
∅	'zero' phone/phoneme	;	<i>emic</i> suspensive intoneme
^v	indicates proximity to V – ^v C, ^v C ^v , C ^v	,	<i>emic</i> continuative intoneme
^c	indicates proximity to C – ^c V, ^c V ^c , V ^c		normal preintoneme (<i>no sign</i>)
C _*	C with audible explosion	¿	interrogative preintoneme
C [†]	C with inaudible explosion	¡	imperative preintoneme
C ^h	= /C̱/ ≠ /C̱h/	λ	emphatic preintoneme
C ^h	= /C̱/ ≠ /C̱h/	¿	supplementary interrogative preintoneme (in French)
C'	ejective C	-	(^τ ' ˌ ˌ) tone with strong stress, cf § 12.17
ˈC	injective C	ˌ	(ˌ ˌ) tone with mid stress, cf § 12.17
ˈC	dejective/click C	˙	(˙ ˙) tone with weak stress, cf § 12.17
ˆC	prenasalized dejective C	=	(^τ " ˌ ˌ) tone with extrastrong stress, cf § 12.17
˜C	prenasalized C	˘	(^τ ˘ ˘ ˘) falling tone, cf § 12.18
ˈV	stressed V (with strong/primary stress)	˙	(^τ ˙ ˙ ˙) rising tone, cf § 12.18
ˌV	half-stressed V (with mid/medium/secondary/half-strong stress)	˘	Japanese <i>akusento</i> (distinctive pitch lowering, cf § 12.3.2.1-4 of <i>HP</i> _r)
˚V	unstressed V (with weak stress)	˘	(˘ ˘ ˘ ˘ ˘) shift diacritic, cf § 8.11, 9.5
˚V	destressed V (with reduced stress, up to weak; starting from ˈV)	<>	paraphonic element (cf § 14.3-5) – or grapheme
˝V	over-stressed V (with extrastrong stress)	[]	phonetic transcription
Vː	long V	/ /	phonemic transcription
V˙	half-long V	[[]]	hyperphonetic transcription
Vː	less than long V	// //	hyperphonemic transcription
V˙	less than half-long V	()	symbol/phon(em)e which can fall (or be lacking)
V	utterance-final V	(())	potential symbol/phon(em)e, which can be used, as in fig 8.8-9.
V	after a pause or silence V		
V [#]	word-final V		
[#] V	word-initial V		
V [#]	syllable-final V		



Natural Tonetics

Microstructures (mostly syllables, stress, and tones)

Macrostructures (mostly intonation)

Superstructures (with paraphonic intonation, as well)



2015 updating of *Luciano Canepari's*
canIPA Natural Tonetics

from Ch 12-14 of the book:

Natural Phonetics & Tonetics



12. Microstructures

(mostly: syllables, stress and tones)

Syllables

12.1. The SYLLABLE is a phonetic reality (both in an auditory and an articulatory sense), which is present in the linguistic consciousness of all people, no matter what language or dialect they speak, and whether they are literate or not. It is the fundamental unit of the spoken language – the smallest one capable of constituting an utterance by itself, such as *Yes* or *Here*, &c.

A syllable is made up of one or more phonic segments, which have a good deal of cohesion and coarticulation among one another. Syllables are also the groups into which we instinctively separate words, when we are speaking on the phone and the line is very bad (because of problems with static or interference).

For purposes of scientific analysis and description, it is normal to consider single segments (ie phones) as the minimal units of phonetics, such as *m*, *p*, *b*. And it is even possible to work on the level of components (or *phonetic features*), such as *bilabial closure* for *m*, *p*, *b*. However, actual speaking is carried out through full syllables (even if the syllables are made up of only one –short– phone, as in the Italian words *e*, *o*, *a* [e, o, a] ‘and, or, to/at’), whether these are stressed or not. The smallest isolated forms in English can be words such as *a*, *I*, *owe*, *awe*, *ah*, which are diphthongs or long vowels [‘eɪ, ‘aə, ‘ɜʊ, ‘ɔɪ, ‘ɑː], but in connected speech *a* is [ə].

Syllables make up in turn part of larger groups, constituted by sequences of syllables linked together by phenomena of assimilation or coarticulation: RHYTHM GROUPS (or *stress groups*).

In a rhythm group, one syllable has greater PROMINENCE with respect to near-by ones. The number of syllables making up a rhythm group can vary (depending on the speed of speaking and the particular message, as well as the language in question) from one syllable to around ten, with an average of 3-6 syllables per rhythm group.

12.2. The syllable can be considered as the result of the coordinated movements of the respiratory, phonatory, and articulatory mechanisms. Increases in general muscular tension, in expiratory pressure, in phonatory energy, and in the opening of the articulatory organs converge together.

These increases are followed immediately by corresponding reductions in the various areas. This is the point of view of *production* (ie the speaker); while from the point of view of *perception* (ie the listener), everything becomes transformed into sound waves, which travel to the auditory mechanism of the listener.

It is important that we clear up, once and for all, that phonetically the concept of a ‘syllable’ is rather different from that of grammar (not to mention poetic meter)! It is therefore essential to distinguish between syllables in a traditional sense

(*graphic* syllables) and natural *phonic* syllables. For this reason, it is entirely useful to speak of *phono-syllables* and *grapho-syllables*. In Italian, we can exemplify the difference with the word *festa*, with syllable division /'fɛs-ta/ (phonic) and *fe-sta* (graphic). It ought to be unnecessary to mention the absurdity of the grammatical syllable division, given that the pronunciation is unmistakably [fɛs-ta].

However, it is very difficult to defeat noxious scholastic 'beliefs', since they are inculcated at an early age. Grammarians and poets have, for centuries, convinced people that words like Italian *mai* rightly have only one syllable, whereas others, like *mia*, have two! Scientifically, there is nothing which is farther from the truth! In fact, we have: *mai* /'mai/ ['maɪ] and *mia* /'mia/ ['mi'a] (at the end of a line of verse, as well).

It is so simple and natural. Yet, in schools the official 'story' is that *mia*, *mie*, *mio* have two syllables (because they are made up of *mi-* and *-a*, *-e*, *-o* respectively), whereas the more 'solid' *miei* has only one, because it does not alternate with other forms! In reality, there is only one PHONO-SYLLABLE in all of these cases: /'mia, 'mie, 'mio, 'mjei/ ['mi'a, 'miɛ, 'mi'o, 'mjeɪ].

Scale of syllabicity

12.3. Within each phono-syllable, there is a considerable degree of correspondence between the openness or closure of the PHONOARTICULATORY ORGANS (ie *phonic production*) and the scale of syllabicity of the different phones (ie *auditory perception* of the sound wave). In fact, under *equal* conditions of stress, length, and pitch, the more open and more voiced phones are more *perceptible* (in other words, they are audible at a greater distance, ^{or} more distinctly). Clearly, in order to test this condition, a notable distance should be considered. In fact, if the distance involved were too close, it would be possible to get the impression that [ʃ] is more 'sonorous' than [a], particularly thinking of the 'example' of *shh!*, which is capable of getting a whole room full of people talking in groups to be quiet.

However, listening carefully (and if we look, also carefully, at a good transcription), we can see that *shh!* normally corresponds to [ʃʃʃ], in short something quite a bit different from just [ʃ]. This last would be plain, 'non-syllabic', voiceless, and short, without any particular stress –even wishing to transcribe it as [ʃ]– and in any case, without pitch, since the vocal folds do not vibrate. Here, however, a simple –'egalitarian'– [a] is definitely much more perceptible (especially at a distance of 30-50 feet).

At this point, we need to make a brief terminological and conceptual digression, because, as could have been expected, the worst term imaginable (namely, 'scale of sonority') is also the most widely used, in the scientific literature as well. It is true that we are speaking of more or less 'sonorous' *sound waves*, but this in the very generic sense of phonic emissions, or in other words, actual utterances. Utterances are naturally composed of voiced phones, but also of voiceless ones, so there are a few problems here.

It would be a step in the right direction to get rid of the other expression (which

for a while seemed to us to be reasonably appropriate), namely ‘scale of perceptibility’. Although this term does not have the inevitable ambiguity inherent in ‘sonority’, it still runs the concrete risk of provoking the misunderstanding discussed above. In fact, it is fundamental to remember that absolutely *equal* conditions of stress, length, and pitch are required.

12.4. Therefore, it is more appropriate –and even necessary– to speak of the SYLLABILITY SCALE. Given the phones making up a particular utterance, the purpose of this *scale* is to make it possible to pick out the individual syllables. The division into syllables of an utterance is determined by the *syllable nuclei* (the maxima, the heights, the peaks, the apogees), in their contrast with *syllable boundaries* (the minima, the depths, the troughs, the perigees), where the actual division takes place.

With these considerations in mind, phones produced with greater articulatory (mouth and jaw) opening are more ‘perceptible’ (and consequently more apt to constitute the *nucleus* of a *syllable*) than ones with less opening. The same is true of phones with voicing (ie vibration of the vocal folds), with respect to voiceless ones (ie without this vibration). Along the continuum between voiced and voiceless phones, syllabicity diminishes constantly through the intermediate phases: *voiced*, *voiced lenis*, *mixed*, *voiceless lenis*, *voiceless*.

We therefore present now the syllabicity scale (going from the greatest to the least, cf fig 12.1). Every phonic syllable is, therefore, constituted by phones grouped together according to this scale, in such a way that the most perceptible ones (ie the syllabic NUCLEI) are in the center, while the less perceptible ones (ie the syllabic MARGINS) are on the boundaries.

fig 12 .1 Scale of syllabicity (with some examples).

1. *First group*: VOCALIC

open vocoids:	[æ, a, ɒ; ε, ɐ ɔ; ã, ã̃, õ]
mid vocoids:	[ɛ, ɜ, ɔ; e, ə, o; Ē, ẽ, õ]
close vocoids:	[ɪ, ɨ, ʊ; i, ɨ, u; ĩ, ĩ̃, ũ]
intense (<syllabic>) contoids:	[ɱ, ɳ, ɲ; ɹ, ʁ, ʀ]

2. *Second group*: SONANTIC

median or lateralized approximants:	[j, ɥ, ɰ, w; ɹ, ɻ]
trills, taps, flaps:	[r, ʀ; ɾ, ɽ; ɹ, ɻ]
laterals:	[l, ʎ, ʟ; ɭ, ʭ, ʮ]
nasals:	[m, ɱ, n, ɳ, ɲ, ɳ]

3. *Third group*: CONSONANTIC

peripheral approximant:	[β, ɸ, δ; ɸ, ɸ̃, ɦ]
constrictives:	[v, ɸ̃, z, ʒ, ʁ, ʁ̃]
stop-strictives:	[dz, dʒ, dʒ̃, dʒ̃̃, gɟ, gɟ̃]
stops	[b, d, t, ɖ, ɗ, ʈ, ʈ̃]

4. *Fourth group*: NON-SONANTIC

vocoids:	[i̥, ʉ̥, u̥, ɪ̥; ɛ̥, ɐ̥, ɔ̥, ʌ̥]
sonants (or sonorants):	[ɾ̥, ʀ̥, ɹ̥; ɻ̥; ɱ̥, ɳ̥, ɲ̥, ʎ̥]
continuant (approximants/constrictives):	[ɸ̥, ɸ̥̃, ɦ̥, ɦ̥̃; f̥, s̥, ʃ̥, x̥]
momentary (stops & stop-strictives):	[p̥f̥, t̥s̥, t̥ʃ̥, k̥x̥; p̥, t̥, ʈ̥, k̥]

In most cases, there are no problems, and the syllables form units with perfect internal coherence around the nucleus, moving from the most marginal phones (in both directions): *blank* ['blæŋk], *cleft* ['khlɛft], *ground* ['gɹɑːŋd, 'gɹ-], *final* ['fæ-nɪ], *written* ['ɹɪt-ɪ, 'ɹ-]; Italian: *quando* ['kwɑnːdo], *tronfio* ['trɒmːfjo]; German: *Esel* ['ɛːzl], *haben* ['haːbm]; Czech: *Petr* ['pɛ-tɪ], *krk* ['kɪk], *vlk* ['vɪk].

12.5. In all languages, however, there are cases –occurring more or less frequently– in which this order is not fully respected: *splash* ['splæʃ], *six* ['sɪks], *mere* ['mɪɐ̯]; Italian: *sta* [sta], *sberla* [z'bɛrːla], *mia* ['miːa]; German: *Stadt* [ʃtʌt]; Russian: *Pëtr* (Пётр) ['pɒtɐ]. When /sC, zC/ are preceded by /V/, they have the natural syllabification, which we have already shown in other transcriptions: Italian *questa* ['kwɛsːta], *una sberla* [uːnazːbɛrːla], unless (as in English) the lexical syllabic structure does not take precedence: *a splash* [əˈsplæʃ], *six eyes* ['sɪks ˈaɪz].

From a phonic point of view, however, every part not divided by a hyphen (or by a space) is a syllable. In fact, even though [s, z, ʃ] are more perceptible than [p, b, t], and [æ, a, ɔ] are more so than [i, ɪ, u], &c, we have no division into distinct phonetic syllables, provided that the elements in question belong to the same subdivision, out of the four in the scale, *ie* *vocalic*, *sonantic*, *con-sonantic*, and *non-sonantic* (note Latin *consonare* 'to sound together', since *con-* = 'with'). The preceding is true as long as there is no increase of stress present. In fact, in [ˈja, iˈa], the first sequence constitutes a single syllable, while the second sequence constitutes two different syllables. As we have seen, there is just one syllable in Italian *mai* /ˈmai/, *vuoi* /ˈvɔɪ/, *miei* /ˈmɛi/, and even in *mia* /ˈmiːa/, or in British English *mere* /ˈmɪə̯/ ['mɪɐ̯]. This is true because, even though [i, a] have different levels of openness ([i] is closer than [a], and less 'perceptible', but it functions as a nucleus), they are both part of the same group: the *vocalic*. However, in the Italian of Naples (in a tune), we have two or three syllables in these cases, due to stress differences: *mia* ['mɪˌiː], *mai* ['mɑˌiː], *vuoi* [vuˌoːi], *miei* [miˌɛːi].

12.6. Let us consider some examples from English: *few* ['fjuː], *Swiss* ['swɪs], *piano* [phiːən-ɔ, 'phjən-ɔ], *situation* [sɪtʃuːɪʃən], *cooperative* [kəʊpəˈrɛɪtɪv], *co-op* ['kəʊɒp]. In English as well: *splashed* ['splæʃt] and *sixth* ['sɪksθ] form only one syllable, because /sp, ks/ belong to the same group: the *non-sonantic*; all of this even though [s] is relatively more perceptible than [p, k]. The same is true of ['kəʊɒp].

In French, words such as *quatre*, *peuple* /ˈkatɹ, 'pœpl/ are monosyllabic, because [χ, l] are voiceless just like [t, p]: ['catχ, 'pœpl]; they are therefore in the fourth group (*non-sonantic*). Moreover, *double* ['dubl] is monosyllabic too, because [l], being voiceless (and *non-sonantic*), is less perceptible than [b] (in the third group, *con-sonantic*). If voicing is preserved (as would be expected phonemically), we have, instead, bisyllables: ['catɹɔ, 'pœplɔ, 'dublɔ] (native speakers can even utter ['catɹ, 'pœpl, 'dubl], still as two syllables, especially in protunes), as in Russian too, for the variant *Пётр* ['pɒtɪ], even though here the voicing is only partial.

In Japanese, voiceless (lenis) vocoids are still capable of constituting the syllabic nucleus, because the nearby contoids are completely voiceless and consonantic (and are therefore less perceptible, even while being part of the same group, *ie* *non-*

-sonantic): *kite* [ci-te] /kite/ (or /kite/, of a different meaning, cf § 12.2.6.2 in *HPr*). The Japanese auxiliary form *desu* /de.su/ is bisyllabic until it remains [-de.su], but it generally becomes monosyllabic [-des, ·des].

Therefore, even while whispering (ie with voiceless lenis phonation), syllables remain intact, as is well-known. In fact, even if the message as a whole is less perceptible than one in a normal voice, the same differences in the scale mentioned above remain valid. When pronounced, a voiceless lenis, a vocoid, or an intense contoid, is still more audible than any other (normal or 'non-syllabic') voiceless contoid, whether lenis or not. The reader should try whispering, for example: *Yes, you're right – Oui, t'as raison – Sì, por supuesto – Sì, esatto.*

Syllabication (or syllabification): division into phono-syllables

12.7. In different languages, phonic syllables take more or less different forms, because they depend upon the phonological systems present, and on the languages' phonotactics (ie which combinations are normal or possible). Differences involve the number, order, and type of segments allowed, as well as the way in which syllabication is accomplished.

Within considerations of general phonetics, there are certain possibilities, which are more frequent and 'normal', and therefore defined as UNMARKED. These facts should be omitted from transcriptions, except in order to show intentionally the differences between an unmarked syllabification and other ones. It is, instead, important to note cases of MARKED syllabifications: those which are less frequent (or 'normal') in the languages of the world. In ordinary transcriptions, even these syllabifications can be possibly omitted, if they have been adequately explained. However, it should be emphasized that correct syllable division is very important for describing and pronouncing a given language well. Sometimes, it is neither easy nor simple to determine and perceive where the boundary between two phonic syllables is located, because of coarticulation, too, not only in unstressed syllables.

As we have mentioned, syllabic nuclei contain a notable amount of internal cohesion, which can also include coarticulatory transitions between the boundary elements of the single nuclei. The reader should remember that there is no real break between one syllable and the next (whether the boundary is marked with a hyphen or not), but a mere lessening of energy. It is important to carefully consider cases with a *simple* contoid (preceded by a stressed vocoid which remains phonetically short, and followed by vocoids, or by [central, lateral, trill, or nasal] approximants), or with a *geminate* or a *lengthened* contoid. In this last situation, there are respectable differences between Italian, Swedish, Finnish, and Japanese. A final point is that the hyphen is usually not used when there are prosodic symbols as well (especially for stress or pitch) in the same point, because in such circumstances it would be redundant and awkward.

12.8. Let us now consider some examples: *pepper* ['phɛp-ɐ], *paper* ['phɛɪ-pɐ], *coble* ['khɜ-bɫ, 'khɒb-ɫ], *unyoke* [ɐn'jɜk], *anew* [ə'njɹu], *penknife* ['phɛn.naɐf],

bookcase ['bɒkˌkeɪs]; Italian: *pepe* ['peːpe], *farò* [fa'rɔ], *acre* ['aːkre], *conio* ['kɔːnjo], French: *chapeau* [ʃa'pɔ], *passer* [pa'se], *étoile* [e'twɔl], *noblesse* [nɔ'blɛs], *panier* [pa'nje]; Arabic: *atraab* [at'ræb], *tanyiil* [tan'jiil]; Hindi: *vaakya* [ʋaak-jə], *aadnaa* [aːd-na]. Moreover, Italian *penna* ['penːna], *motto* ['mɔtːto]; Swedish *penna* [ˈpɛnˌna]; Norwegian: *atten* [atˌtɛn]; Finnish *tässä* [ˈtæ̌sːæ]; in Japanese, we have *motto* [ˈmɔtːɔ] (§ 12.3.2.1-4 of HPr).

Generally, those contoids, if any, which precede the nucleus of a given syllable have a more energetic articulation than those which follow it. In many languages, including most Germanic ones, stop and stopstrictive contoids occurring at the beginning of stressed syllables tend to be 'aspirated': *repeat* [ɹɪ'pɦɪɪt̚], *club* [ˈkɦlɛɪb̚], *chin* [ˈtʃɦɪn̚]; or German *Betrieb* [b̥ʁɪt̚ɦɪːp], *kaum* [ˈkɦaom], *Pferd* [ˈpɦɛːɾt̚].

12.9. It is advisable to use rigorous terminology when referring to the structure of different kinds of syllables.

Thus, a SIMPLE (or mononuclear) syllable has a single vocalic element, a COMPOUND syllable, on the other hand, has a vocalic element which is (phonemically) long, or doubled (or geminated), or else a (true) diphthong (or triphthong): *cry*, *crying*, *layer* [ˈkɦɪˌaɪ̯, ˈkɦɪˌaɪ̯ɪ̯, ˈlɛɪ̯ɪ̯] ([ˈkɦɪˌaɪ̯, ˈkɦɪˌaɪ̯ɪ̯, ˈlɛɪ̯ɪ̯] American English); Italian: *avere* [aˈvɛːre]; in neutral Italian: *mai*, *mia* /ˈmai, ˈmia/ [ˈmaːi, ˈmɪːa]; in some regional Italian pronunciations: *no*, *mai*, *mia* /ˈnɔ, ˈmai, ˈmia/ [ˈnɔɔ, ˈmaai, ˈmɪia]; in German: *Eis*, *treu*, *treuer* [ʔaes, ˈtɦɛ̯ɔʏ, ˈtɦɛ̯ɔʏɐ] or [ˈtɦɛ̯ɔʏʌ].

An intense contoid, such as [ɹ], or [ɾ], can be considered appropriate as elements making up parts of diphthongs and triphthongs, in the real phonic sense of the terms (cf § 5.2-3), while we do not have 'diphthongs' in: *yes*, *wit* [ˈjɛs, ˈwɪt̚]; Italian: *ieri*, *può* [ˈjɛːri, ˈpwɔ̯], nor 'triphthongs' in: *cube* [ˈkɦjɪˌuɪ̯b̚], or in Italian: *miei*, *vuoi* /ˈmjei, ˈvwɔi/ [ˈmjeːi, ˈvwɔːi]. In fact, [j, w] are actually plain ('non-syllabic') contoids.

Moreover, a CHECKED ('closed') syllable ends in one or more consonantal elements, as in: *texts*, *glimpsed* [ˈtɦɛksts, ˈɡlɪmpst̚]; Swedish: *skälmskt* [-ʃɛlmskt, -ʃ-, -st̚]; Italian: *cantan(te)*, *pas(ta)*, *trop(po)* [kanˈtanː(te), ˈpasː(ta), ˈtrɔpː(po)].

A FREE ('open', 'unchecked') syllable ends, instead, with a (simple or compound) vowel element: *I*, *me*, *you*, *potato* [ˈaː, ˈmɪː, ˈjɪˌu, phəˈtɦɛɪt̚ɔ]; Italian: *so*, *sai*, *sono*, *causa* [ˈsɔ, ˈsaːi, ˈsoːno, ˈkaːuza].

Finally, it can be useful (especially to determine the location of stress in certain languages, such as Arabic, Hindi, and Latin) to distinguish between LIGHT (free simple) syllables: *visi(bil)ity* [ˌvɪzə(ˈbɪl)əɪ̯t̚i], Italian *rivedere* [ˌriveˈdeːre], MIDDLE ones (free compound, or checked simple ones): *sorrow* [ˈsɔɹˌɔ], *solo* [ˈsɔːlɔ]; Italian *laurea* [ˈlaːurea], *cantante* [kanˈtanː(tɛ)], or HEAVY ones (checked compound, or bi-checked/tri-checked ones, &c): *hands*, *(e)xempts* [ˈhænːdz, (ɪɡ)ˈzɛmpt̚s, (ɪɡ)-] Italian *aus(pico)*, *ins(tallo)*, *frain(teso)* [ˈausː(pɪko), ɪnsː(talːlo), ˌfrainː(tɛːzo)].

Syllables & the speech chain

12.10. There are cases of contoid sequences (in word-initial or word-final position), which belong to the same phonic syllable. However, if the same contoid se-

quences (or other similar ones) occur between vowels ^{or} intense contoids, then the sequences in question generally become split up into different syllables, according to the principles of nucleus and syllabic boundaries perceptibility. In sequences such as /Vsp, spV/, as in *spell*, *wasp*, or in Italian *sparo*, /s/ and /p/ belong to the same syllable (even though the stress mark is inserted between them in Italian, because we have *uno sparo* [u-nos-'pa-ro], cf § 3.3.1.3 of *HPr*): ['spɛɫ̩, 'wɒsp; s'pa-ro] (Ch 2 of *HPr*, on English, will explain our use of /IV̩/, instead of the 'traditional' /IV/ [IV̩]). However, in *hospital*, or in Italian *dispari*, the phonic syllable boundary is between the /s/ and the /p/: ['hɒs-pɪ-t̩; 'dis-pa-ri]. In addition, in an Italian phrase like *due strani film americani* 'two strange American films', we have [dues-'tra-ni 'fil-ma me-ri-'ka-ni].

The syllables of an utterance can contain variously long vocoid sequences. In fact, sequences of phones which all belong to the first group on the syllabicity scale (ie *vocalic*, 1-4, also including the more frequent intense contoids), are not uncommon: *you DO know who I am* [jʊ'dʒu:nɔ(h)muəæm]; Italian: *i suoi autografi* [i'swɔiau'tɔ:grafi] (possibly: [-ɔjau-]), *lo direi a Eugenio* [lodɪ'rei aeu'dʒɛnjo] (possibly: [-ɛ'jaeu-]); French: *papa a à aller à Auteuil* [pa'pa AAalea'œtœj] (also [-A' A-, -A' A-]).

Phonetically, the English words given below are monosyllabic (whether pronounced with two vocoids and one intense contoid, or with three vocoids, or else with two, or with one only) – the American different variants are added in brackets: *towel* [tʰaʊt̩, tʰaʊt̩], *hour* ['aʊə, 'aʊ, 'a:ə, 'a:, 'ɑ:] (Am. ['aʊ]), *fire* ['faɪə, 'faɪ, 'fa:ə, 'fa:] (Am. ['faɪ]), *lower* ['lɔə, 'lɔ:ə, 'lɔ:] (Am. ['lɔ]), *employer* [ɪm'plɔə, -ɔə] (Am. [-ɔə]).

12.11. In languages such as Italian, Spanish, and French, the division of an utterance into syllables takes no account of word boundaries. Therefore, the initial and final contoids of certain words can become part of different, but contiguous phonic syllables. In Italian: *un'altra* [u'nal-tra], *non è vero* [no-nev've:ro], *per andare a Roma* [pe-ran'da-re a'ro:ma]; in French: *mes amis ont été là* [me-za'mi zɔ̃,te-te'la, -za'miō-te]; in Spanish: *los hombres iban al hospital* [lo'sɔmbre 'siβa na'lospi'tal] (with [s] in American Spanish).

Other languages, such as English and German, preserve syllable boundaries, at least to some extent. This occurs especially in the case of stressed syllables. Sometimes it is possible to make semantic distinctions in this way (with varying degrees of consistency), as in these examples: *an aim* [ən'eɪm], *a name* [ə'neɪm]; *night-rate* ['naɪt-r̩t̩, 'naɪt-], *nitrate* ['naɪt-r̩t̩]; *I can see the meat* [ækən'sri ðə'mi:t̩], *I can see them eat* [ækən'sriðəm 'i:t̩].

The different languages of the world not only have their own 'sounds' (and intonations), but they can also have different phono-syllable structures. For example, genuine Italian words (ie excluding recent or lofty borrowings, &c), do not contain sequences of differing CC which do not include /n, r, l, s/. This is because the (Italian) phonological system has assimilated the other sequences, producing geminates: *settantotto* [settan'tɔ:t̩to] (from *se[pt]em* and *o[kt]o*).

The Germanic languages, instead, can have a great number of heterogeneous clusters of CC (and CCC as well), especially in Swedish and Icelandic. Slavic lan-

guages, such as Russian, also have a vast collection of consonant clusters, with their own peculiarities. In Europe, sequences such as /ji, wu/ are generally unacceptable – in English they occur in a very small set of words, such as: *yeast*, *yip* [ˈjiɪst, ˈjɪp], *womb*, *wolf* [ˈwʊm, ˈwɒlf]. But in Chinese, for example, /ji, wu/ is normal, for instance: *yǐ*, *wū* [ˈji, ˈwu].

12.12. We have mentioned (§ 12.1) that the syllable is the fundamental unit in spoken language. Therefore, in phonetic transcriptions the smallest isolated sequence occurring is, in fact, the syllable. This means that when plain ‘non-syllabic’ contoids occur, representing particular allomorphs, they must be joined to nearby vocoids. Cases include the article *l’* in Italian and French, or cogemination in Italian (as in *a cena* [atʃˈtʃeːna], cf 3 of *HPr*). Contoids at the beginning (or end of words), which become part of different syllables, should also be joined in this way.

In normal speech, Italians do not distinguish between *Lavena*, *l’avena*, *la vena*. All of them are pronounced [laˈveːna] (the only possible difference is that the first form has a variant in /ɛ/ [ɛː]), and therefore the most ‘rigorous’ transcription would be to use the transcription above, in all cases. Possibly, in order to provide help for the learner, it would be possible to use a slur (symbol): [laˈveːna, l_aˈveːna, la_vˈveːna]. However, it is advisable to limit such expedients (which are quite a bit less useful than might seem) to a sort of explanatory experiment at the beginning of the learning process. Let us look at a similar case in French as well: *lavoir*, *l’avoir*, *la voir* [laˈvwaʁ] ([laˈvwaʁ, l_aˈvwaʁ, la_vˈwaʁ]).

Length

12.13. The reader can compare § 6.4.1, where the basic ideas were first explained. The length in time of the articulation of a phone is measurable in hundredths of a second (ie centiseconds – $\frac{1}{100}$), or thousandths (ie milliseconds – $\frac{1}{1000}$) but it is sufficient –and more useful– to give relative indications, with respect to an average of 9 $\frac{1}{100}$ per phone, with oscillations ranging from about 6-12 $\frac{1}{100}$. This is, in fact, the necessary length required for adequate perceptibility of *short* phones, those considered to be of ‘normal’ length (except for taps, which –by their nature– cannot be longer than 3-6 $\frac{1}{100}$ without becoming trills or stops). Short phones have no associated diacritics, and are represented by the simple phonetic symbol [n], since they are just normal. If normal phones have less duration than the short degree, they are defined to be shortened and denoted by giving smaller versions of the original symbols as superscripts: [n̠]. When, instead, the length is greater than the normal amount, we have *half-long*, *long*, and *extra-long* phones: [n̠, n̠ː, n̠ːː].

These LENGTH diacritics are called *semichrones*, *chrones*, and *superchrones*, respectively. On a phonemic, distinctive level, we speak of *chronemes*, as in German: *Stadt* [ˈʃtʰat̪], *Staat* [ˈʃtʰat̪ː]. We have already seen that in (British) English, forms like the following ones were transcribed traditionally: *ship* [ˈʃɪp], *sheep* [ˈʃiːp]; *look* [ˈlʊk], *Luke* [ˈluːk]; *not* [ˈnɒt], *nought* [ˈnɔːt]; *hat* [ˈhæt], *heart* [ˈhɑːt]. Since then, transcriptions improved somewhat, giving: [ˈnɒt, nɒtː, ˈhæt, hæːt]; then an-

other step forward was made, reaching the level of: /ʃɪp, ʃi:p/, /lʊk, lu:k/, /nɒt, nɔ:t/. However, we will never get tired of repeating that English /i:, u:/ are diphthongs (and not long monophthongs), and therefore a transcription like [ʃɪip, ʌpu:k] is much more appropriate, together with [ʃɪp, ʌɒk; ʌnɒt, ʌnɔ:t; ʰæf, ʰɑ:t]. In fact, they should have the stress mark as well, even though they are monosyllabic, since other (monosyllabic) words are not stressed in sentence context (as we have said). It is, consequently, important to distinguish forms like *in* [ɪn] (prep.) from ones like *inn* and also *in* (adv.), both [ʰɪn:].

12.14. Distinctive length can also be manifested as gemination, especially for consonants, but also for vowels (in which case, there may even be a diphthong, whether mono-timbric or di-timbric, as has been seen in the case of English [ɪi, ɪu]): *part-time* [ʰhɑ:tʰhɑ:əm, ʰhɑ:tʰhɑ:əm], *part-time job* [ʰhɑ:tʰhɑ:əm ʰdʒɒb], *that time* [ðætʰhɑ:əm] (in modern Germanic languages, consonant gemination occurs only in lexical composition, or in sentence context): Italian: *cade* [ka:de], *cadde* [ʰkad:de]; *ero* [ɛ:ro], *erro* [ɛ:ro]; Japanese: *gaka* [gɛ-kɛ], *gakka* [gɛk-kɛ]; *to-ki* [-tɔ:ɕi], *took* [-tɔ:ɕi]; Tamil: *paḍu* [paḍu], *paḍu* [paḍu]; *kanam* [kanam], *kannam* [kanam]; Hungarian: *vár* [var], *var* [vɔr], *varr* [vɔrr]; Russian: *žat'* (жаты) [ʒatʂ], *sžat'* (сжаты) [sʒatʂ].

A large number of languages use the length of particular segments distinctively, within their particular phonological system. In Arabic, Hausa, Hindi, Tamil, Hungarian, Finnish, and Japanese, for example, both consonant and vowel length are distinctive. Other languages, among which Italian, Bengali, Punjabi, and Amharic, use only consonant length for purposes of distinction. Still other languages, among which generally the Germanic ones, have phonemic opposition between short and long (or diphthongized) vowels. There are also languages such as Spanish, Romanian, modern Greek and Hebrew, Indonesian, and (Mandarin) Chinese, which do not use length distinctively, even though they can naturally have segments which are pronounced with a certain length for phonetic, phonostylistic (ie expression), or paraphonic (ie emotion or health) reasons.

Two levels of (vowel or consonant) distinctive length are more than sufficient, in the languages of the world. In fact, what are supposed to be three distinctive levels of length in Estonian and Lapp are simply combinations of the two basic types. Examples from Estonian include: *jama* [jama], *jaama* [ja:ma], *jaama* [ja:a-ma], *kabi* [kapi], *kapi* [ka-pi], *kappi* [kap-pi].

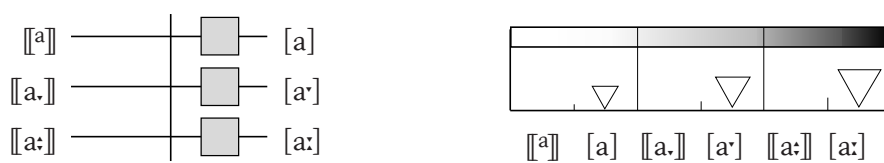
Particularly in those languages which use pitch distinctively, there is a frequent use of *morae* (singular *mora*), which are the minimal units of length (Greek *μόρα* 'division'). These units correspond to a short, or light syllable (such as /a/). A mid, or medium, syllable has two morae (made up of two vocalic elements, or of a long vocalic element, or of a short vocalic element followed by a consonantal one, which in turn may be normal –voiced or voiceless– or 'syllabic' (intense), as for example /aa, a:, an, aṇ, ad, at/). A long, or heavy, syllable has two vocalic elements and one consonantal one, or instead one vocalic and two consonantal ones (/aan, a:n, aaṇ, a:ṇ, ann, and, ant/).

In the systematic description of a language (and, better yet, while comparing

multiple languages or regional accents), it could be useful to use a diagram which does a better job of showing the value of every symbol of length (every chronetic symbol). Therefore, beginning with the more specific symbols (already listed in § 11.21), we give the *chronogram* as well (in fig 12.2). For a level of (phonetic) length less than those of the three *fundamental* degrees, [a, a', a:], it is possible to use the three *supplementary slightly reduced* levels, [ạ, a̤, ḁ:], respectively. We simply provide the diagram, with two possible types of scales to represent facts concerning length (their use can be easily intuited, even if they are not directly applied here).

In any case, we observe briefly that in Italian (respect to German, for example), it might be considered desirable to use [ː]: *bene, male* /bɛːne, 'maːle/ [ˈbɛːne, 'maːle] instead of [bɛːne, 'maːle]. Or in Spanish protunes, one could use [ː]: *quiero hablar* /'kjero a'βlar/ [ˈkʲɛːro aβlar], instead of [ˈkʲɛːro aβlar]. Finally, in American English (especially mediatic [treated in § 2.4.2.1-5 & § 2.5.2.4 of our *HPr – A Handbook of Pronunciation*]), it could be considered desirable to transcribe *heat, short* as [ˈhiːt, 'ʃɔːt], instead of [ˈhiːt, 'ʃɔːt] (in neutral American pronunciation, we have: [ˈhiːt, 'ʃɔːt]).

fig 12.2. Chronograms to show different degrees of length.



Pitch & tones

12.15. The melodic height (and movement) on a syllable is called **TONE** (cf § 6.4.4). Pitch is primarily determined by tension and vibration of the vocal folds and of the whole larynx. The more the folds are *tightened* or *loosened*, the more pitch becomes higher or lower. The effect can be accentuated by increasing the pressure of expiratory air and by raising the larynx; on the other hand, it can be diminished by reducing the pressure and lowering the larynx.

Pitch range is individual and relative, not absolute – to see this, it is enough to consider the notable differences between the average voices of men (low), women (mid), and children (high). Moreover, within each of these classes, there are innumerable possibilities for variation, including juxtapositions and exchanges from one class to another. See fig 6.17-18 and the tonograms from the phonosyntheses of tone languages (ie languages with ton[em]es), as well as fig 11.10-20 & fig 12.3-6 in *HPr*, for Mandarin Chinese and Japanese.

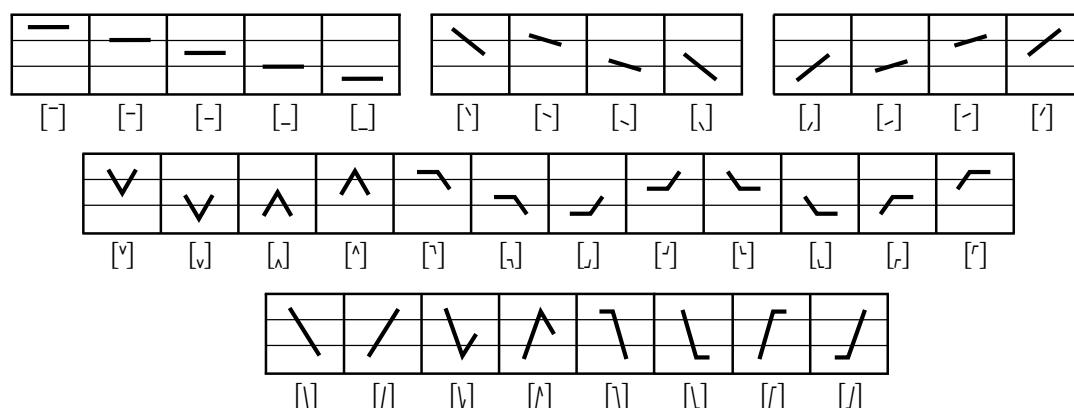
The range of pitch can be usefully divided into three juxtaposed bands: *high*, *mid*, and *low*. Of these three, the two bands on the ends are **MARKED**, while the central band is 'normal', neutral, **UNMARKED**. Thus in the mid band, no particular symbols for tones could be required, and so [ˈ\$, '\$, ˌ\$, ˙\$, ˘\$] might indicate syllables with mid tone and, respectively, *extra-strong*, *strong*, *medium*, *weak*, and *reduced* stress.

Vietnamese, Thai (or Siamese), and Burmese, have TONEMES (ie distinctive tones) on every syllable (or almost every syllable). These tonemes can be of various types: compound, gliding, or level. Sometimes, they are also accompanied by particular phonation types, such as creaky voice (or laryngealization), or breathy voice (or lenition).

In African languages, such as Yoruba, Ewe, and Hausa, level and gliding tones (and tonemes, of course) prevail (often the gliding ones are combinations of two level tonemes). In other languages, such as Swedish, Norwegian, Croatian, Serbian, and Japanese, various combinations of pitch and stress on different syllables of the word, or rhythm group, determine the marked forms in comparison with the unmarked ones.

Normally, two different tonemes on elements which form a single syllable (with /V:, VV, VN/) assimilate one another. This occurs, for example, in Japanese: *kondo* [ˌkɔ̃ɴ.dɔ̃] (//. .//), which shows a moderate change from mid to low levels.

fig 12.3. Principal tones: symbols and tonetic characteristics.



Of course, slightly different shapes are quite possible and normal, depending on languages and accents (as, also in vocograms, the exact positions are not at all alike and fixed).

The tonograms in fig 12.3 only show the tones uttered with a strong stress [ˉˉˉˉˉ] [ˊˊˊˊˊ] [ˋˋˋˋˋ] (here we give only the first three series). But, different degrees of stress are also possible, as we already know. Thus, three slightly less strong series are [ˉˉˉˉˉ] [ˊˊˊˊˊ] [ˋˋˋˋˋ]. The correspondent signs for a secondary stress are [ˉˉˉˉˉ] [ˊˊˊˊˊ] [ˋˋˋˋˋ]. For a weak stress, we have the following five positions [ˉˉˉˉˉ]. An emphatic stress has [ˉˉˉˉˉ] [ˊˊˊˊˊ] [ˋˋˋˋˋ]. While milder emphatic series are [ˉˉˉˉˉ] [ˊˊˊˊˊ] [ˋˋˋˋˋ]. As we said, these degrees of stress are possible with any other tones.

For instance, in Mandarin Chinese, we can certainly have (showing only the basic tonemes, without taxotones – with emphatic (or extrastrong), normal (or strong, or primary), and median (or secondary) stress: T1 [ˉˉˉˉˉ], T2 [ˊˊˊˊˊ], T3 [ˋˋˋˋˋ], T4 [ˉˉˉˉˉ].

Tonetic practice

12.17. In order to work with intonation (and tones), it is important to be acquainted with *pitch*, which is simply the height and melodic variation of speech (in one syllable at a time, stressed or unstressed). Pitch is determined by tension and vibration of the vocal folds and of the entire larynx.

The more the folds are tightened, the higher the pitch becomes; naturally, when they are loosened, the pitch becomes lower. The effect can be accentuated by increasing the pressure of expiratory air and raising the larynx. In the same way, the effect can be attenuated by lessening the pressure and lowering the larynx. At this point, it is absolutely indispensable for the reader to take a bit of time and investigate this mechanism.

It is necessary to become precisely aware of the correspondences between pitch movements and glottal tension and position (in the vocal folds and larynx). It goes without saying that the task can become appreciably easier if the reader records the attempts and listens to them calmly and repeatedly, possibly working with very small snatches of the recording at a time (and therefore pressing the pause button often).

In the beginning, it will be enough to make any sort of attempt whatsoever, to try to pass from one pitch to another, perhaps with big jumps to perceive the differences better. Afterwards, however, it will be necessary to work more systematically, attempting to execute more gradual and planned movements, after having accurately written them down.

The attempts should be carried out (whether planned ahead or not) by saying into a microphone what is meant to be recorded (or, more prudently, what has actually been recorded, since intentions are one thing, but actions are another). In this way, it is possible to compare the actual execution with what was planned. These exercises should be organized so as to cover the full range of possibilities, from static pitch levels to various types of different and combined movements. Stress and length differences can be added as well.

At the beginning, it will be unquestionably necessary to plan on fairly long practice, with many repetitions. After covering the various combinations of pitch level and gradual movement which are possible, one should then move on to identifying one's own intonation characteristics.

12.18. It is clearly necessary to proceed while constantly recording oneself, and particularly to do so without becoming overly depressed. Discouragement often comes from hearing one's own voice and one's own pronunciation characteristics (which at the beginning can be a rather unpleasant experience), as well as from the feeling of not being able to do anything decently. We hear our voice on a cassette recorder—or, nowadays, from a computer sound file—in a different way than we are accustomed to hearing it. In fact, when we hear our own voice, we hear it not only from vibrations in the air, but also from vibrations which propagate through the bones of the skull, directly from the phonatory mechanism to the auditory one.

As for the other problem—our apparent perceptual and productive limitations—it is enough to remember that we are not at all used to efforts of this type, and therefore they require time and personal commitment. The tonograms of 6 & 7

13 (fig 6.17-21 & fig 13.1-9) will certainly be of help, as will the phonosyntheses of 16-23, or those in *HPr*; they are not at all superfluous, nor useless, nor inaccessible, either. It is sufficient to work at them without superficiality and without distrust – they will more than repay the effort!

The pitch range (that is, the full range from the highest pitch to the lowest pitch), therefore, is individual and relative, not absolute. As we have pointed out in § 12.17, there are noteworthy differences between the voices of *men* (generally low), of *women* (higher), and of *children* (still higher, cf fig 13.1), and there is a great range of variation even with respect to these norms. Each person must put a bit of effort into discovering and analyzing his or her own pitch range, which is more limited in extent than the range in singing.

Working as always with a computer sound program –or a tape recorder– the reader should be recorded while speaking ‘spontaneously’. That is, one should not just read a written text chosen at random, but pronounce various words and sentences of different types, uttering them, however, as if they were occurring in natural conversation. For this purpose, the examples from fig 13.2.1 would work very well (although they represent just neutral British English intonation); they will, then, need to be listened to repeatedly, both as a whole and using the pause button to segment them. Of course, for other accents and languages, it would be a very nice thing to be able to rely on the corresponding curves. Many such curves, on tonograms, are already available from our books. Others can be found in some pdf files freely downloadable from our web site. Many more are appearing either in our site or in our books.

It will, then, be important to focus on the various details, which as the exercises proceed, will come out more and more clearly and seem more and more obvious, even if they went completely unnoticed at the beginning. It is necessary to learn to listen to every single characteristic and to every component and variation, independently from the others, simultaneously present. The characteristics are woven together in a sort of tangled web, which is however harmonious and even melodious.

In fact, the reader must succeed in hearing, not just the entirety and not just generalities, but also in listening to the single characteristics, perceiving as many details as possible. Something similar occurs while listening to a full orchestra: it is possible to hear the music as a whole, but it is also possible to learn to recognize –and savor– every individual instrument.

All in all, the same is true of all phonetic characteristics. The only difference is that tonetic characteristics are effectively more complex, and therefore require a greater commitment.

12.19. After the initial experiments for discovering one’s own pitch range in speech, the reader should choose sentences in which all the vowels are the same (phonically as well – thus, in Italian for instance, it is important to avoid mixing together /e, ε/ and /o, ɔ/). Possible examples for Italian include: *Quindici bimbi simili di Rimini*, or *Per prevedere tre sere vere*, or *Sono molto forforoso*, or possibly *Mangia la patata salata*, or *Sara sarà andata armata da Catania a Malaga* (with [ˈmapːɟa, kaˈtaɲja]).

These sentences will not necessarily be among the most normal or probable in

conversation. However, the fact of having all of the vowels of the same quality in all the syllables is a great help. The reason is that in this manner, we avoid the risk of being misled by the different pitch intrinsic to the different vowels (even if acoustically different contoids can influence vocoids to some extent).

Therefore, the reader can proceed at this point with less difficulties, modifying the intonation (cf § 6.4.5.1-4 & ¶ 13), moving from a conclusive sentence to an interrogative one, or else a suspensive or a continuative one. The reader should use recordings as always, and listening to the results with care, multiple times. It is necessary to pay attention to all the differences in pitch, while leaving aside other characteristics for the time being. In languages which differ from Italian because they have different vocalic timbres in stressed or unstressed syllables, it could be difficult to obtain suitable phrases and sentences. Thus the words could be changed in order that the same vowels are used instead of the original ones, as for instance in [ɑv'ɑ:nlɑ 'tʰɑ:kɑts ɑndwɑ'n'dɑ:g], [iv'inli 'tʰri 'kʰits iindwɪn'dri:g], [əv'ən-lə 'tʰə 'kʰəts ɑndwɑ'n'də:g] (*I've only seen two cats and one dog*), or it could be possible to simply hum each sentence.

In any case, using our *intonation* system (and perhaps sentences of our own language), we should be able to establish what our low(est) pitch is by considering the end of a conclusive tune, such as (though here examples are still from Italian – with the same vocoid) *da Malaga* 'from Malaga' [da'ma:laga:], as well as the high(est) pitch in *da Malaga?* 'from Malaga?' [ɛda'ma:laga:], which will probably be on the last syllable, or the second or third to last, depending upon whether we have an interrogative tune of the rising type, as in neutral Italian and British English [·'·], or one of the rising-falling type, as in [·'·], [·-·], [·'·] or [·-·], [·-·], [·'·], [·'·], &c (here we show the ideal four-syllable pattern). Then we should try to discover our mid pitch, by seeking a point between these approximate (and individual) extreme points.

Let us note that, in transcriptions of current texts, mid pitch stressed syllables, [·], might be indicated with [-], as in tone languages, but it is not actually necessary: [·-·], [·-·], [·-·], or [·-·], &c.

It is very useful to add voluntary modifications, even if this makes the utterance more forced – the important point is to explore new things constantly. The experiments can involve single words, or even single syllables, with all the vowels, the same as before (but naturally, in the future, it will be necessary to move on to more natural words and sentences, with different kinds of vowels present at the same time).

12.20. For *tones*, as well, it would be good to draw tonograms (the figures with the three juxtaposed bands, as in fig 12.5-7), and to mark what is heard when listening to the recordings.

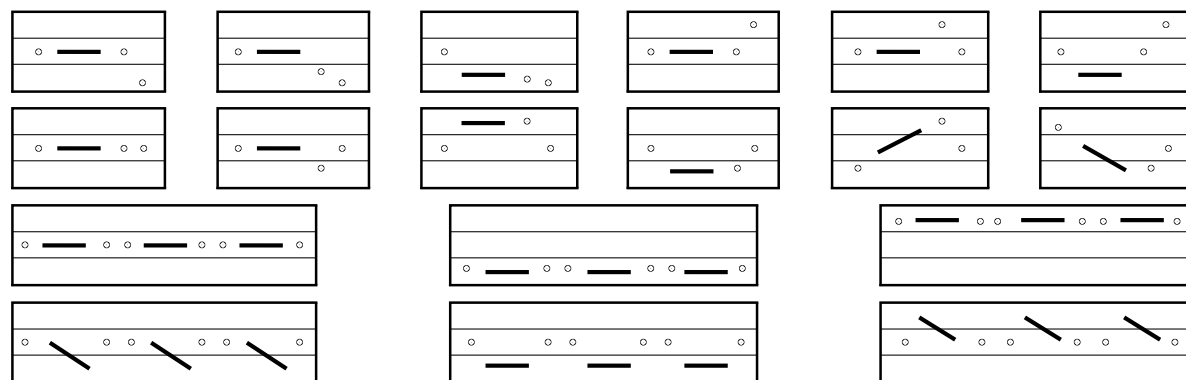
Another possibility is to mark a pitch beforehand, and then work at trying to reproduce that exact pitch perfectly, listening to the recording immediately afterwards. Syllables like *la-la-la* can be used [lɑ:lɑ:lɑ:], and then the pitch can be modified while maintaining the stresses, giving, for example: [_ _], [- -], [^ ^]; [_ ^], [^ _], [^ ^], [^ _], &c.

More syllables will be added: [_ -], [_ - -], and gliding tones will be added as well: [^ ^], [^ ^ ^], [^ _ ^], [^ ^ ^], &c, including more complicated ones and compound

ones: [ɿ], [ʊ], [ʌ], [ʌ̃], [ɨ], [ɨ̃], [ʏ] &c (better than the older –and fewer in number– analytical signs [ɿ̣], [ʊ̣], [ʌ̣], [ʌ̣̃], [ɨ̣], [ɨ̣̃], [ʏ̣], cf fig 12.5, choosing between the tunings and the tones –if present– of the phonosyntheses of *Ḫ* 16-23, or of *HPr*, and other books or pdfs of ours.

It is also possible to use nonsense words, such as: [phaʔʰaʔkaʔ], [phiiʔʰiikiʔ], [phuʊʔʰuukʊʊ] (similar to the patterns [paʔakaʔ], [piʔikiʔ], [puʔukuʔ] we have used in the audio recordings of *Phonetic Notation*, given in the bibliography).

fig 12.4. Tonograms for exercises with tones.

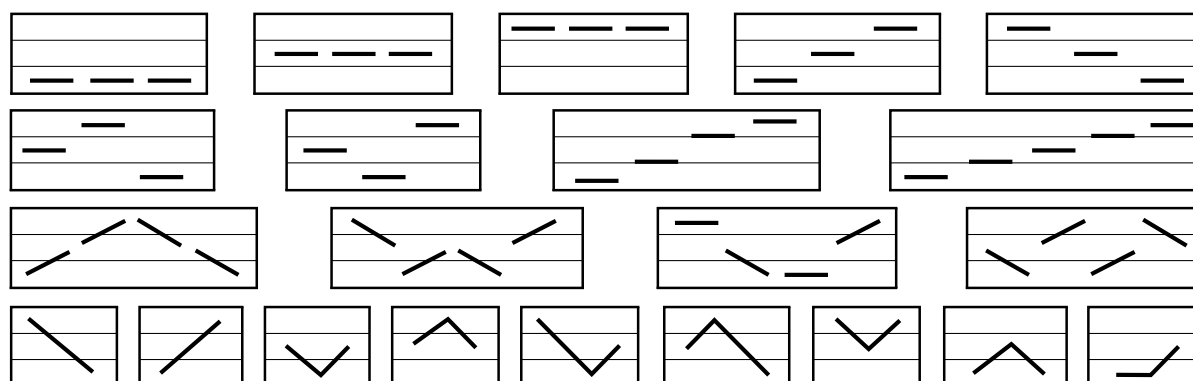


It will also be useful to perform exercises on *intonation*, as well (cf fig 12.6), perhaps after having seen Gh 13, also with [phaʰthaʰkaʰ paʰthaʰkaʰtʃaʰ], [pʰiʰthiiki pʰiʰthiiki-tʃiʰ], [pʰuʰthʰuuku pʰuʰthʰuukuʰtʃuʰ], alternating between *tunes* like [·'·.], [·'·.], [·_·.], and [·'·:], [·'·:], [·_·:], and [·'·:], [·'·:], [·_·:], [·_·:], [·'·:], [·_·:], as a start.

And it would not be a bad idea to try *protunes* with various peculiarities, using [phaʰtʰaʰkaʰ paʰtʰaʰkaʰ paʰtʰaʰkaʰ], [pʰiʰiʰtʰiʰiʰkʰiʰ pʰiʰiʰtʰiʰiʰkʰiʰ pʰiʰiʰtʰiʰiʰkʰiʰ], [pʰɯʰuʰtʰɯʰuʰkʰuʰ pʰuʰtʰɯʰuʰkʰuʰ pʰuʰtʰɯʰuʰkʰuʰ/], as in, for example: [·¹·¹·¹·¹·¹] (or [·¹·¹·¹·¹·¹·¹]), [·¹·¹·¹·¹·¹·¹·¹], [·¹·¹·¹·¹·¹·¹·¹·¹], [·¹·¹·¹·¹·¹·¹·¹·¹·¹], [·¹·¹·¹·¹·¹·¹·¹·¹·¹], [·¹·¹·¹·¹·¹·¹·¹·¹·¹·¹], &c.

As we have already said, having the same vowels and the same sequences makes it possible to concentrate on the pitch, without distractions and without having to worry about remembering a particular sentence. The voiceless C can be useful to segment these strings better, especially if using some computer acoustic programs (to help beginners or less gifted readers).

fig 12.5. Further tonograms for possible exercises.



Stress

12.21. In addition to the fundamental ideas seen in § 6.4.2-3, we add here that STRESS is the increase of muscular activity and air pressure in the lungs, larynx, and articulatory cavities, applied to one particular syllable. Therefore, on the part of the speaker, there is a greater general effort. That is to say, there is an increase in expiratory energy, in laryngeal tension, and in articulatory force, with respect to weaker syllables. In fact, even for syllables 'without stress', a certain amount of both physical and mental effort is necessary. Moreover, in order to be audible, even the weakest syllables have to have a certain length, pitch, and force, together with a certain (intrinsic) perceptibility, provided by the phones of which it is composed.

As is well-known, these four factors (ie timbre, force, pitch, and length) combine together differently, according to the different languages and the particular syllables in question, to produce a sufficient amount of *prominence* (cf § 13.1). This prominence is what matters in every language, whether the location of stress is distinctive or not. Those acoustic analyses which 'reveal' that one single element (out of intensity, frequency, and length) is responsible for accentual prominence, are definitely imperfect and lacking, as well as being misleading. In fact, they fail to balance and compensate for all the components, in their actual proportions, which can change depending on the intonation movements of sentences and on (phonetic ^{or} phonemic) length. Instead, the human ear of a native speaker succeeds in all of these tasks, and often the ear of a foreign speaker can also perform well in these respects. Machines cannot compete with human capacities, because they are too limited and too selectively objective, and lack the indispensable quality of flexibility.

From a perceptual point of view, listeners normally manage to distinguish which syllables are stressed by putting together all the available elements of the utterance, in order to reconstruct and deduce the way in which they would themselves produce those elements to obtain analogous results. For practical purpose, we can speak of the process in simplified terms of *force* (production) and *volume* (perception). Therefore, once the prominence of a syllable has been established, excluding severe variations in pitch, length, and timbre (which are present, but occur in their normal, inevitable proportions), the relative differences with nearby syllables can be analyzed, in order to gradually modify the strength of the stress.

It is not rare to find people who cannot find the location of the stress in their own language, when vowel timbres have no significant differences between stressed and unstressed syllables. If they are asked to indicate which syllable is stressed in words like Italian *cavallo*, *margherita*, or even *fare*, *farai*, they may answer completely at random! They do not make mistakes, however, with *farà*, *così*! They are completely deaf concerning prominence (and also concerning the other things not shown in writing, in particular the timbres of *e*, *o*, *s*, *z* /*e*, *ɛ*; *o*, *ɔ*; *s*, *z*; *ts*, *dz*/). There is, however, one way (which goes back at least to certain Latin grammarians and teachers) to learn which syllable is stressed. The person is asked to pronounce the words in question as if shouting them to someone quite far away. Immediately, or immediately after the first try, it will be enough to *pretend* to shout.

Quickly enough, anyone can learn in this way how to tell correctly which syllable

ble is stressed: [ka'val:lo, ,marge'ri:ta, 'fare, fa'ra:i; fa'ra, ko'zi]. In fact, in this way, the stressed phonetic syllable is notably lengthened, and it receives a generally high(er) prominence which is decidedly perceptible. This remains true even though the other syllables (particularly the last one) also gain in prominence – they still gain less prominence than the truly stressed one: [ka'val:lo, ,marge'ri:ta].

Naturally, all this is true of one's own language and, in this case, for an Italian native speaker. However, if this speaker, for example, pronounces *ippodromo* or *gratuito* as [ɪppo'drɔ:mo, ɪgratu'i:tɔ], then this is the stress location that will come out of the exercise (in this case, it is a pattern which should be decidedly avoided [as the present author has indicated in the *D'PI* – Dictionary of Italian Pronunciation – marking these realizations with '↓']). For this reason, in order to get reliable answers, it is necessary to consult a good dictionary, or better still, a dictionary of pronunciation. This is true of native speakers as well, and therefore even more so of foreigners.

In this last case, the method just indicated for finding the stress in a word, will obviously not work. In fact, what would be determined, at most, is the position (correct or otherwise) that the *foreigners* attribute to the given word, according to their personal experiences and knowledge as non-natives.

12.22. In considering normal denotative utterances, it is important to pick out which syllables bear the SENTENCE STRESS (ie *ictus*). These are syllables which have *strong*, or *primary* stress: [ˈ\$]. Other syllables have less strong stress: *mid*, *medium*, or *secondary*: [,\$], or *weak* ('without stress' and –rather– without a mark): [\$]. This last corresponds to the *neutral*, UNMARKED, level of force for a syllable. The syllable remains, however, fully audible, even in cases when the nucleus is *attenuated*, as with [ə, ɪ], &c. It is also possible to have syllables with *reduced* stress, written [˘\$], that is, less than the normal weak stress; this is true particularly in rapid speech. On the other hand, there are also syllables with *extra-strong* stress, [ˈˈ\$], which is *emphatic*.

The different languages can use (the position of) stress in a word as a distinctive element, in a more or less extensive way. From a phonemic point of view, it is appropriate to try to understand the unmarked structure of every language with FREE STRESS (ie, not automatically linked to a particular syllable, for phonological reasons, or reasons of syllable length).

For example: *photograph* ['fɒtə'gɹɑf], *photography* [fə'thɒgɹəfi], *photographic* [fɒtə'gɹæfɪk], (*an*) *increase* ['ɪŋkɹɪs], (*I*) *increase* [ɪŋ'kɹɪs]; in Spanish: *término* ['tɛrmino], *termino* [tɛr'mi'no], *terminó* [tɛr'mi'no]; in Italian: (*io*) *capito* ['ka:pito], (*ho*) *capito* [ka'pi:tɔ], *capitò* [ka'pi:tɔ], *fotografo* [fo'tɔ:grafo], *fotografano* [fo'tɔ:grafano], *fotografare* [fo'togra'fare], *fotografò* [fo'togra'fɔ].

DISTINCTIVE (or *phonemic*) stress, as in some of the cases seen just now for English, Spanish, or Italian, could be called a *stresseme*, in opposition to mere *stress* (or instead, as will be seen very shortly, it would be possible to speak of the *dyneme*, in contrast to *dyne*, in order to use more careful and scientific terminology in this area as well).

At times, it is important to speak of *destressed* syllables, [˘˘\$], not just unstressed ones (ie [\$], but [˘\$] in phonemic formulae). This refers to syllables which are nor-

mally stressed, but which become unstressed, or with reduced stress, in a phrase or sentence. This typically occurs because the words in question are weak monosyllables, or weak elements of lexical compounds (or else to lexemes which are weak in sentence context, for pragmasemantic reasons).

Depending upon languages, the words are typically grammemes and lexemes of little prosodic and pragmalinguistic importance, which have normal primary stress when pronounced on their own, in isolation, or as original forms. Languages can behave differently, in terms of both prosodic and articulatory reduction.

In Italian, for example, in cases like *è vero*, *tre volte*, *poiché*, *benché* we have full reduction from a prosodic point of view, but only partial reduction in terms of the articulations; in fact, we have [ɛv've:ro, trev'vɔl:te, pɔi'ke, beŋ'ke] (cf \mathfrak{G} 3 of *HPr*). In Spanish, prosodic reduction of lexical monosyllables is less than in Italian (cf \mathfrak{G} 6 of *HPr*), and the same is true of northern Italian dialects.

In Catalan (and in some other Romance languages, including many northern and southern Italian dialects), only a restricted set of phonemes generally occur in unstressed syllables of bisyllabic and polysyllabic words, due to the presence of extensive neutralization, even to /ə/.

Often, the vowel phonemes allowed are only /i, a, u, ə/ (Neapolitan), /i, a, u/ (Sicilian), or also /i, ʌ, u/ (neutral Catalan), or /ə, a/ (the Italian dialect of Bari, Apulia).

However, in these languages as well, destressed vowels are generally not a phenomenon having to do with phonic reductions of (isolated) words, but they rather follow the different phonic laws of the utterance (of the word in context and of *connected speech*), that is, of *phone groups*.

In fact, although descriptions commonly emphasize the idea that neutral Catalan has only three V in unstressed syllables, (/i, ʌ, u/ [i, ʌ, u]), in sentence context (and in the first elements in lexical compounds), we naturally find /e, ɛ, a, ɔ, o/ [e, ɛ, a, ɔ, o], as well, as in these Catalan examples: *és gros*, *com més*, *ha fet* [ez'ɣrɔs, kɔm'mɛs, a'fet].

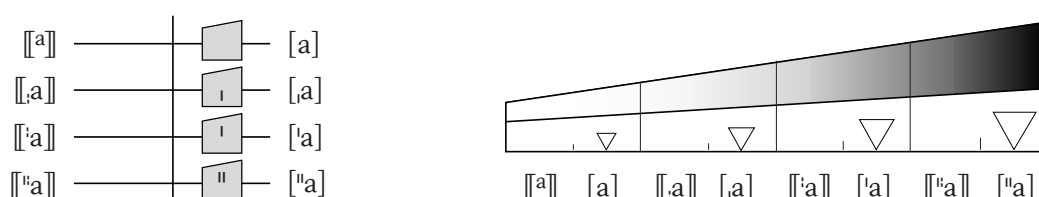
12.23. fig 12.6 gives two diagrams (for two different types of scale) which could be useful for showing the peculiarities of stress in different languages, and thereby in making comparisons on general interlinguistic levels easier. In fact, the *dynogram* (or *stressgram*) makes it possible to observe the continuum of *dynetic* levels (that is, the force of stress, aside from simply functional *dynamic* peculiarities (of course, the word is derived from Greek δύναμις <*dýnamis*> 'power, force, strength') to which the normal markings can refer: weak stress, [], secondary (or mid) stress, [], primary (or strong) stress, ['], and emphatic (or extra-strong) stress, ["]].

In cases where intermediate gradations occur, they could be: half-mid stress, ['] half-strong, ['], and possibly, also half-extra-strong, ["]. An extra syllabic nucleus (usually epenthetic, with functions of support) can be called extra-weak. It can be generically marked with [*] (the same symbol as for perceptible explosion of stops, or other contoids, since the two phenomena coincide in production), or with a superscript of the vocalic symbol, a more articulatorily appropriate method (as we have done in Hindi, *HPr*, § 10.3.1.4).

Observing fig 12.6, we perceive the four *fundamental* categories: [a, ʌ, 'a, "a] (weak, mid, strong, and extra-strong), and the four *supplementary* ones: [ʌ, ʌ, 'a,

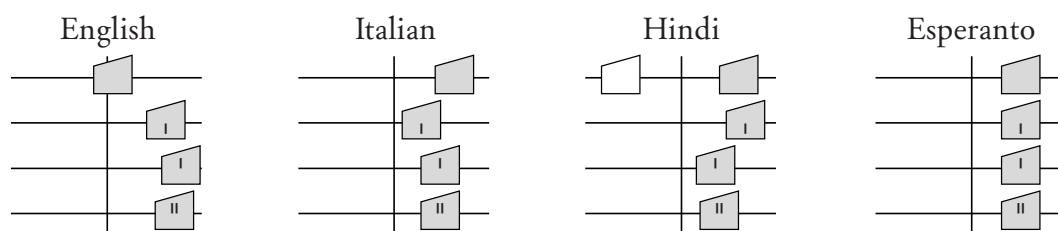
"a] (extra-weak, half-mid, half-strong, and half-extra-strong – added within ([[]]). For each of these, the right half refers to the ‘normal’ position, with the cursor in the middle of it, while the left half is used for levels which are weaker than normal, should these occur. These supplementary intermediate gradations, [ᵃ, ːa, ˑa, ˒a] could be useful for explaining particular cases, as we have, for example, done with certain compounds in English (*HPr*, § 2.3.4.2), German (*HPr*, § 5.3.3.2 & 5.3.3.5), Spanish (*HPr*, § 6.3.2.2), Portuguese (*HPr*, § 7.3.2.2), and Hindi (*HPr*, § 10.3.2.5). Of course, we might suggest more recent and more exhaustive books of ours, already published, or forthcoming. The extra gradations should also be understood as effective possibilities for oscillation.

fig 12.6. Dynograms, for gradations in stress.



In a systematic treatment of the pronunciation of a language, such as in a specific monograph, it is possible to show greater detail. Just as much more space would be given to intonation than in the chapters of *HPr* (where the intonation is given ‘embryonically’, but with all of its potential for applications), it would be possible and useful to present the dynogram (and the chronogram) in their respective sections (or together with the tonograms). Here, we give in fig 12.7 a comparison between English, Italian, Hindi, and Esperanto. Several peculiarities can be noted, including the extra-weak level in Hindi (indicated by the white cursor, used for very short vocoids serving only as support), and, in contrast to the others, the canonical regularity of Esperanto.

fig 12.7. Dynetic comparisons between English, Italian, Hindi, and Esperanto.



Stress (or word stress – mostly with English examples)

12.24. We know that (the position of) stress may be distinctive, in English: *im-port* (noun, adj.) [ɪmpɔːt], *im-port* (verb) [ɪmˈpɔːt]; *present* (noun, adj.) [ˈprez-ɪnt], *present* (verb) [prez-ɪnt].

English sentences usually keep the stresses of their words well, even in mono-

syllabic lexemes (ie lexical monosyllables), while monosyllabic grammes (ie grammatical monosyllables) lack any stress (as, in general, do unstressed syllables in polysyllabic words): *Sam has bought three new small black cats* ['sæmz 'bɔ:t 'θɪrɪ 'njʊu 'smɔ:l 'kʰæts]; but we have: *and there was a large crowd of people* [əndəwəzə'lɑ:ðz 'kʰɪə'rɒd 'vʰrɪpɪ], *but it's of the greatest importance* [bətɪtsɪðwə'gɪɪfɪsɪt ɪm'phɔ:ɪns].

However, in long words (and in sentences as well), many syllables with full vowels generally receive secondary stresses (especially when they occur near unstressed and reduced syllables): *overestimate* [ɔvə'ɛstɪ'meɪt], *visibility* [vɪzə'bɪl-əti], *perpendicularity* [pɜ:ˈpɛndɪkjə'læ-əti], *recognize* [ˈɪk-ɪɡnəz], *Mexico* ['meksɪkɒ].

In compounds, the more frequent structure is ['\$,\$'] (more rarely ['\$,\$']: [fɪf-ˈθrɪn] *fifteen*). Sometimes, even ['\$,\$'] occurs, as in 'collocations' (or occasional –or free– compounds, which are, then, modifiable): *blackbird* ['blæk,bɜ:ɹd] (but *black bird* ['blæk 'bɜ:ɹd]), *bulldog* ['bʊl,dɒg].

Of course, there are also many instances like: *English teacher* 'a teacher of English' [ˈɪŋɡlɪʃˈθri:tʃə] and *English teacher* 'a teacher who is English' [ˈɪŋɡlɪʃ ˈθri:tʃə].

Let us now consider compounds such as *first class* (noun and adverb) and *first-class* (adjective), and the collocation *first class*, in a sentence like *that was the first class to be considered*. From a phonetic point of view, they are alike: [ˈfɜ:s(k) ˈkhlɑ:s]; however, from a phonemic point of view, and for teaching and lexicographical purposes as well, it could be very useful to distinguish them as: /ˈfɜ:sfˈklɑ:s/ (compounds: ' ['\$,\$\$']) and /ˈfɜ:sfˈklɑ:s/ (collocation: ' ['\$,\$\$']').

Besides, patterns are flexibly structured. As a matter of fact, we have: *fifteen* [fɪfˈθrɪn] and *page fifteen* [ˈpeɪdʒ fɪfˈθrɪn], but *fifteen pages* [fɪfˈθri:m ˈpeɪdʒz]; *brandnew* [ˈbrænd(ɹ) ˈnjʊu], but *a brandnew computer* [əˈbrænd(ɹ) ˈnjuu kəmˈpju:tə].

Moreover: *secondhand* [ˈsek-ʍn(ɹ) ˈhænd], but *secondhand clothes* [ˈsek-ʍnˌhænd ˈkhlɜ:ʍ(ð)z]; and *they're all secondhand* [ðeɪzˈɔ:l ˈsekʍnˌhænd]; also *afternoon* [ˈɑ:fˈtə-nɪrən] and *good afternoon* [gʊdˌɑ:fˈtə-nɪrən, gʊd-, gʊd-], but *afternoon tea* [ˈɑ:fˈtə-nɪrən ˈθri].

A few cases can vary according to speech rate, but also whether they occur in tunes or protunes, as well as according to personal choices. Here, we will make use of different degrees of intermediate stress, too, which (without an emphatic one, [ˈ]) are, in descending order: [ˈ], [ˈ], [ˈ], [ˈ], [ˈ].

It is worthwhile observing nuances carefully: *demonstration exercises* [ˌdɛmən-ˈstɪɪʃn ˈeksəˌsæzɪz, ˌdɛm-ən-ˈstɪɪʃn ˈeksəˌsæzɪz], *elevator operator* [ˈel-əˌveɪtəɹ ˈɒp-əˌteɪtə, ˈel-əˌveɪtəɹ ˈɒp-əˌteɪtə, ˈel-əˌveɪtəɹɒpəˌteɪtə], *lighthouse keeper* [ˈlaɪtˌhaʊs ˈkhi:pə, ˈlaɪtˌhaʊsˈkhi:pə]; let us notice and compare: *light housekeeper* [ˈlaɪt ˈhaʊsˌkhi:pə].

12.25. To feel certain about the stress patterns of compounds, it is necessary to look them up in reliable dictionaries. But pronunciation dictionaries are not always the best choice, for this aspect, although, of course, they have to be consulted. We willingly recommend the Random House dictionaries which, for secondary stress, are almost perfect; of course, the stress patterns shown are American (and, practically, International) ones, but, in general, they may hold good even for British English, which, in the meanwhile, may have added *or* kept some oth-

er possible variants (mainly collocation-like, rather than compound-like, so less useful ones: *weekend, icecream, New York, New Zealand, New Hampshire...*).

In addition, the Oxford 'Advanced Learner's' dictionaries show the 'marked' cases of primary stress in several lexical collocations (which are quite unpredictable, syntactically, above all for foreigners).

In (dia)phonemic transcriptions such as ours, the most typical and numerous compounds are shown with a single primary stress /'\$/; the secondary one is easily recoverable, because the second lexeme necessarily bears a secondary stress.

Vice versa, most dictionaries printed in the USA include secondary stress, /'\$/; but usually the non-IPA symbols they use put stresses *after* stressed syllables, unfortunately, not *before*, and simply through a difference in thickness (which, sometimes, is not evident enough, even with both of them *in præsencia*). As a matter of fact, we happen to find, eg 'in scrib' for our *inscribe* [ɪn'skrɪəb] and 'vizə bilə tē' for *visibility* [vɪzə'bɪlətɪ]. But some American dictionaries are misleading, because they mark secondary stress for most unstressed syllables bearing full (unreduced) vowels.

Regrettably, mainly dictionaries published in the UK (even pronouncing dictionaries) do not use secondary stress wisely enough. As a matter of fact, a collocation like *central heating* [ˈsɛntɹəl ˈhiːtɪŋ] is, usually, represented as */sentrəl ˈhiːtɪŋ/, exactly like *centralistic* */sentrəlɪstɪk/, which, of course, is [ˈsɛntɹəlɪstɪk].

However, the more they mark the better, even when things are predictable, provided they do so in an exact and accurate way. Indeed, didactic transcriptions (especially for beginners) should show several characteristics, with no absurd and groundless fear that they may confuse. In reality, too simple a transcription is less useful and, sometimes, misleading, too.

As regards diaphonemic transcriptions in compounds with suffixes, it is sufficient to know which of them are always *non(half)stressable* (/'\$/') and which are prosodically *(half)stressable* (/'₍₀₎\$/'). As a matter of fact, the others, that have full vowels, are always *(half)stressable* (/'\$/'). In addition to those with /ə, ɪ/, the following are always unstressed: *-ic, -ics, -ing, -ish, -ist, -ive, -phil* [-ɪk, -ɪks, -ɪŋ, -ɪʃ, -ɪst, -ɪv, -fɪt] – *rhetoric, politics, lingering, yellowish, novelist, descriptive, anglophil* [ˈrɛtərɪk, ˈpɒlɪtɪks, ˈlɪŋ-ɡwɪŋ, ˈjɛl-ɔʃ, ˈnɒv-əlɪst, dəˈskɪp-tɪv, ˈæŋ-ɡləfɪt] (for *anglophile*, we have [-fæɪl, -fɪt]).

Instead, the following are *half-stressed* (if preceded by an unstressed syllable), but *unstressed* (if preceded by a stressed syllable): *-hood, -ism, -ite, -ize (-ise), -ship, -ule* [-hʊd, -ɪzəm, -aɪt, -aɪz, -ʃɪp, -juːl] – *womanhood* [ˈwʊm-ən-hʊd] (≠ *childhood* [ˈtʃhaɪl-(d)hʊd]), *terrorism* [ˈtɛrɪz-əm] (≠ *Buddhism* [ˈbʊd-ɪzəm, ˈbʊu-dɪzəm]), *Trotskyite* [ˈtrɒtski-əɪt] (≠ *sulfite* [ˈsʌlf-əɪt]), *criticize* [ˈkrɪtɪ-ə-saɪz] (but *baptize* [ˈbæpt-əɪz], in addition to [bæptˈhaɪz]), *scholarship* [ˈskɒl-ə-ʃɪp] (≠ *friendship* [ˈfrɛnd-(d)ʃɪp]), *molecule* [ˈmɒl-əkjuːl] (≠ *globule* [ˈɡlɒb-juːl]).

Sentence stress (mostly with English examples)

12.26. It is advisable to consider as *sentence stress* (or *ictus*), every case of word stress which remains stressed in sentence context, and does not become reduced.

Generally, English does not reduce its ictuses; as a matter of fact, we can easily have examples such as the following (please, note that in phonotonic transcriptions, the symbols /, ; ./ indicate intonation, not just a separation of example words, together with /ʔ/ and /ɛ ɪ ʌ/, which are less ambiguous at first): *Then three nice black cats ran out* [ˈðenː ˈθɪrɪ ˈnaəs ˈblæk ˈkhæts ˌɹæːn ˈaʊtː].

It is preferable to avoid using the term ‘sentence stress’ to refer to the sentence *focus*; this last notion refers to the word, or words (and therefore concepts), which in a given utterance are communicatively more *prominent*; in fact, they are highlighted by virtue of being *new* to the conversation (as opposed to being already *given*, or *known*).

Sentence stress and focus are in fact two distinct attributes, although they are not necessarily incompatible. In fact, they can both be present in the last stress group, even though this possibility is statistically the least frequent: *I never said that was true* [aʊˈnev-ə ˈseɪdː ˈðæp wʌzːtʰɪjru, -æʔ, -æʔ].

In practice, it is much more probable for the sentences above to be uttered as follows (although we leave with readers the task of making their own phonotonic transcriptions): *I never said that was true* [aʊˈnev-ə ˈseɪdː ˈðæp wʌzːtʰɪjru..], or [aʊˈnev-ə ˈseɪdː ˈðæp wʌzːtʰɪjru..], or better [aʊˈnev-ə ˈseɪdː ˌðæp wʌzːtʰɪjru..].

Therefore, a concrete utterance (which is sufficiently long) will have multiple *ictuses* – ie *protonic* syllables and one or more *tonic* syllables (in the rigorous sense of *stressed syllables*, respectively, in the *protune* or in the *tune*).

At the same time, the utterance can even have one or more points which are communicatively *highlighted* (ie the *sentence foci* [ˈfɜːsə, -kə, -ki]), and these are generally expressed by different proportions of stress and pitch.

The sentence *These are the new co-workers of my neighbor Roberta* (British spelling -our) can be variously realized, with single or multiple highlights. We can therefore encounter: *These are the new co-workers of my neighbor Roberta* [ðɪzəðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..], or also [ðɪzəðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..], or else also [ðɪzəðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..].

In any case, the elements highlighted can be grammemes, as well, in case of particular contrasts. With the examples above, we can have: [ðɪzəː əðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..], or [ðɪzəː əðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..] (with *are* highlighted), or even [ðɪzəðəˈnjruː ˈkʰɜːwɜːkɪz əvmaəˈneɪbə ɹəˈbɜːtə..] (with *new* destressed, but with *my* highlighted, for some particular reason).

Some kind of attenuation can occur in parts of the sentence rendered ‘parenthetical’, as in the following example, which is spoken as a sort of afterthought: *of my neighbor Roberta* [əvmaəˈneɪbə ɹəˈbɜːtə..].

12.27. In *idiomatic use*, we find that given word sequences, which can also occur in their literal sense, present outwardly ‘strange’ (or *marked*) stressing. In fact, grammemes, or qualifiers, are brought out instead of the lexemes that accompany them, because these last are destressed (here shown by means of /|/, which becomes distinctive).

More often, we find the sequence *grammeme + attenuated lexeme*, as in: *for one thing* [fɜːwɛnːθɪŋ], *on the other hand* [ɒnðɪəð-əhænd], *by no means* [bəˈnɜː]

,mɪnz], *by all means* [baə'ɔ:tɪmɪnz], *at any rate* [ə'tʰɛn-iɹɪt], *in any case* [ɪn'ɛn-i-kheɪs], *in any event* [ɪn'ɛn-iəvɛnt], *in that event* [ɪn'dæʃ-əvɛnt], *on that score* [ɒn-'ðætˌskɔː], *in no time* [ɪn'nɜːwɪthaɪm], *in the long run* [ɪndə'lɒŋrʌn], *(even) at the best of times* [(i)vən ətðə'bɛstəvɪthaɪmz].

Some other times, instead, we find *attenuated lexeme + accentuated grammeme*, as in: *I know what* [aɪə nɜːw'wɒt], *that's about it* [ðætɪs əbaʊt'ɪt], *fancy that!* [fænsɪ 'ðæt]

Thus, *idiomatic stressing* gives a particular meaning, to certain lexical collocations, which is *not* literally predictable.

On the contrary, in the *literal sense*, their stress is the 'normal' one, which *is* predictable from the syntactic order of their words, each one bearing its usual meaning, as for: *in that event* [ɪn'dæʃ tʰɛnt], *by all means* [baə'ɔ:t 'mɪnz], *on the other hand* [ɒndɪ'eð-ə 'hænd], *that's about it* [ðætɪs əbaʊtɪt].



13. Macrostructures

(mostly intonation)

Prominence

13.1. The degree in which a syllable stands out among adjoining syllables in an utterance is defined **PROMINENCE**, as already mentioned.

It is the result of different combinations –depending on languages and speakers– of four fundamental elements: the **TIMBRE** of the phones, which form a syllable (ie their relative intrinsic *perceptibility*, determined by articulatory characteristics), **STRESS**, or *strength* of realization, relative **PITCH**, and **LENGTH** (or *duration*). For practical purposes, it is better to analyze the four elements separately (cf ¶ 12).

Rhythm & rhythm groups

13.2. Every language has its own particular rhythm, deriving from the structures of its syllables and rhythm groups.

RHYTHM is the result of regular occurrences of prominent syllables in the speech chain. Generally, the alternation of stressed and unstressed syllables is fundamental. In many languages, stressed syllables may also be long(er) *or* be on a marked pitch – high or low (ie different from the mid –unmarked– value).

To all this, some languages may also add a considerable reduction in the duration *or* timbre of the phones of unstressed syllables (indeed some of these phones, often, drop completely, as happens in English, for instance). In quite a large number of languages, duration *or* pitch do not depend on stress; consequently, they may contribute to increase or diminish the prominence of both stressed and unstressed syllables. These characteristics are *chronemic* (ie short phones functionally opposed to long ones, being phonemes) and *tonemic* (ie syllables with different –functional– tones, ie *tonemes*).

13.3. **RHYTHM GROUPS** (or stress groups) are formed by –at least– one syllable with strong stress. Usually, a stressed syllable is accompanied by other syllables, with *secondary* (or *mid*), *weak*, or *reduced* (or *weakened*) stresses. Furthermore, they show considerable internal cohesion, not only on the phonetic and prosodic level, but also on the semantic one; which means that they have a precise global meaning.

The rhythm groups of certain languages may have only few weak syllables, alternated with mid ones. Other languages, instead, may have quite long sequences of weak or weakened (or reduced) syllables (with shortened phones and attenuated timbres).

English and the Apulian dialect of Bari and Foggia (and others in higher-south-

ern Italy) belong to the latter group of languages; on the contrary, the following belong to the former: Italian, Spanish, French, Brazilian Portuguese, Polish, Czech, Hungarian, Swahili, Hausa, Japanese, Vietnamese. Other languages have intermediate positions: more or less near one group or the other. For instance: German, (Lusitanian) European Portuguese, Russian, Arabic, Hindi, and Chinese are among them.

Here are some examples: *And there was a large crowd of people waiting for them:* [ɲðwɔzəˈlɑ:ðz ˈkɦɪɑoð ɣˈphɪɪpɪː ˈweɪtɪŋfəðm̩.]; *I'm gonna take all of them to the performances:* [aəmgwɒnəˈɦeɪk ˈɔːləðm̩ː ɹəðəpəˈfɔːmənʒ̩.]. English examples will be given only in neutral British pronunciation, to make comparisons easier and simpler.

On the other hand, let us consider these Italian examples (which are a translation of the English ones): *E c'era una gran quantità di gente ad aspettarli* [etʃtʃeraunaˈgran kwantiˈtad diˈdʒɛnːteː aˈdaspɛttarːli.]; *Li porterò tutti quanti agli spettacoli* [liˈportɛrɔt tuttiˈkwanːtiː aˈlɪspɛttˈaːkoli.].

Pauses

13.4. A PAUSE is a momentary break in speech, which takes place for various reasons: physiological (ie breathing), semantic (ie meaning), logical (ie connection), psychological (ie attitudes), and pragmatic (ie communicative strategies). It is convenient to measure pauses in reference to the number of syllables which could fill the time of their duration, resulting from an average of both stressed and unstressed syllables. Therefore, we speak of *short*, *mid*, and *long* pauses, of about 3, 6, and 9 syllables respectively, or rather of about 2-4, 5-7, 8-10 mean phonosyllables: [], [||], [|||].

If a short pause is not certain, or may be missing, it is indicated by [:] and is better defined as a *potential* pause. Sometimes, above all for psycholinguistic or behavioral purposes, it may be necessary to indicate pauses in a more precise way: in hundredths of a second; especially when they differ from expected 'normal' ones.

Usually, in *pause groups* (ie what is included between two pauses), normal speech uses two or more rhythm groups, which are linked to convey a fuller sense.

Sometimes, a pause group coincides with one rhythm group; at other times, combinations of rhythm groups in different pause groups change the meaning of similar utterances, often much more than the presence or absence of tones within the utterance itself, as in: *You may go now* [jəˈmeɪˈgɔː. ˈnaːo..], quite different from *You may: go now* [jəˈmeɪ. ˈgɔː ˈnaːo..], again different from *You may. Go, now* [jəˈmeɪ. ˈgɔː. ˈnaːo..].

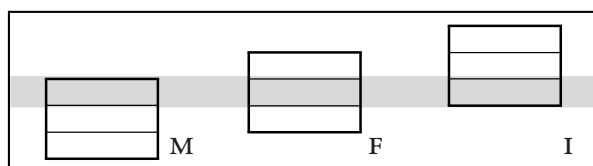
Pitch & tunings (or intonation groups)

13.5. fig 13.1 schematically shows the relationship between the three fundamental types of voices: *male* (M), *female* (F) and *infant* (I); the grey band helps to realize that the same *absolute* pitch corresponds to quite different *relative* pitch levels. Of course, among the three groups (already introduced in 12.17 & § 12.20)

there is a fairly gradual transition, since –for each one– we can easily find more or less high/low voices, in addition to those representing the average of each group.

When two or more pause groups are linked together, their meanings are co-ordinated as well; therefore, they are combined into something wider and more coherent, thanks to a particular intonation contour. Thus we get TUNINGS, which may even coincide with one rhythm group, or one word, possibly formed by one syllable, again: *Yes?* or *Here*.

fig 13.1. Relationship between male, female, and infant voices.



Paragraph & text

13.6. When one or more speakers continue on the same subject, with semantic cohesion, a sequence of tunings is technically called a PARAGRAPH. From a prosodic point of view, a paragraph is usually characterized by given rhythm and intonation features, which determine their internal cohesion, in contrast to other paragraphs, within the same *text*.

Generally, a paragraph ends with a greater pitch lowering (compared to normal pitch), which is marked with [.] at the end. Likewise, a paragraph may begin at a slightly higher pitch, marked by [°] at the beginning. This guarantees internal unity and coherence, in contrast with other paragraphs.

A simple kind of paragraph is constituted by sayings: *When the cat's away, the mice will play* [°~wɛn ðʊ'khæts ʊ'weɪ. ðə'mæʊsɪ 'phleɪ..].

A TEXT may be constituted by a speech, a lesson, a (university or public) lecture, a news bulletin, a sermon, a soliloquy, a joke, &c. A *paragraph* may be constituted by the sentences of different speakers, when the text (presenting semantic and pragmatic cohesion) is a conversation, a phone call, an oral examination, an interview, a quarrel, &c.

The text is not necessarily long: even *Here?* – *Yes* may be a text, supposing that the two speakers share certain presuppositions.

Rate

13.7. Languages (and speakers) have different rates of uttering. RATE can be measured in words per minute (100-200 on average), in phono-syllables per second (2-5), or in phones per second (6-20).

In general the number of words and syllables varies according to their structures and extensions; the number of phones varies according to their (phonetic and phonemic) duration.

Moreover, rate varies according to particular semantic, social, and pragmatic factors. *Conversation* itself can be classified in at least three different types: *slow*, *normal*, and *quick*. Consequently, the numbers given above tend to move towards the limits indicated, or even to slightly exceed them.

Pause incidence is connected with rate, too. Indeed, there is a limit beyond which phones cannot be shortened or lengthened without becoming incomprehensible, or ridiculously intolerable. Therefore, the quicker/slower the rate is, the more the duration and number of pauses will be reduced/increased.

In a *normal conversation*, pauses take almost *a quarter* of the total duration of a text. But the time taken by pauses can be longer: up to *half* of the total duration. There are cases (or particular moments) where pauses can even take three quarters of the total time (without falling into pathology); but such cases fall within the aims of paraphonic analysis.

Intonation

13.8. INTONATION (as can already be inferred from § 6.4.5.1-4) is constituted by the relative pitch of syllables forming more or less long sequences of connected speech.

These sequences are called TUNINGS and can consist of pause groups (which, in turn, consist of rhythm groups); but they can also consist in a single word – which can even be monosyllabic: *No*. – *No?* – *No!* – *No...*

What is essential is that pitch –through given differences– adds (or, rather, gives) different pragmasemantic nuances –such as ‘statement, question, command’, &c– to phonic sequences which could otherwise be identical.

Thus the difference obtained is not merely semantic, conceptual, as in the case of ton(em)e languages, such as Chinese. However, by using the same principles and the same symbols of syllabic-tone notation, we can accurately (and without too many problems) transcribe the characteristics of pitch and strength of the syllables of a whole utterance. In fact, stress-tonal signs show both the relative pitch and stress-degrees of the syllables before which they are put.

First, let us see (fig 13.2.1) an iconic and simple way to introduce people to into-

fig 13.2.1. ‘Icono-ono-graphic’ examples for intonation.

1	See you on Saturday.	
2	(Will they) see you on Saturday?	
3	(If they don't) see you on Saturday...	(it'll be a total disaster.)
4	(If they don't) see you on Saturday...	(don't worry about it.)

nation: by carefully reading the examples given, and following the highs shown for every grapheme.

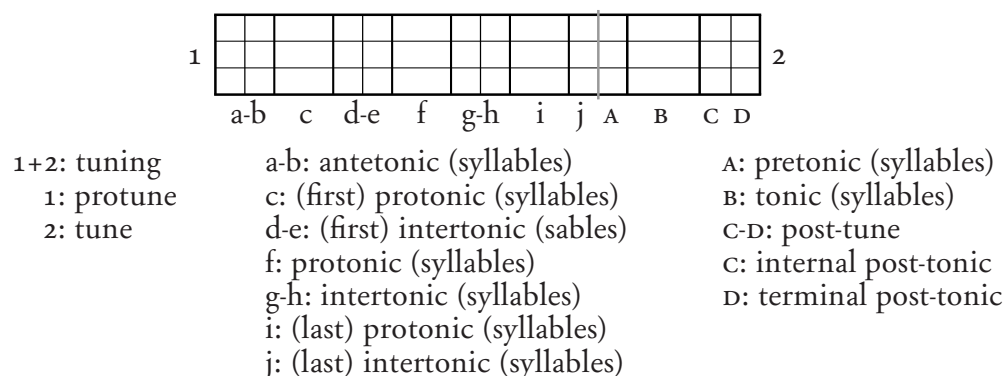
Now, we can go to fig 13.2.2, where we can see the whole pitch extension of an utterance, which is called a TUNING (or intonation group, cf fig 13.5-6, § 13.11 & fig 6.21). It is divided into a PROTUNE and a TUNE). Here we anticipate that a general *tune* consists of three parts: a PRETONIC syllable, the TONIC (ie the stressed) one, and (two) POSTTONIC syllables.

A *protune* consists of one or more *stressed* and *unstressed* syllables (which are called 'protonic' and 'intertonic' syllables, respectively).

Sometimes, it could be important to refer explicitly to the first or last 'protonic' syllable, in the description of certain languages with particular protunes. Usually, the first protonic can be preceded by some 'antetonic' (ie initial unstressed) syllables.

13.9. In anticipation of what will be dealt with presently (from § 13.11 onwards), we may say that there is a 'normal' *protune*, for statements, which has no particular symbol since it is the unmarked one: / /. There are, then, three marked protunes: *interrogative* (/̇/), *imperative* (/̇/), and *emphatic* (/̇/). These symbols are put at the beginning of an utterance, but not in the poor syntactical meaning of a 'school sentence'.

fig 13.2.2.2. Tuning.



For the French language, it is necessary to add a fifth protune, for partial questions (/̇/), which contain an interrogative word), instead of the normal one (/̇/), as can be seen in *HPr* (in fig 4.3; see § 4.3.5 as well). It is true, though, that at a greater level of formalization we could avoid introducing this peculiar (notational and categorial) innovation, by using extraphonic information and recognizing interrogative lexical elements (such as *qui*, *quand*, *combien*, *comment*, *pourquoi*, *où*) as belonging to a particular group.

Nevertheless, from a descriptive and contrastive point of view, more practical (and less theoretical) structures seem to be preferred; thus it is sufficient to find /̇/ to realize we are dealing with partial questions and not with total questions (/̇/).

We must make it clear at once that *written* sentences are one thing, while the *spoken* language is quite another reality, often very different indeed. Naturally, in

the spoken language, tunes are much more numerous than ‘simple sentences’ of grammar and syntax, as will be seen below. Indeed, plain and linear syntactic sentences, from a true linguistic point of view (ie actually spoken sentences in real and spontaneous speech, even if uttered by professional actors), very rarely coincide with phonic sentences. As a matter of fact, almost any syntactic sentence is made up of at least two or three phonic sentences, or better *tunings*.

But let us consider *tunes*. Generally they are formed by the *tonic* syllable (ie the stressed one, which is also the last strong syllable in an utterance, in a sense), the *pretonic* (ie the possible unstressed syllable before it), and the *post-tonic* syllables (ie the possible unstressed syllables after it). In the tonetic diagrams (or rather *tonograms*), two post-tonic syllables are indicated (ie internal and terminal); sometimes it is useful to refer to one of them, clearly, in order to highlight typical movements more clearly, above all to distinguish interrogative tunes of the rising type ([·'·]), from those of the falling type ([·'·]). In any case, the term *post-tune* may be used to refer to both syllables, collectively.

We will now consider, concisely (and by looking closely at fig 13.4), the three marked tunes (of neutral British English): *conclusive* (/./), *interrogative* (/?/), *suspensive* (/;/), and the unmarked: *continuative* (/./) – *On Saturday* [ɒn'sæt̪-əˈdɛɪ., -əˈdɪ..], *On Saturday?* [ɒn'sæt̪-əˈdɛɪ?, -əˈdɪ·], *(If not) on Saturday... (then...)* [ɒn'sæt̪-əˈdɛɪ., -əˈdɪ·], *(Perhaps) on Saturday, (but...)* [ɒn'sæt̪-əˈdɛɪ, -əˈdɪ·].

13.10. The best way of dealing with the intonation of a language consists in presenting its structures through appropriate and clear diagrams (ie tonograms), with clear examples and a simple and sufficiently complete notational system (not cumbersome and useless).

First of all, we must repeat that the use and choice of intonation patterns do not depend on syntax at all, but on *semantics* and *pragmatics*, and above all on *communicative goals*. In fact, even if the syntactic formulation is, in the end, the most evident linguistic rendering (for those who are used to reading and writing), in actual fact, it is nothing but a faithful representation of the pragma-semantic way to express concepts and thoughts, peculiar to every language.

If, for instance, we write –and beforehand say– *I've been looking for this for ages* [aɐvbn̩ˈlɒk-ɪŋ fəˈðɪs.. fɪˈeɪdʒɪz̩..], the superficial formulation at hand is only the inevitable result of the mental and linguistic processes that produce, in English, the sentence just seen, although with slight possible variations.

In actual fact, it results from the juxtaposition of different concepts (each one indicated by /./, or [·'..]) in a single syntactic string, seemingly simple and straightforward, but actually very complex, as is obvious from its prosodic structure, if supported by an appropriate intonation pattern, as indicated by the small but precious signs used.

Let us now examine the intonation structure of neutral British English. However, we must first consider a general scheme, which will enable us to really *see* its characteristics. Thus fig 13.2 gives the diagram of tunings. It shows the use we make –when speaking normally– of pitch heights of the various syllables forming the different possible utterances in a given language.

In order to make experiments on the pitch of different syllables, it is certainly better to use identical vowel phones, to avoid being mistaken by articulatory timbres, possibly interpreted as differences in pitch. This is easier in languages like Italian, where examples like *Rimini, concorrono, Anna assaggiava quaranta ananas* ['ri:mini, koŋ'kor:rono, 'anna assaɖʤa'va kwa'ran'ta 'a:nanas] are not difficult to find (despite their meanings, 'the name of an Italian town, they are in competition, Ann tasted 40 pineapples'). As already said, these identical vowels help not to be biased, or misled, by different timbres; since front V seem to have a higher pitch, compared to back ones, which give the opposite impression.

Tunings (or intonation groups)

13.11. Tunings consist (as already seen, cf § 13.8-9 & fig 13.2.2) of a protune (in our example *I am transcribing the following example* [aəm'tʃɹæn'skɹɪəbɪŋ ðə'fɒl-əʊɪŋ ɪg'zɑ'mpəl]) and a tune (*phonetically* [fə'neɪtɪk-li.]). In this case, we have a normal protune and a conclusive tune. The latter is represented, tonemically (in an abstract, more theoretical, way) by /./, and tonetically (in a more realistic way) by [·'..].

The number of syllables in the example has been calculated on purpose in order to have full correspondence between the tonogram and the syllables of the sentence, to be able to show the characteristics more clearly.

Of course, in normal speech, it is unlikely to find sentences with the same number of syllables; however, the usefulness of the diagram is not compromised, since the actual syllables available (whether more or less than 14) share pitch heights in a fair way. So they may either compress the movement of several syllables into only one or two, or expand it over a larger number of syllables: *Yes, we do* or *Our aim is to pass on ideas, techniques, and practical activities, which we know work in the classroom* (even if this last example, more realistically, will be divided into more parts, with the addition of the respective tunes, mostly continuative), thus: *Our aim is to pass on ideas, techniques, and practical activities, which we know work in the classroom.* In a phono-tonetic transcription, we have: [ɑ:ɹ̄'ɛɪm ɪg'zə'phɑ:s 'bɪn. ə-ðɪ'vɜ:z̄ ʃ'hɛk'nɪɪks əm'phɪ'æktɪkəl æk'tɪvɪtɪz̄ ɹ̄wɪtʃwɪ'nɜ:ɹ̄ 'wɜ:k̄. ɪnðɹ̄'khlɑ:sɪdʒm̄.].

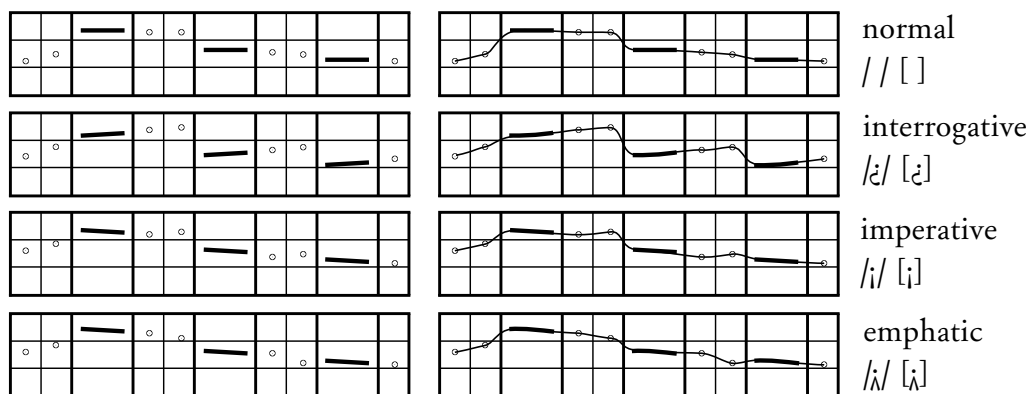
Protunes

13.12. fig 13.3 shows the four protunes (of neutral British English): one is unmarked, or *normal*, and has no symbol; three are marked: *interrogative* /̇/ [̇], *imperative* /̇̇/ [̇̇] (for instance: *Pay attention!* [ɪ'phɛɪ ə'thɛnʃn̄.]), and *emphatic* /̇̇̇/ [̇̇̇] (*We have to check everything very carefully!* [ɹ̄wɪ'hæɪ ʃə'tʃ'hɛk̄ ɹ̄v̄-ɹ̄i'θɪŋ ɹ̄v̄ɛɹ̄-i 'kheɜfl̄i.]).

fig 13.3 shows, on the left, sketchy tonograms; on the right, they are given in a more realistic way. Actually, the schematic diagrams are sufficient indeed, since these tonograms necessarily generalize and normalize the data, allowing slight differences of realization, as well.

On the contrary, for teaching and learning purposes, these schematic tonograms are decidedly more useful, making comparisons with those of other languages possible.

fig 13.3. Protunes of neutral British English.



Tunes

13.13. fig 13.4 shows the three marked tunes (of neutral British pronunciation, again both schematically and realistically) – *conclusive* /./ [·'..], *interrogative* /?/ [·'·], and *suspensive* /;/ [·'·] – in addition to the unmarked one, *continuative* /,/ [·'·].

The marked tunes have a functional charge, which is crucial for communication, as they oppose one another distinctively. The unmarked tune – the continuative one – may be considered as the neutralization of the three marked ones (since each of them would be inappropriate in certain –less important– contexts, being too specific and having very definite functions).

The aim of the continuative tune is, above all, to oppose a theoretical ‘zero’ tune. It is quite different from a straightforward and progressive flow of enunciation, without the slightest variations (or breaks), even theoretical or potential. Its only purpose is to slightly highlight a word, compared to a complete non-occurrence of tunes (as happens within a protune).

Indeed, there is a difference between *I saw six men* [aə'so: 'sɪks 'men:] and *I saw six men* [aə'so: 'sɪks· 'men:]; in the latter, of course, *six* is more prominent than in the former, since it has its own tune, instead of being a part of the same protune.

At the end of § 13.11, we have seen that a syntactic string does not generally correspond to just one tune; in fact, more or less numerous continuative tunes occur, otherwise the sentence would not sound spontaneous and convincing. At first, one does not fully realize this internal subdivision, which is completely natural. Its appropriate use goes entirely unnoticed; whereas, its absence would not pass unnoticed at all (as happens in unprofessional reading or recitation).

For instance, if we consider an utterance such as *Look! the prints of a bear*, we realize that it can be said in many ways – apart from actual and paraphonic considerations such as the *fright* taken at the sight, or the *delight* expressed by naturalists, or the *satisfaction* felt by hideous poachers... (all of them are rendered with different nuances, clear and easy to interpret). Of course, this is different from a unitary sentence such as *Look at the prints of a bear*, in just one tuning: [ˈlʊkwɪt ðə ˈprɪnts əv ə ˈbeɪr].

utsʰeɪnu. | [həˈmɒɪ-ʒɔ ʊtʰphɔː. | əmˈsɪk ənʰhaəɔd. | aɪtˈgɜːw ʊˈweɪ.]. However, a suspensive tune is very likely for *Tomorrow it'll pour* [həˈmɒɪ-ʒɔ ʊtʰphɔː.].

Too often, current writing (which is not at all sophisticated) uses only commas: *Yesterday it rained, today it is raining, tomorrow it'll pour, I am sick and tired, I'll go away*. Thus, with the guilty complicity of schools, one is led to a kind of 'child-like' reading, which makes people utter things like: [°ˈjɛsʰədɛɪ ʊtʰeɪnd. ° ʰəˈdɛɪ utsʰeɪnu. ° ʰəˈmɒɪʒɔ ʊtʰphɔː. °] əmˈsɪk ʊnʰhaəɔd. ° aɪtˈgɜːw ʊˈweɪ. °]. The small rings show the additional pitch movement which is typical of 'bookish intonation', which must be kept well apart from normal (ie conversational) intonation, and also from the typical intonation of text exposition (even done mentally), as we will see in § 13.27.

A further example to show that, normally, writing and punctuation are just miserable devices with syntactical functions, and not at all helpful for reading: *I'm terribly busy: I can't come; I'll let you know; don't be cross* [əmˈʰheɪ-əbli ˈbɪzi. aɪˈkhaŋ ˈkhem. | aɪtˈlɛtʃ-μ ˈnɜːw. ˌdʒɔm bɪˈkhaɪps.]. Also the example *I've been looking for this for ages* [aɪv bɪnˈlɔk-ɪŋ ʰəˈðɪs. fɪˈeɪdʒɪz.] shows this characteristic.

Contrary to what grammars keep on repeating, a *comma* does not necessarily indicate a short pause, as a *semicolon* does not indicate a pause which is half-way between the 'short' one of commas and the 'long' one of *full stops* (as it is absurdly 'prescribed'). However, these are the results achieved by schools, ie sadly rigorous and monotonous pauses, which are not able to convey appropriate meaning to sentences (especially when they are read).

And all those who today abuse punctuation, by omitting it almost completely, will they ever pause?

Questions

13.16. A further important point, to always keep in mind, is that an interrogative tune need *not* be used whenever there is a question mark at the end of a sentence! Unfortunately, this is another real mistake taught in schools.

It is important to clearly distinguish the different kinds of questions. Among the more recurrent and normal types, only *total questions* (or 'yes-no questions') request interrogative tunes. These questions are answered by *Yes* or *No* (or, possibly, by *Perhaps*, *I don't know*, *It depends*, &c); but, above all, they do not include interrogative words: *Did you see?* [ɪdɪdʒəˈsɪriː], *Is it interesting?* [ɪzɪtʰɪŋtʰɪsɪŋ], *Can you hear me?* [kənɪjəˈhiəmiː], [kənɪjuuː].

It is important to pay due attention to cases where there is a 'given' element (*book*, *music*, *John*, *here*, *hereabouts* [in the following examples]), which is less important and thus less stressed, being already 'known', since previously mentioned, or 'expected', as present in a particular communicative situation, since it can be visible, or implied, or inevitable, from social or cultural experience.

Have you read this book? [hævɪjəˈʰɛdː ɪdʰɪsˈbɔk.], *Do you like music?* [dʰ(ə)jəˈlækː ɪdʰmjuzɪk.], *Do you know where John is?* [dʰ(ə)jəˈnɜːwː dʰweɪzˈdʒɔˈnɪz.], *Is the station far away from here?* [ɪzðəˈstɪɪʃn ˈfɑːɪ ʊˈweɪː ɪdʰfɔmˈhiːv.], *Is there a library near here?* [ɪzðəˈʰlaɪbrɪəriː ɪdʰnɪzˈhiːv.].

13.17. In the examples just seen, the structure is $/\dot{\epsilon} \text{ ? } / + / \dot{\epsilon} \text{ , } /$ with *attenuation* of the sentence-internal interrogative tune. Thus, strictly speaking: $/\dot{\epsilon} \text{ ? } / + / \dot{\epsilon} \text{ , } /$, as will be seen shortly, with modifications of the tunes (§ 13.21-3).

Indeed, internal attenuation is automatic, so it need not be explicitly marked: $[\dot{\epsilon} \text{ : }] + [\dot{\epsilon} \text{ : }]$, for $[[\dot{\epsilon} \text{ : }] + [\dot{\epsilon} \text{ : }]]$. In fact, that utterance is formed by two tunes, not just one; and this is significant to show the difference between written and spoken codings. The former is too sketchy, due to its excessively limited graphic possibilities, but it should not in the least restrict the varied phonic possibilities, which are typical of spontaneous and qualified speech.

This is the reason why punctuation should be more careful and accurate, still without introducing new –though desirable– signs, as for instance ‘.’ (no longer as an ‘*epigraphic* dot’, but as an ‘*orthological* [raised] dot’, followed by a space), in particular, in those cases where Western Grammar is not allowed to separate a subject from its verb (and the like). However, in Turkish, for instance, it is indeed more than ‘correct’ to write: *Ahmet, Ankara’dadır* [ʔʌh'mɛt. ʔʌŋkʌɾɰ.dʌdɰz̥.] ‘Ahmet is in Ankara’.

With orthological structures as the following, we would have quite different meanings from those given above (though pragmatically less probable indeed): *Have you read this book?* [$\dot{\epsilon}$ hævjəʔʔɛd̥ ðɪs'bøk̄.], *Do you like music?* [$\dot{\epsilon}$ d(ə)jəʔʔlæək̄'mɯzɪk̄.], *Do you know where John is?* [$\dot{\epsilon}$ d(ə)jəʔʔnɜːw wɛz̥'ɟɔːn̄ɪz̥.], *Is the station far away from here?* [$\dot{\epsilon}$ ɪz̥ðəʔʔsɪɪʃŋ̄ 'fɑːɹ̄ w'wɛɪ̄ fɹ̄əm'hɪv̄.], *Is there a library near here?* [$\dot{\epsilon}$ ɪz̥ðəʔʔlɑɪbɹ̄j̄ 'nɜːz̥ 'hɪv̄.].

13.18. On the contrary, *partial questions* (or *wh*-questions, or *yes/no* questions) include specific (interrogative) words, such as *who*, *what*, *which*, *when*, *where*, *why*, *whose*, *how*, *how much*, *how long*... Clearly enough, the answers regard the part of the questions where the interrogative word occurs, since the rest of the questions themselves is already known, or shared, or implicit.

If somebody asks us: *How many languages do you speak?* [$\dot{\epsilon}$ ˈhaomɛni 'læŋgwiːɟɪz̥. ɪɟjə'spɪɪk̄.], it is obvious that they know we happen to speak some languages; and if we say *Who told you that?* [$\dot{\epsilon}$ ˈhɪu 'tʰooʔɟəðæɹ̄.], or *How do you know?* [$\dot{\epsilon}$ ˈhaːo ɟjə'nɜːw.], that piece of information is something known, or ‘given’.

Therefore, the voice falls at the end, as for a conclusive sentence. Indeed, the questions just seen could even be formulated as: *I'd like to know how many languages you speak*, and *You must say who told you that*, and *Tell me how you know*.

However, even if in partial questions the conclusive tune has to be used (which is falling just as in statements), there is certainly some pitch difference (apart from an obvious syntactic one) between a question like *When will they buy a new computer?* and a statement like *When they buy a new computer*. This also occurs in languages with identical syntactic patterns, as in Italian *Quando comprano il nuovo computer?* ‘When will they buy a new computer?’ and *(Lo copiano) quando comprano il nuovo computer* ‘(They will copy it) when they buy a new computer’.

The difference is in the protune. As a matter of fact, all kinds of questions have something in common, ie the interrogative protune, $/\dot{\epsilon} /$ [$\dot{\epsilon}$], which, as can be seen in fig 13.3, has a partially different pitch contour from the one used in normal pro-

tunes. This difference consists in modifying the usual pitch movement, through the anticipation of the typical interrogative curve (/ʔ/ [·'·]), which in neutral British English pronunciation is rising – from mid to high pitch.

The anticipation in question, however, does not exhibit the actual change from mid to high, but reproduces it on a small scale, by distributing pitch heights among the stressed and unstressed syllables. Thus, it modifies the usual contour of the unmarked protune only partially.

Nevertheless, this is quite sufficient to make the difference perceptible right from the beginning, ie on the very first syllable(s). So, in the Italian examples too, the difference is surely there already on *Quan-*, and increases on *-do* (and so on – often together with a different degree of stress). But the symbol /ɛ/ [ɛ] alone is sufficient to indicate the pitch difference that the ear clearly hears: *Quando comprano il nuovo computer?* [ɛ'kwando 'kom:prano. ɛɛ'ilnwo'vo kom'pjuter.], in comparison with *Quando comprano il nuovo computer* [kwando'kom:prano. il'nwo'vo kom'pjuter.]. Going back to the English example, we have: *When will they buy a new computer?* [ɛ̃ˉwɛn-ɪ ʔɛɪ'baʊ. ɛ̃ə'njɪu kʊm'phjʊtɜː.] and *When they buy a new computer* [wɛnðɛɪ'baʊ ə'njɪu kʊm'phjʊtɜː.].

Besides, as all of the partial questions, these too can be said with a continuative tune (which renders them less categorical), or by attenuating the tune (cf § 13.21-3).

The question about the *computer* already shows that the plan of buying a new machine (hopefully a new Mac) was 'known', or 'given', not a 'new' fact. Equally, we have a parenthesis as soon as an example like *When are you leaving?* [ɛ̃ˉwɛn: əjə'li:vɪŋ..] becomes a known fact as far as the departure is concerned: *When are you leaving?* [ɛ̃ˉwɛn:.. ɛ̃əjə'li:vɪŋ.]. Usually, this also happens –for pragmasemantic reasons– in sentences like: *How much does it cost?* [ɛ̃hao'mɛtʃ.. ɛ̃dʒʊk'kɒst.]; whereas realizations such as *How much does it cost?* [ɛ̃haoˉmɛtʃ dʒʊk'kɒst.]; are to be found only in 'teaching' recordings (and, unfortunately, what we actually hear, in too many recordings, is *How much does it cost?* [ɛ̃haoˉmɛtʃ dʒʊk'kɒst.], indeed!).

13.19. Let us briefly move back to the kind of intonation used at school, which makes people say **[ɛ̃ˉwɛn-ɪ ʔɛɪ'baʊ ə'njɪu kʊm'phjʊtɜː]* **When will they buy a new computer?* whose meaning, strictly speaking, would be closer to 'Would you mind repeating that? I didn't quite catch what you said. Did you ask about when they're going to buy a new computer?', ie *When will they buy a new computer??* [ɛ̃ˉwɛn-ɪ ʔɛɪ'baʊ ə'njɪu kʊm'phjʊtɜː°] (where ° indicates a higher pitch raising).

In actual fact, there is a big difference, since the classic 'bookish question' (as we will see presently, in § 13.20 & 13.25) is: [ˉwɛn-ɪ ʔɛɪ'baʊ ə'njɪu kʊm'phjʊtɜː.°]. That is, an interrogative tune is added at the end of conclusive tunes ([..]+[°]), as if it were not real communication, but rather a kind of drill in order to 'identify' a question, and by 'concluding' it –only at the end– with what is thought to be expected (according to the 'rules', ie with an interrogative tune).

However, this operation goes against the rules of real communication completely; and practically without distinguishing between total and partial questions. Indeed, even a question like [ɛ̃ˉwɒts jɒ'neɪm.°] *What's your name?* is a classic example, instead of [ɛ̃ˉwɒts jɒ'neɪm..] *What's your name?*

13.20. There is also a difference between: *How many times shall I say that?* [ç̣hɑŋmeni ʔhɑəmẓ ɕ̣lɑə'seɪ̯ðæ̣ṭ..] –a normal partial question– and *How many times shall I say that?!* [ç̣hɑŋmeni ʔhɑəmẓ ɕ̣lɑə'seɪ̯ðæ̣ṭ..] –a (partial) *rhetorical* question, which certainly does not ask for information about the number of times, but instead communicates a meaning like ‘Will you obey me at last?’ (please, note the emphatic stresses).

In addition, there can also be a *polite* partial question: *How many times shall I say that?* [ç̣hɑŋmeni ʔhɑəmẓ ɕ̣lɑə'seɪ̯ðæ̣ṭ..], which uses the unmarked continuative tune in order to make the question less brusque, as in *What's the time?* [ç̣wɔts ðə ʔhɑəm..], *Who is it?* [ç̣hɪru ʔzɪṭ..], decidedly more suitable, above all with strangers, than *What's the time?* [ç̣wɔts ðə ʔhɑəm..], *Who is it?* [ç̣hɪru ʔzɪṭ..].

All this demonstrates that syntactical punctuation and word order are not at all sufficient to determine which kind of intonation is the most appropriate for a given sentence.

Besides, if people ask *Can you hear me?* [ç̣kɪp̣jə'həmi..], their intention is certainly not to check whether their listener's hearing is (still) good, but rather whether it is possible or not to ask them for something, talking normally.

Obviously, there are many nuances which can be detected in the various kinds of questions that –every day– we can produce or hear. These questions may be participating, polite, inquisitive, formal, detached, ironic, sarcastic, and so on. In all these cases, the paraphonic component, with its varied facets, highly modifies canonical intonation patterns, which are so to say ‘expected’, producing mixtures of protunes and tunes, too.

Tune modifications

13.21. Even a sentence like *Put it on the table* [̣phɔṭ-ɪ̯ ɔ̣ndə̣ʔhɛɪḅṭ..] can be said with different intentions. In fact, *Put it on the table* [̣phɔṭ-ɪ̯ ɔ̣ndə̣ʔhɛɪḅṭ..] can sound too brusque and impolite, or too familiar and friendly; these nuances are not explained by syntax, but rather by *pragmasemantics*. Therefore, often ATTENUATION may be introduced, which can be shown by placing an empty dot at mid height [◌]: *Put it on the table* [̣phɔṭ-ɪ̯ ɔ̣ndə̣ʔhɛɪḅṭ..◌].

We have seen above that, for repetition (or incredulity) questions, the tune is ACCENTUATED. At the end of a conclusive utterance, and especially at the end of a text paragraph, it is frequent and normal to use the accentuation of the conclusive tune too: *And this ends our programs* [əṇ ð̣ɪs ʔeṇdẓ ɑ̣'phɪzɔgɪæmẓ...].

13.22. Often, again for pragmasemantic reasons, utterances are *specified*, when their communicative highlighting –or sentence highlighting– is not on the final part of an utterance (as generally happens), as we have already seen in some previously presented questions.

For instance, *I've bought the tickets for the concert* [æṿ'bɔ̣ṭ ðə̣ʔhɪḳ-ɪtṣ fə̣ðẉ'kɒṇ-sə̣ṭ..] we find a ‘normal’ tuning expected according to the tonogram. However, one may have to say: *I've bought the tickets for the concert* [æṿ'bɔ̣ṭ.. ɪ̯ðə̣ʔhɪḳ-ɪtṣ fə̣ðẉ-

'khɒnsəʃ.ɪ] – possibly even with some emphasis: *I've bought the tickets for the concert* [aɪvˈbɔʊt.ɪ ɪðəʃhɪk-ɪts fəðwˈkhɒnsəʃ.ɪ], as an answer to a rather doubtful question about somebody's efficiency or memory.

From a pragmasemantic point of view, the most likely intonation pattern, for a question like *Have you bought the tickets for the concert?*, is *Have you bought the tickets for the concert?* [ɛːhævjuˈbɔʊt.ɪ ɪðəʃhɪk-ɪts fəðwˈkhɒnsəʃ.ɪ], contrary to school performances and, unfortunately, to most recordings in various teaching courses too, which instead foist absurdities such as *Have you bought the tickets for the concert?* *[ɛːhævjuˈbɔʊt ɪðəʃhɪk-ɪts fəðwˈkhɒnsəʃ.ɪ]. Strictly speaking, a sentence pronounced like that would really mean something like 'Why did you buy the tickets for the concert, you silly idiot!').

13.23.1. The best way to attract (much) attention to what somebody is going to say is to use a *suspensive* tune: *If they haven't understood I really don't know what to do about it!* [ɪf ðeɪˈhæv-ŋtʌndəstəndəʃtəwɔːd.ɪ aɪˈʒʌli dʒɒnˈnɜːw ˈwɒt ɪˈdʒuː.ɪ ɪˈbɔʊtɪt.ɪ], *And when at last I came round the corner, they were already there* [əmˈwɛn: əɪˈlɑːst əˈkheɪm ˈʒaʊnd ðwˈkhɒnɪ.ɪ ˌðeɪwɜːɪstˈʃɛd-ɪ ˈðeɪ.ɪ], or to clearly separate the parts of an utterance: *Are you going by bus, or walking?* [ɛːɑːjʊ ˈɡɜːwɪŋ bʌsˈbeɪs. ɜːwˈwɔːkɪŋ.ɪ], or to announce in advance the end of a complete list of items: *Apples, pears, strawberries, cherries* [æp-ɪz. ˈpheɪz. ˈstɹɔːbɜːz. ˈtʃɛɪz.ɪ].

A suspensive tune can also occur at the end of particular incomplete utterances: *I did try...* [aɪˈdɪd ɪˈhɪɑː.ɪ], *You'll see one day or another...* [jɪˈsri wɛnˈdɛɪ ɪˈʒəneð-ɪ.ɪ]. 'Intermediate' degrees are possible: *I did try...* [aɪˈdɪd ɪˈhɪɑː.ɪ], *You'll see one day or another...* [jɪˈsri wɛnˈdɛɪ ɪˈʒəneð-ɪ.ɪ] (with attenuated suspensive tunes); *I did try* [aɪˈdɪd ɪˈhɪɑː.ɪ], *You'll see one day or another...* [jɪˈsri wɛnˈdɛɪ ɪˈʒəneð-ɪ.ɪ] (with attenuated conclusive tunes); and *I did try* [aɪˈdɪd ɪˈhɪɑː.ɪ], *You'll see one day or another* [jɪˈsri wɛnˈdɛɪ ɪˈʒəneð-ɪ.ɪ] (with no attenuation of conclusive tunes). Obviously, they present different communicative nuances, which are fairly easy to imagine.

In addition, some particular words can receive emphasis. Here we will not enter the field of paraphonics, which adds further nuances, ie emotional (eg sadness, shyness, threat...), and social as well (eg skill, supremacy, arrogance...). Certainly, these characteristics are real and present, in actual communication, but they are even more complex to analyze, describe, and transcribe. Unfortunately, too many intonation analyses and notations are still unable to adequately separate these two quite different fields of intonation, although, obviously, in speech they are inseparable, but... distinct! This means that it is important both to develop full awareness and to succeed in using a notation system which is fairly appropriate, but obviously not too simple. However, see G 14.

13.23.2. In some languages, such as English and French, but also Italian and others, according to communicative aims, when there are some *implications*, quite frequently, a *suspensive* tune may be used (with or without attenuation, or possibly accentuation), or a *continuative* one.

This use is more likely to be found in phrases like the following, in place of the tune one might infer from writing and syntax: *Hi!, I'd like a pizza, Go straight a-*

head, Make yourself at home, Can I have that chair? or in French: *Bonjour!, J'aimerais bien une pizza, Allez tout droit, Asseyez-vous, Ce n'est pas possible!* or in Italian: *Ciao!, Vorrei una pizza, Vada sempre diritto, S'accomodi, Posso prendere una sedia?*

Quite often, these two tunes are used –instead of conclusive (or attenuated conclusive) ones– when there is no real planning of what is being said, differently from what actors do with a text they already know and have ‘studied’, just to render it in the best possible way (and there *is* a difference – which is quite easily noticed!).

When people talk with no previous planning, in addition to the task of putting together the things to say, another problem arises: trying to avoid being interrupted by their interlocutors, while trying to manage to collect the ideas they want to present. Thus, using different tunes from the conclusive one, obviously, also has the aim to try to achieve this very result, and at the same time communicating that the speakers have not finished their exposition yet.

13.23.3. Another frequent use of *non-conclusive* tunes derives from the insecurity –or weak conviction– of the speakers about what they are saying, or towards their interlocutors felt to be ‘dominant’, by superiority of prestige, role, age...

Often, it is a real behavioral *implication* –of the speaker, not about the message– which conveys ‘non-invasiveness’, in different mixtures of friendliness, deference, hesitation (precisely with /;/, or even simply /,/).

However, sometimes it is actual invasiveness indeed –although not really aggressiveness– due to an excess of liveliness or talkativeness, which prevent the speaker from taking pauses and almost breathing, with the result that normal conclusive tunes are practically missing (or are very much attenuated). On the contrary, more pauses and more conclusive tunes would give the listener relief.

Indeed, this use of non-conclusive –ie continuative or suspensive– tunes includes reported cases of ‘rising tunes’ above all for variants of English (firstly from New Zealand, Australia, and North of England, but now even for the rest of Great Britain, and for Ireland and North America, too), instead of the expected or predictable conclusive tunes.

Although this phenomenon has been detected and described in the areas just mentioned, it is nevertheless not absent elsewhere, and for other languages. Neither is it something absolutely new, but simply something which can show itself more freely –alas!– without real drawbacks or excessive social stigma.

However, the problem of these reports (even of ‘high rises’, as in [total] questions) arises from the fact that, still too often, intonation is dealt with according to the old method of the British school of phonetics, which is mainly based on two opposing types: falling and rising (although the British method of intonation had been really innovative and praiseworthy, in the first half of the twentieth century [even compared to other schools and methods, even currently followed by some, as the so-called *ToBI*, which tries to do tonetics by using computers, ie using one’s eyes instead of one’s ears]).

Unfortunately, the ‘rising’ type included both interrogative tunes (usually: [·'·], but also [·'·], &c) and suspensive tunes (generally: [·'·], or [·\·] [·\··], or [·'·] [·'··], and [·-·]), which really have rising movements on the post-tonic syllable.

bles; but on (quite) different levels. In fact, for /?/ the terminal post-tonic syllable is high indeed, whereas for /;./ it remains within the mid band, as can be clearly seen in our tonograms, including the ‘Oceanian’ ones of Australia and New Zealand. Therefore, they must absolutely not be combined in descriptions (although this is just what is still done, too often, indeed).

The solution to this problem is to adequately separate the ‘linguistic’ level of intonation (ie the linguistic system) from the ‘paralinguistic’ one (ie *paraphonics*). Of course, machines cannot do that, since even environment noises ‘are a part’ of a sound message for a machine. Rightly, it is up to ‘natural’ phoneticians to define in advance an inventory of tunes and protunes, with their actual realizations, in order to be able to separate them from paraphonic superstructures, which are additional. No doubt, the latter belong to *language usage*, but *not* to intonation proper (or linguistic intonation). Instead they belong to paralinguistic intonation. It is quite obvious that rising post-tonic syllables, if modified by an equally rising superstructure, produces the global, ‘raw’, result consisting in an even more rising movement. However, the analyst’s experience and skill could avoid gross errors such as those of interpreting the pitch movements as if they really belonged to the intonation system of a given language. On the contrary, they are the (natural and inevitable) result of the combined actions of (true) intonation and paraphonics (according to pragmatic, geographic, and sociolinguistic characteristics).

A similar case of communication ~~or~~ description misunderstanding occurs when some northern Italians (in particular from the northeastern region of Veneto) use suspensive tunes with post-tonic syllables of the [.] kind, or similar continuative tunes (with a limited rising movement, ie within the mid band, but still of a rising kind). Indeed, people from other regions often interpret such *post*-tunes as if they were [·], ie interrogative, whereas they are nothing of the kind (neither physically, nor intentionally).

fig 13.5. Attenuation of tunes.

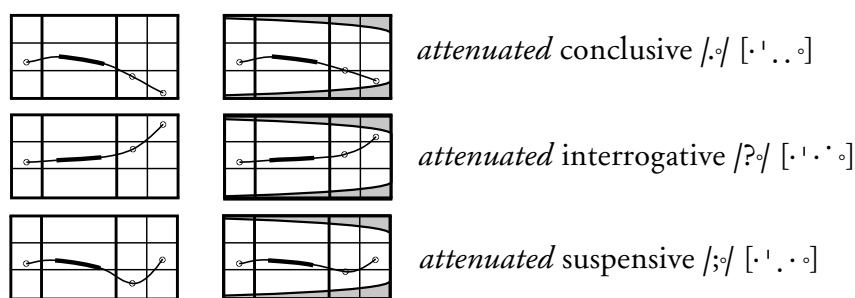


fig 13.6. Accentuation of tunes.

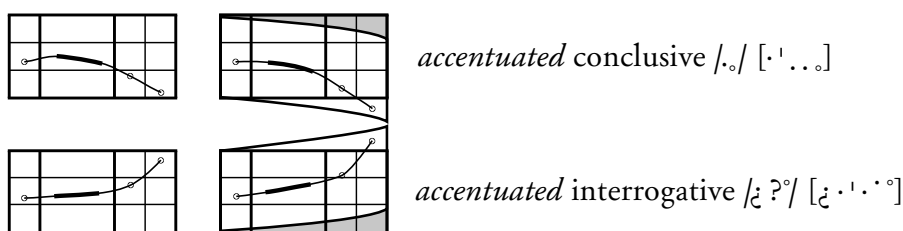


fig 13.5 shows the *attenuation* mechanism of marked tunes (we briefly mentioned above), whereas fig 13.6 shows the *accentuation* mechanism of the two tunes which are functionally the most opposing (conclusive and interrogative – already mentioned too).

Parentheses & quotations

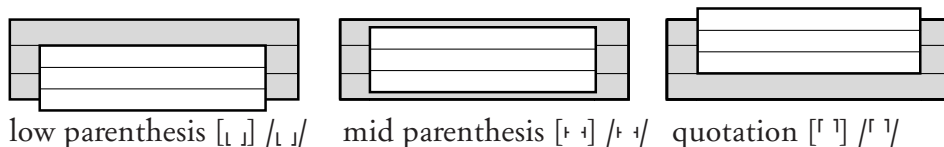
13.24. Lastly, again in a concise way, let us consider fig 13.7 which shows the diagram of *parenthetic phrases* (which can be *low* or *mid*, as we will see presently) and of *quotations*. Here we will illustrate parentheses and quotations: *First of all –he said– let's consider 'natural' phonetics, as it's properly called* [fɜːsɪ əv'ɔːt̪ hɪ'seɪd̪ ˈlets kʌn'sɪd̪ə ˈnæt̪ʃ-ɪt̪.. ˈfə'nɛt̪-ɪks̪.. ɪzɪts̪ ˈphɒp̪-əli ˈkʰɔːt̪d̪..]

Parentheses are characterized by a reduction of stress, an increase in the rate of speech, and low or mid compression; whereas quotations have an increase in stress, a reduction of rate and a raising of pitch (without compression). Therefore, quotations are –practically– the opposite of parentheses.

In transcriptions, it is neither necessary nor recommendable to try to show these prosodic peculiarities, not even with regard to stress, which remains marked as usual (without notational reductions, [], or accentuations, ["]). The symbols [] , [ˈ] , [ˈ ˈ] are more than sufficient to bear in mind all these differences, with respect to 'normal' utterances.

Obviously, quotations must not be confused with 'direct speech' – since, in *First of all –he said– let's consider 'natural' phonetics, as it's properly called*, only *he said* would be excluded, because all the rest (and what may follow) *is* direct speech, indeed.

fig 13.7. Diagrams of parentheses and quotations.



Considerations on communicative 'roles'

13.25. We have already talked about 'bookish intonation' (§ 13.15). We will now study in depth 'bookish questions' as well (mentioned in § 13.19-20). Considering things from the outside, some typical and recognizable superstructures are fairly easy to find. As a matter of fact, a *bookish question* is the sum of a (substantially affirmative) sentence and a (substantially interrogative) communicative function. They use a conclusive tuning –ie a normal protune followed by a conclusive tune– modified by a *role* interrogative tune: /./+ '/?/' [..]+[°], without even distinguishing between the two fundamental types of questions – total (/ɛ ?/ [ɛ ˈ]) and partial (/ɛ ˈ/ [ɛ ˈ..]).

Contrary to the rules of actual communication, in bookish questions something *is stated* (which is the literal content of an utterance), and only at the end something

else is added like *there is a question too* (but with no real fusion of the elements).

For that particular task, then, it is not at all important (to try) to realize the two different types of question as in actual speech: it is only a 'task' to perform! (... nothing more.) Thus, instead of using an interrogative protune and other tunes fit for conversation, the structure indicated above is provided: $/./+/?/$ $[.]+[^\circ]$.

13.26. During a lecture on Phonetics, if we give the example of a (partial or total) question without introducing it –as usual– by stating first 'for instance', but saying it exactly as: *What's the time?* [$\text{ɛ}^- \text{wɒts } \text{ðə}^+ \text{tʰa} \cdot \text{ə} \text{m} \cdot$], or *Is it raining?* [$\text{ɪ}^+ \text{ɪz} \text{ɪ}^+ \text{r} \text{e} \text{ɪ} \text{n} \text{ɪ} \cdot$], even the most attentive students, at least for a short while, will feel obliged to answer.

However, the situation of a lecture is exactly one of an 'implicative' superstructure or a 'role' superstructure, which makes what is being said clear, so much so that it is often not easy to avoid the tautology that makes one say: 'let's give an *example*, for *example*: x, y, z' [$\text{lets}^- \text{g} \text{ɪ} \text{v} \text{ə} \text{n} \text{ɪ} \text{g}^+ \text{z} \text{ə} \text{m} \text{p} \text{l} \cdot \text{f} \text{ə} \text{ɪ} \text{g}^+ \text{z} \text{ə} \text{m} \text{p} \text{l} \cdot \text{'E} \text{k} \text{s} \cdot \text{'w} \text{ə} \cdot \text{'z} \text{E} \cdot \text{d} \cdot$].

It goes without saying, of course, that the intonation examples given during a lecture (or a lesson, or used as a drill) must –or should– aim at spontaneous conversation as far as possible, getting rid of the typical –frankly unbearable– superstructure of the teaching situation.

13.27. Actually, even *bookish intonation* is a prosodic superstructure, which is added to a whole *text* presented to someone. The function of all those monotonous sudden rises within a text (also corresponding to the end of a concept, or a categorical statement, even an emphatic one) is that of communicating that the speaker has not yet finished talking and does not want to be interrupted.

In the case of someone who is reporting something (rather than expressing one's thoughts), like a story or the subject of an oral examination, even an implicit reference to the temporary incompleteness of the *text* is added; whereas its completion is implied by the final pitch lowering, which opposes the (higher than usual) pitch of the beginning.

There is also an 'acceptable' version of bookish intonation, which consists of the typical pattern of an *exposed* text (ie mental, not a read one). Therefore, it is not a conversation –nor is it a soliloquy– because a superstructure is added which gives the characteristic of a *text exposition*. It is recognized by the fact that it presents mechanical and 'regular' pauses (which are never too long), and quite attenuated tunes, but most of all they are 'completed' by slight sudden rises from low to mid pitch, which are indicated by adding $[^\circ]$ after a tune.

We will now give an example and compare it with real bookish intonation –*Thus, in such cases, one must keep calm, follow the instructions, and think long and hard before acting*:

(CONVERSATION) [$\text{'ðes} \cdot \text{ɪn}^- \text{sɛt} \text{'kheisiz} \cdot \text{'wɛm} \text{m} \text{'sɛkhiip} \text{'kha:m} \cdot \text{'fɒl-zɔ} \text{ðiun}^+ \text{'stjɛk} \text{ʃn} \cdot \text{ə} \text{n}^- \text{'θɪŋk} \text{'lɒŋ} \text{wɪ}^+ \text{'hɑ:d} \cdot \text{bɪf} \text{'ɔ:t} \text{'æktʃu} \cdot$];

(EXPOSITION) [$\text{'ðes} \cdot \text{ɪn}^- \text{sɛt} \text{'kheisiz} \cdot \text{'wɛm} \text{m} \text{'sɛkhiip} \text{'kha:m} \cdot \text{'fɒl-zɔ} \text{ðiun}^+ \text{'stjɛk} \text{ʃn} \cdot \text{ə} \text{n}^- \text{'θɪŋk} \text{'lɒŋ} \text{wɪ}^+ \text{'hɑ:d} \cdot \text{bɪf} \text{'ɔ:t} \text{'æktʃu} \cdot$];

(BOOKISH READING) [$\text{'ðes} \cdot \text{ɪn}^- \text{sɛt} \text{'kheisiz} \cdot \text{'wɛm} \text{m} \text{'sɛkhiip} \text{'kha:m} \cdot \text{'fɒl-zɔ} \text{ðiun}^+ \text{'stjɛk} \text{ʃn} \cdot \text{ə} \text{n}^- \text{'θɪŋk} \text{'lɒŋ} \text{wɪ}^+ \text{'hɑ:d} \cdot \text{bɪf} \text{'ɔ:t} \text{'æktʃu} \cdot$].

Notice, for *exposition*, the difference in the relative height reached by [°] (ie lower than [°]), and the quite normal pitch at the beginning (in comparison with [°] of bookish intonation).

Furthermore, in bookish intonation, *hesitations* can be frequent, generally realized as longer than usual *unfilled pauses* (cf § 13.4), but often they may become *filled pauses*, with autonomous ‘syllables’: [v, v:, 3, 3:, m, hm], or with (paraphonic) drawls (not regional ones such as those typical of the American ‘Deep South’): *but the-en you’ll ha-ave to wai-it...* [bətðEEN juʊθhææy ɪwˈWEEɪt]. A well-done exposition will limit hesitations to the most, unless they are ‘intended’ to reach two aims: to draw somebody’s attention to certain points, or to fake spontaneous speech, as when improvising, in order to be more welcome and seem smarter.

13.28. *TV news* presents a [° ° ° ° ° °] superstructure, which permits one to identify the beginning and the end of every piece of news. Good newsreaders restrict themselves to this superstructure, which is necessary and crucial, while accurately avoiding introducing the excessive internal (sudden) rises, which are typical of bookish intonation. But, too often, the news is unduly and arbitrarily segmented so that its utterances are even distorted, to the point that they can communicate different –or even opposite– senses, as regards the actual meanings of the information intentions.

Furthermore, these pauses are quite mechanical and short (but, above all, different from those of ordinary conversation), whereas, near the end of a piece of news, there is frequently an interruption between the last stress (ie the one on the tonic syllable) and the preceding one. All this happens independently from internal cohesion (which would be necessary among the elements), so much so that even a first name is separated from its family name, a verb from its direct object or adverb, and an adjective from its noun, &c: *...*the famous opera by Giuseppe*| *Verdi*; **the efforts to accelerate the structural reforms*| *of the economy*; *...*with new*| *proposals*; ...

The last examples show that often the normal structure is irrationally distorted; whereas, in previous points of a piece of news, more often distortions regard cases such as: *...*the Cannes*| *Film Festival* – instead of ...*the Cannes Film Festival*.

Often, within a piece of news, newsreaders do not keep the end of a sentence separated from the beginning of the next one: *...*they decided to meet*| *in London they also promised...* – instead of ...*they decided to meet in London*| *they also promised...* (ie ...*they decided to meet in London. They also promised...*).

13.29. Obviously, there are many other COMMUNICATIVE ROLES, which must allow people to realize that spoken words are not to be interpreted in a *personal* way, as among friends or acquaintances. On the contrary, it must be clear that they are to be interpreted as a part of a role, thus in an absolutely *impersonal* way, as operator and client. For instance, a ticket collector (*fares, please*), a postal worker (*good morning*), a switchboard operator (*hello, we-are-the-best-in-the-world*), a shop assistant (*good afternoon, Sir, can I help you?*), a stewardess (*flying with us is a pleasure and a guarantee*), a Far-West sheriff (*howdy, stranger!*).

The (alleged) ‘remedy’ prescribed by schools, in order to avoid the dullness of child-like reading, leads to *flattening* (with pitch compression of the internal parts), to increasing *rate* (with the reduction of many stresses), and to *hypo-segmenting* utterances (with the suppression of many tunes), with a loss of the wished expressiveness: *[◦][[◦]həpɪl[◦]phɛːz ə[◦]hɛɪstɪ[◦]ˈvɛdʒɪəbɪˌsuːpːː[◦] ðiːŋˈɡɹɪdiənts məsbɪˈtʃhɜːzn̩[◦]ˌvɛɪˌkheɪfəliːː[◦] | ː[◦]ɛː wɒt ɒwɪˈnɹɪdːː[◦]].

Considerations on intonation

13.31. The fundamental criterion for ‘choosing’ the appropriate tunes, for each sentence, consists in the *communicative intention* of every single sentence, or sometimes of a part of a sentence, which thus receives a certain tune, often without an actual pause. But the absence of pauses must not make people think that the stream of syllables and words is constant and homogeneous: intonation differences are there (indeed!) in spite of the connection among syllables. Rightly these pitch differences, which are included in the typology of linguistic intonation, convey the nuances of meaning that native speakers instinctively recognize, and thus (re)act accordingly.

Therefore, it is not sufficient to have a *continuative* tune, which is used mainly for subdividing the speech chain into pragmasemantic sequences. These are of fundamental importance to communicate what people think, in order to interact with others. Thus one of the three marked tunes is chosen.

A *conclusive* tune, as we have already seen, adds to the concept being expressed the communicative function of completeness. An *interrogative* one adds the function of request, generally with total questions and, occasionally, with clarifying questions, when people have not (fully) understood or think they can not believe an interlocutor or their own ears.

Lastly, a *suspensive* tune is used to draw attention to what somebody is going to say (or not to say), or to some more or less relevant alternatives.

When people are not slave to syntactic punctuation (if any – or at least syntactically appropriate), in order to obtain satisfactory results, it is sufficient to apply the right *communicative aim* to one’s thoughts. However, it is quite obvious that, if people do not *really* know the intonation patterns of their own language (ie in a perceptive and productive way as well – *not only theoretically*), the result will be a performance which is either regional (for native speakers with no falterings or hesitations), or decidedly foreign (if they try to use the patterns of their own language while speaking another one).

13.32. Since some tunes (and protunes) of certain languages may be very different from those of others, or even opposite (or can remind some opposite functions), it is important to consider the provided tonograms very carefully, to compare them with those of one’s own mother tongue (or a regional variant of it), if they are available.

Otherwise, it is highly advisable to endeavor to get them, and try to grasp the

differences of the tonograms of other languages or those of the neutral (or ‘standard’) accent of one’s own tongue. If one is able to sing in tune, the operation proves to be better, but this is not at all indispensable: what is essential is to have the will to make this comparison (if one is convinced).

Certainly, a significant number of speakers of tone languages are ‘out of tune’, and yet they all use their ton(em)es adequately, as for instance Chinese men and women do (and, of course, children as well, if not too young).

Obviously, even less clearcut behavior is to be expected. For instance, a question like *Who wrote ‘Romeo and Juliet’?* –instead of the answer *Shakespeare* [ʃEIkspɪə..]– might receive a not too sure one, like *Shakespeare* [ɛʃEIkspɪə..], or even a far less positive one, like *Shakespeare...* [ɛʃEIkspɪə·], where the interrogative protune seeks confirmation.

More convinced answers like *Shakespeare!* [ʌʃEIkspɪə..] (ie emphatic) or *Shakespeare!* [ɪʃEIkspɪə..] (ie imperative) would still be different from *Shakespeare* [ʃEIkspɪə..], in the opposite direction.

These principles hold for all languages, but –obviously– they have to be realized with the actual tonetic characteristics (typical of every single language).

The treatment of the intonation of the various languages (in our *HPr – A Handbook of Pronunciation*) might seem to be too sketchy (especially to a hurried reviewer); indeed, it contains all the indispensable elements for the 12 languages dealt with (and their numerous variants too). Instead, in the second part of our *NPT –Natural Phonetics & Tonetics–* the *Phonosyntheses* –or *Synopses–* contain only the unmarked protune and the three marked tunes; however, even from these more basic elements, it is quite easy to obtain both the marked protunes and the unmarked tune. This is true both as a general expectation and as an actual work of elicitation.

The three marked protunes are influenced by the three marked tunes, especially on their intertonic syllables. While, the unmarked continuative tune is influenced both by the conclusive and suspensive tunes, being a kind of average between them.

What is important, for intonation, is to bear well in mind all that has been said in this chapter, of course, after having internalized all the motivations and mechanisms.

Structures & generalizations

13.33. The experience obtained with the intonation systems of hundreds of languages allows us to state that the normal, or *basic*, intonation structures are the unmarked protune (/ /) and the three marked tunes (./ with /?/ and /;/). In addition, we also speak of *fundamental* protunes and tunes: they include the interrogative (/ɛ/), imperative (/i/), and emphatic (/ʌ/) *protunes*.

The three marked protunes announce in advance, in a compressed form (although not necessarily within the mid band, depending on the language), the typical pitch movement of the interrogative (/?/), conclusive (./) and suspensive (/;/) tunes –respectively– differentiating them from the unmarked, normal one (/ /).

On the other hand, the unmarked, continuative tune (/,) neutralizes the functions –and the tonetic substances, as well– of the three marked ones, producing a compressed movement within the mid band. This movement represents their fusion, by flattening the differences, even though given proportions typical of the original marked tunes are maintained, which contribute towards the differentiation of languages. This remains within the mid band (as can be seen in fig 6.19, fig 6.21, fig 13.4 and fig 13.10 [and in those of the 12 languages of *HPr*]).

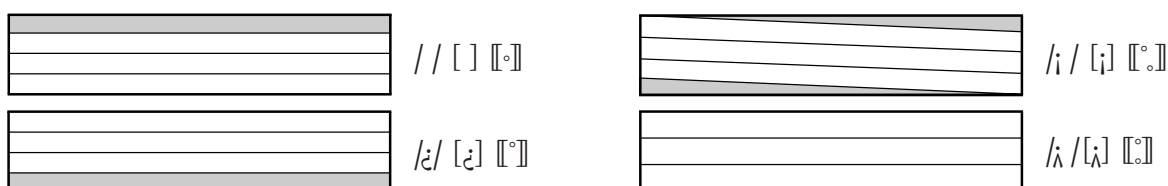
Therefore, the necessary and sufficient notation is simply [$\cdot \cdot$], with a single post-tonic dot, in order to distinguish it –fairly easily– even from suspensive tunes of a mid type, [$\cdot \cdot \cdot$], which is normally used in certain languages.

Only occasionally, it may be necessary to exceed an inventory of four protunes and four tunes, as happens in neutral French and certain similar accents (cf § 13.9 and, in *HPr*, \mathfrak{G} 4). For some other languages, the interrogative protune –although remaining only one– is slightly different from the normal type, as happens in Galician, Greek, and Rumanian (cf their phonosyntheses, § 17.1, § 17.53 & § 17.62).

13.34. In *tone languages* (though, more strictly, they should be called *toneme languages*) as Chinese and also Japanese (cf \mathfrak{G} 11-12 of *HPr*, and the phonosyntheses of other tone languages, in \mathfrak{G} 17-22 of *NPT*), *protunes* and *tunes* are subject to modifications with regard to the extent of their pitch range.

As a matter of fact, in general (cf fig 13.9), a normal protune is slightly compressed downwards, // [] [°], whereas an interrogative protune is compressed upwards, /i/ [i] [°]. An imperative protune undergoes a certain compression, which starts high, then gradually goes down to end in a low position, /i/ [i] [°]. Finally, an emphatic protune does not usually present any compression, remaining completely expanded, /i/ [i] [°].

fig 13.9. Protunes for tone languages.

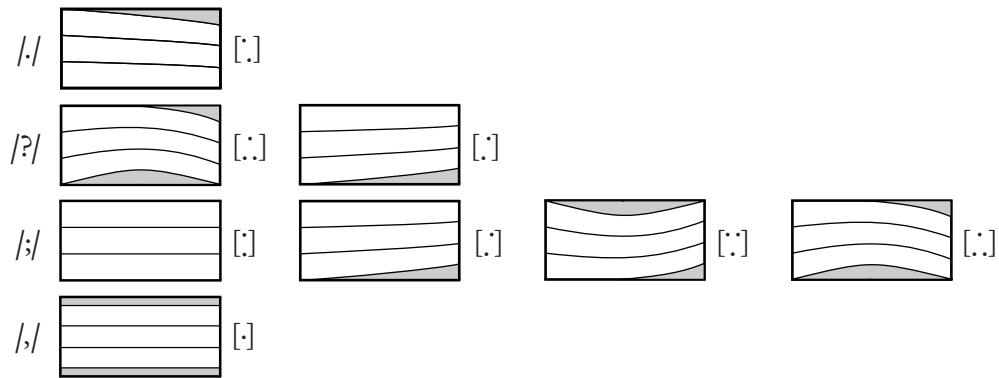


With regard to the tunes of the various tone languages (cf fig 13.10), the conclusive one compresses pitch downwards, gradually, from its beginning (or, as in Japanese, in a more sudden way, at its end).

More often, an interrogative tune is rising-falling, /?/ [·]; or else rising, /?/ [·]. The suspensive tune is the most varied one: more often it is expanded (with no particular pitch movements and without compressions), /;/ [·]; or else it is rising, /;/ [·]; sometimes it is falling-rising, /;/ [·]; or more rarely it is rising-falling, /;/ [·].

As happens with the other languages as well, certain different tonemic functions can have similar tonetic realization, and vice versa.

fig 13.10. Tunes for tone languages.



14. Superstructures

(with ‘paraphonic intonation’, as well)

14.0. ‘Role’ superstructures, or task superstructures, have been introduced, with some examples and classifications, in the sections about intonation, since they are strictly connected with intonation structures (§ 13.25-30). More properly, we might define them as ‘co-structures’; but –to avoid complicating things too much– although maintaining the definition ‘superstructures’ (which are the subject of this chapter), we leave them in the relevant chapter about structures. These co-structures will be presented in a chapter of their own, when they can be studied in greater depth and classified thoroughly. Equally, the chapter on super-structures will (and shall have to) be expanded considerably and more systematically.

Paraphonics

14.1. When the vocal folds (cf fig 14.2) are vibrating along their whole surface, the result is the so-called CHEST VOICE (with actual vibration of the thorax as well); whereas, we get HEAD VOICE if the folds are vibrating only at their sides (thus the thorax has reduced vibration). There are two further quite important positions of the glottis: those which produce *false* and *creaky* voice.

False, or false voice, is an artificially higher than normal tone of voice, which can be used for expressive, phonostylistic, paraphonic purposes; it is achieved by lengthening the vocal folds more than usual and making them thinner, while they are kept ajar and only the arytenoid cartilages are firmly closed together; therefore they vibrate in a different manner than usual. The larynx itself is deformed a little, and lengthened forwards, as can be seen in fig 14.3. There is little air expenditure, and a general impression of higher pitch and effort than normal. In Hindi, for instance, false is connected with the higher parts of its tunes.

For *creaky* voice, or *laryngealization*, instead, the vocal folds are less tense and less thin than usual, whereas the arytenoids remain firmly closed, so that only the part of the folds not in contact with them are free to vibrate. The folds are completely lax, and produce a series of quick glottal taps and a pitch impression which is lower than usual (fig 14.3).

We can find creaky voice in some languages, in conjunction with low pitch, as at the end of certain conclusive tunes, which are falling, or, as in Mandarin Chinese, in conjunction with the low parts of tunes. In British English, creaky voice on a conclusive tune is considered as upper-class: *Yes, indeed* [ˈjɛs ɪnˈdriːd]. Or, in American English, creaky voice is often connected with female speech.

Two other particular phonation types, with paraphonic importance, are *tense* voice and *harsh* voice (fig 14.3).

14.2. By the term PARAPHONICS we mean the particular *or* additional use of phonic (ie articulatory and phonatory) and prosodic elements in current speech. This use is spontaneous (but it can also be fictitious, as good actors demonstrate), and it helps to indicate the speakers' *attitudes* (towards topics or listeners), *emotions* or states of mind (which can be *transitory*, in a particular moment, or *constant/steady*, habitual), and persons' *social role* (in certain different communicative situations).

Generally, paraphonic elements seem to be universal, ie used in every language. Indeed, even without understanding a given foreign language, we can usually intuit, or deduce, the speakers' attitudes, feelings, and social roles. Instead, the *social rules*—more or less unconscious and governing the use of paraphonic elements—are generally very different.

In some cultures, for instance, certain 'negative' feelings must not be expressed, whereas others may be, and 'positive' ones must even be heightened. In other cultures, though, the opposite may be true. Moreover, there are upper and lower limits, changing according to the speakers' age *or* sex, their social roles, and other more or less complex variables.

Here, we shall just explain the characteristics which—alone or combined—contribute to give paraphonic information, when they are superimposed on, or inserted in, the speech chain.

In transcriptions, paraphonic elements are usefully indicated in angled brackets, $\langle \rangle$, in order to identify them clearly and to distinguish them better from prosodic elements, which are more typically linguistic. In fact, the phonic and paraphonic levels should never be mingled, even if, in actual language, they are inextricable.

If one does not do so, the *description of intonation* characteristics becomes not only too heavy, but above all impracticable, and decidedly too subjective. As a matter of fact, even using the same recorded corpus, different phoneticians would inevitably produce different 'data' and descriptions (even if they used computers and acoustic phonetics programs).

Pitch

14.3. Of course, the first paraphonic characteristic to consider is the one that uses pitch in a different way with respect to how intonation uses it. Paraphonically differences can be greater and—what is more—of a fairly different quality, since feelings, moods, and states of mind make use of different pitch extensions.

Usually, in fact, they do not regard every single syllable of an utterance, as in tunings, where pitch is determined by linguistically codified structures (seen in $\text{\textcircled{G}}$ 13). Although with possible variations, caused by changes in the factors determining their origin (ie moods, feelings, states of mind, attitudes, and physiological, psychological, and pathological conditions), paraphonic stretches mostly regard whole utterances of different lengths, even from minutes to hours.

With respect to the habitual pitch extent of a given speaker (within the three

categories of voices, ie male, female, and infant), it will be sufficient to get accustomed to recognizing, first of all, the *raising* of general pitch (indicated by $\langle^{\circ}\rangle$, between *angled* paraphonic brackets), visually and mnemonically helped by fig 14.1. There, the two white lines show the relation with the normal (pitch) extent, which is then remarkably modified depending on the paraphonic use of pitch. We can see that the pitch extent is really ‘raised’ indeed, in comparison with the one considered ‘normal’.

Now, it is sufficient to think of a label such as ‘astonishment’ or ‘aggressiveness’ and say something fitting, like: *And what’s this?* with astonished wonder, or *Don’t be a pain in the neck!* with arrogant aggressiveness. Often, we simply use raising, $\langle^{\circ}\rangle$, when we are talking to children, too: *Hello, pretty child, what’s your name?*

With other labels, we can identify the opposite movement to raising, ie *lowering* $\langle_{\circ}\rangle$, as can happen for sadness: *Oh, that’s such a pity!*

We can have simultaneously raising and lowering, too, which leads to *expansion* both upwards and downwards, $\langle^{\circ}_{\circ}\rangle$, by broadening the three pitch bands, as in cheerfulness: *Here come our dear friends!* Practically the opposite of expansion is *compression*, $\langle^{\circ}\rangle$, which is typical of labels like sleepiness: *I could sleep like a log!*

fig 14.1. Paraphonic characteristics of pitch.

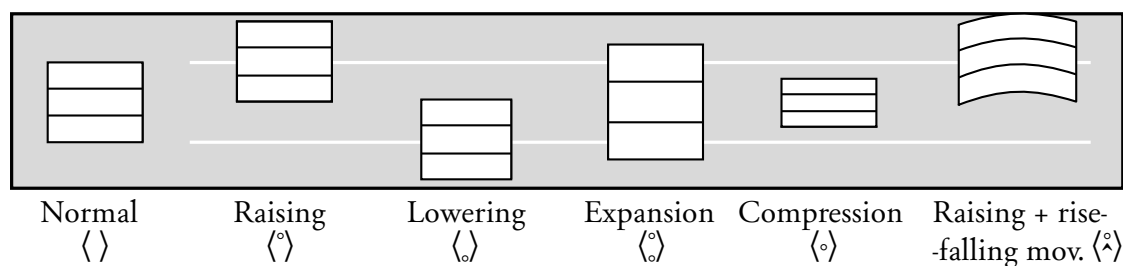


fig 14.2. Normal and paraphonic characteristics of phonation types.

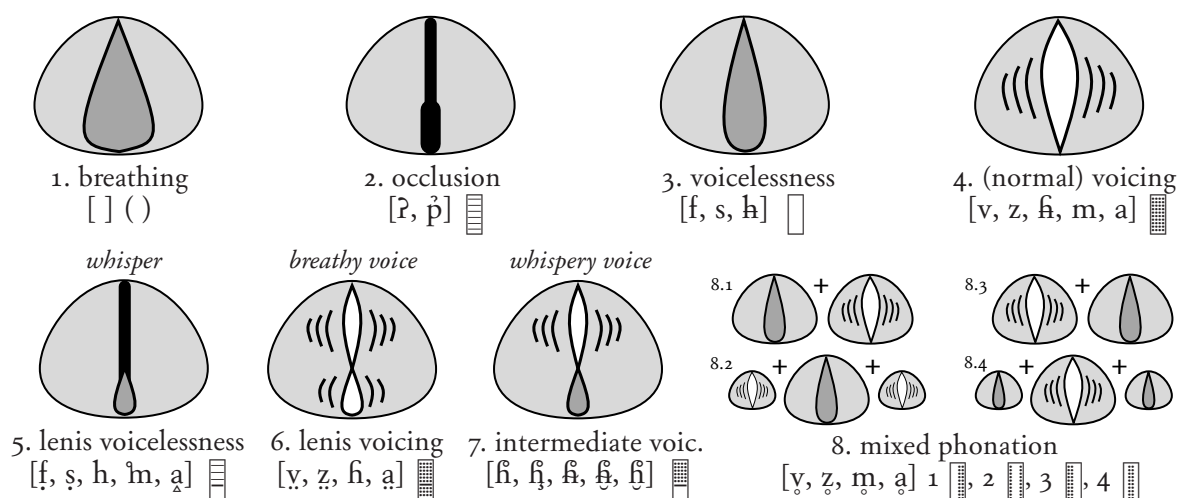
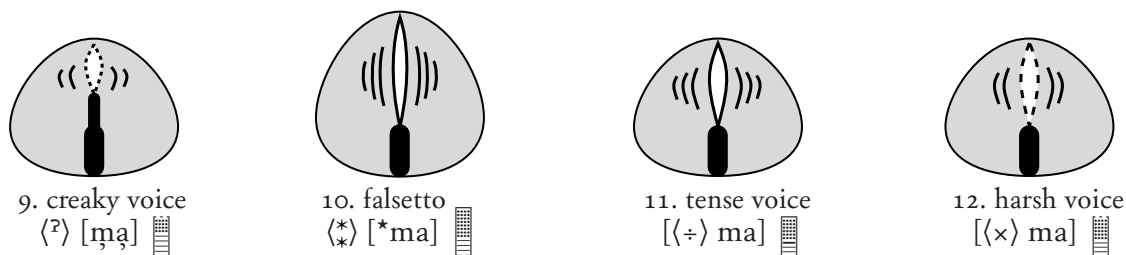


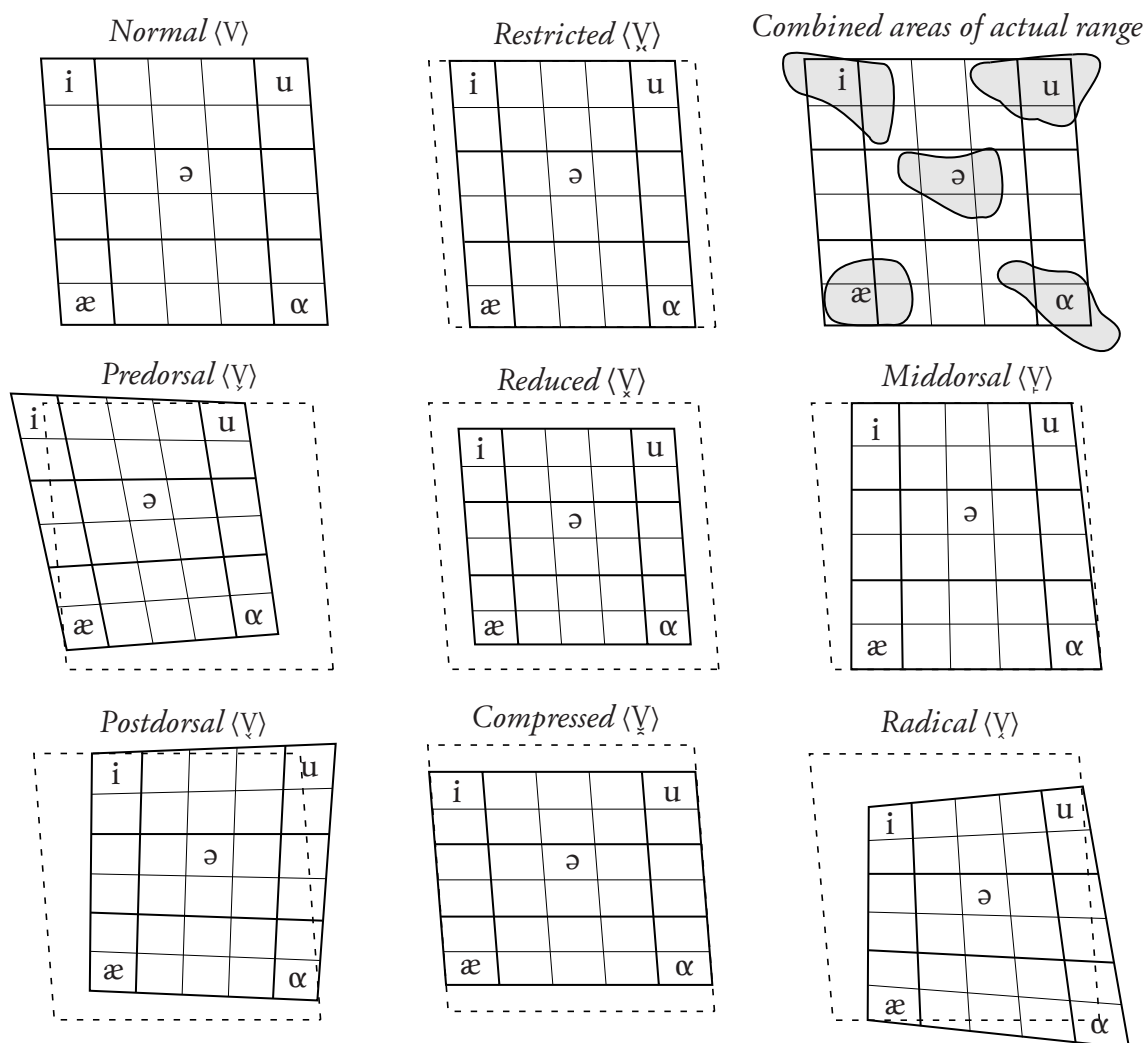
fig 14.3. Some voice qualities, frequent in paraphonic use.



Paraphonic articulatory tongue settings

14.4. As fig 14.4 shows, by reference to the vocoid space in the mouth, in addition to a normal (or laminal) tongue setting, a few others which are possible, and more or less frequent, in languages or accents. Let us carefully notice the deformations undergone by the vowel space, when one of such settings is activated.

fig 14.4. Frequent paraphonic articulatory tongue settings.



We show these changes especially for the vocoids, because the mechanism is easier to explain, making a constant reference to that restricted area in the mouth space. But, of course, contoids are also involved in each of these settings, according to their articulatory nature.

Other paraphonic elements

14.5. It is important to take into consideration the *rate* of speech tied to particular paraphonic labels, by comparing what can be considered as ‘normal’ to the two logical deviations, ie *slowness* ⟨⟩ as in boredom: *What a bore he is!* and *quickness* ⟨⟩, which is typical of hurriedness: *Quickly now, you two, daddy’s waiting in the car!*

Even the *rhythm* of speech is paraphonically relevant. Therefore, we have to pay attention to whether utterances are said more *rhythmically* than usual, ⟨≈⟩, as for sarcasm: *Oh, you’re very smart indeed!* Besides, *rhythmicity* is still more evident in childish singsongs: *You’re such an idiot!* The opposite element, *a-rhythmicity*, ⟨≠⟩, may occur in shyness: *I’m terribly sorry... could you be so kind as to tell me... where the station is?*

The paraphonic use of phono-articulatory force, of course, is extremely important; most of all *strength* ⟨^u⟩, as in aggressiveness: *I’ll bash your face in!*, but in liveliness as well: *Come on, let’s go dancing!* The opposite is *weakness* ⟨_i⟩, for fondness: *He’s a wonderful person indeed!*

In addition to all this, it may be important to notice whether utterances are fluent or broken up by frequent *hesitation pauses*, which –as we saw at the end of § 13.27– may be ‘silent’ (or unfilled) ⟨|⟩, or ‘voiced’ (and filled) ⟨m̥⟩. The latter are by far the most annoying ones, and may be rendered with other more realistic language-specific symbols: ⟨ʒ, ɐ, ʌ⟩, as for: *Er, well – he’s got er...*, even in phonetic transcriptions: [ʒʒʷEEɪ hɪzˈɡɒʃʒʒ].

Even particular types of *articulatory quality* can be added, such as *labialization* ⟨c⟩ in pouting: *No, I won’t go any more!*, or *nasalization* ⟨~⟩ which is possible in boldness: *I won’t speak even if you kill me!*, or the *backing* of the body of the tongue ⟨-⟩, frequent in disgust: *This coffee is undrinkable!*

Other settings, which can be useful for regional descriptions, are: *pharyngealization*, ⟨>⟩ (typical, for instance, of the broad speech of Rome), *faucalization*, ⟨^⟩ (typical of Liverpool English, or again of the broad speech of Catania, in eastern Sicily, cf fig 14.5), and *stiff jaw*, ⟨x⟩ (of so many English accents), and *stiff lips*, ⟨x̣⟩ (again, of some English accents).

In addition, fig 14.6 shows a normal jaw position, in comparison with a protruding lower jaw ⟨x̣⟩ and a receding lower jaw ⟨x̣̣⟩ positions.

fig 14.6. Normal jaw position (A) ⟨ ⟩; protruding lower jaw (B) ⟨x̣̣⟩; receding lower jaw (C) ⟨x̣̣̣⟩.

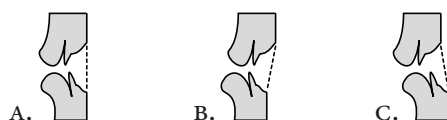


fig 14.5. Other paraphonic articulatory settings.

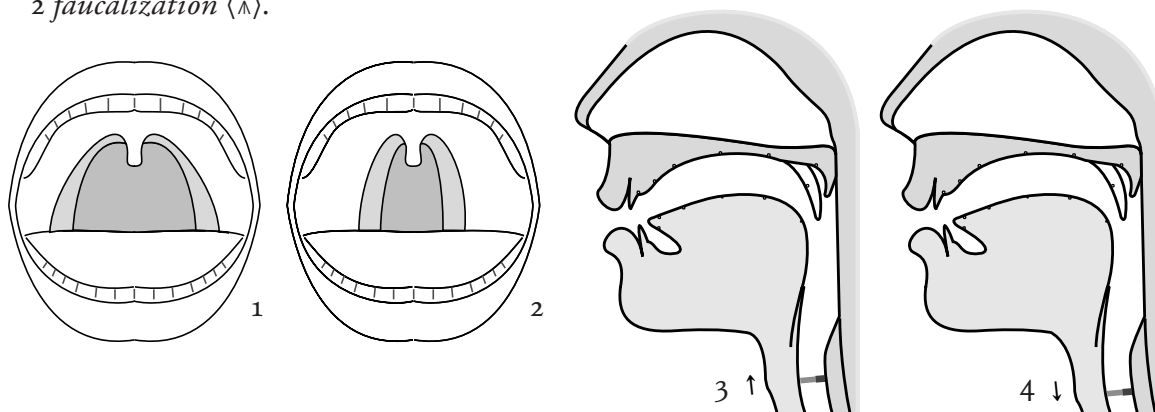
Front view of the open mouth:

1 normal

2 faucalization ⟨ʌ⟩.

3 side view for a *raised larynx* ⟨.:⟩

4 side view for a *lowered larynx* ⟨:·⟩.



Lastly, when we have a *cold*, our voice is chilly with *denasalized* nasal (and nasalized) segments; this is marked by ⟨ɹ⟩: *I won't come tonight*. The paraphonic notation is much more convenient than trying to adequately represent the affected segments as in [aə̃wɜɔŋ ʰkħɐ̃m tɐ̃nəɐ̃t], since we should not ignore (both phonetic and phonemic) vowel denasalization either, as in French.

If we do a simple test, we can ascertain that it is nothing like '[aə̃wɜɔŋ ʰkħɐ̃b tɐ̃hə̃'daɐ̃t]', or in French '[ø̃bo 'vɑ̃ 'blɔ̃]', instead of ⟨ɹ [ø̃bō 'vã 'blɔ̃]⟩ *un bon vin blanc*. These articulations are actually nasal or nasalized, the velum being lowered; but, the air does not manage to pass through the nostrils (either completely or in part), but it goes just to the back part of the nasal cavity, if not slightly further.

Let us note that a *nasal voice* ⟨~⟩ is quite another thing from a denasalized voice (or cold voice, in spite of common belief and terminology). As a matter of fact, a nasal voice can be produced by a certain lowering of the velum, but it can also be produced by some particular resonance in the nasal cavities (with no lowering of the velum), which causes a kind of local vibration. This is typical of a number of accents, also English accents; or it may be an individual characteristic.

14.6. With reference to *phonatory quality*, it is useful to notice whether particular types of voice occur (and to try to detect them). This also goes for articulatory quality, through adequate observations and kinesthetic considerations on one's own articulatory and phonatory movements.

It could be possible to find *murmur* voice ⟨~⟩ in sadness: *It's a shame it's all over!*, or *whisper* voice ⟨∞⟩ for conspiracy: *We have to act with utmost secrecy!*, or *trembling* voice ⟨ʔ⟩ of old age: *I remember little Joe perfectly well, that rascal!*, or *tense* voice ⟨÷⟩ of worry: *Yes, but what are we going to do?*, or *harsh* voice ⟨×⟩ of fatigue: *I really can't cope any more!* (cf fig 14.2-3).

Besides, *laryngealized* voice (or creaky voice) ⟨ʔ⟩ of sleepiness (seen above *I could sleep like a log!*), or *false voice* (or falsetto) ⟨*⟩ when men put on women's voices: *These high heels are going to kill me!*, or *raised-larynx* voice ⟨.:⟩ as in arrogance: *You obviously don't know who I am!*, or *lowered-larynx* voice ⟨:·⟩ as in laziness: *I may do it tomorrow*.

14.7. In addition, the shape and dimensions of Morgagni's ventricle (ie the space between the true and false vocal folds, cf fig 14.7) determines a good part of the individual characteristics of the voice; these characteristics are then accentuated ^{or} modified by the supra-laryngeal cavities.

fig 4.7. Vocal folds (or, less well, 'vocal cords', 3) and 'false vocal cords' (1). The space in between is called Morgagni's ventricle (2).



A typical *black voice* (<♠>, either African or Black American), makes a particular use of tonality, as fig 14.8 shows. In fact, the three typical intonation bands (of our tonograms) undergo a deformation. Thus, the middle band is expanded vertically, so that the other two bands are, by consequence, restricted. In fig 14.8 this process is indicated as a transformation with 're-normalization'.

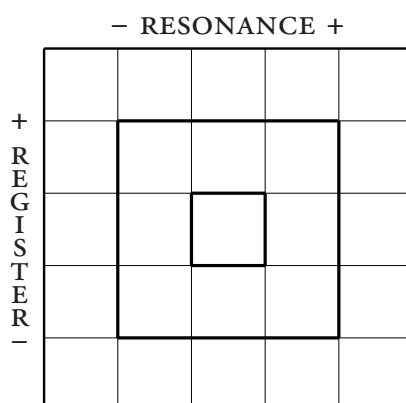
fig 14.8. 'Black voice' paraphonic use of tonality, <♠>.



A classification of individual voices

14.8. Individual voices can be classified according to two parameters: *register* and *resonance*. For any given voice, these parameters respectively refer to an average of their height and vibration, obtained by taking into account the intermediate excursion point of each parameter, according to statistical frequencies of oc-

fig 14.9.A. Idiophonogram for the classification of individual voices.



currence. They range on a five-degree (though continuous) scale, departing from a middle –un-marked– value; and extending to the cells on the border of the diagram (or *idiophonogram*, marked with ‘+’ or ‘–’ (cf fig 14.8).

Further important information about the speakers’ (or, rather, in this particular case, the singers’) sex and age can be supplied in a simple way, as we shall see in a moment. Of course, we must keep in mind that sex and age characteristics form social stereotypes, which depend –at least– on three factors: *physiological* (such as anatomical dimension), *cultural* (such as social and ethnic habits), and *individual* (such as states of health). But, thanks to our own experience, we can generally manage fairly well to make our judgements about the speakers sex and age (except for really ambiguous cases). All this happens in spite of the (sometimes great)

fig 14.9.B. Idiophonograms with 33 voices.

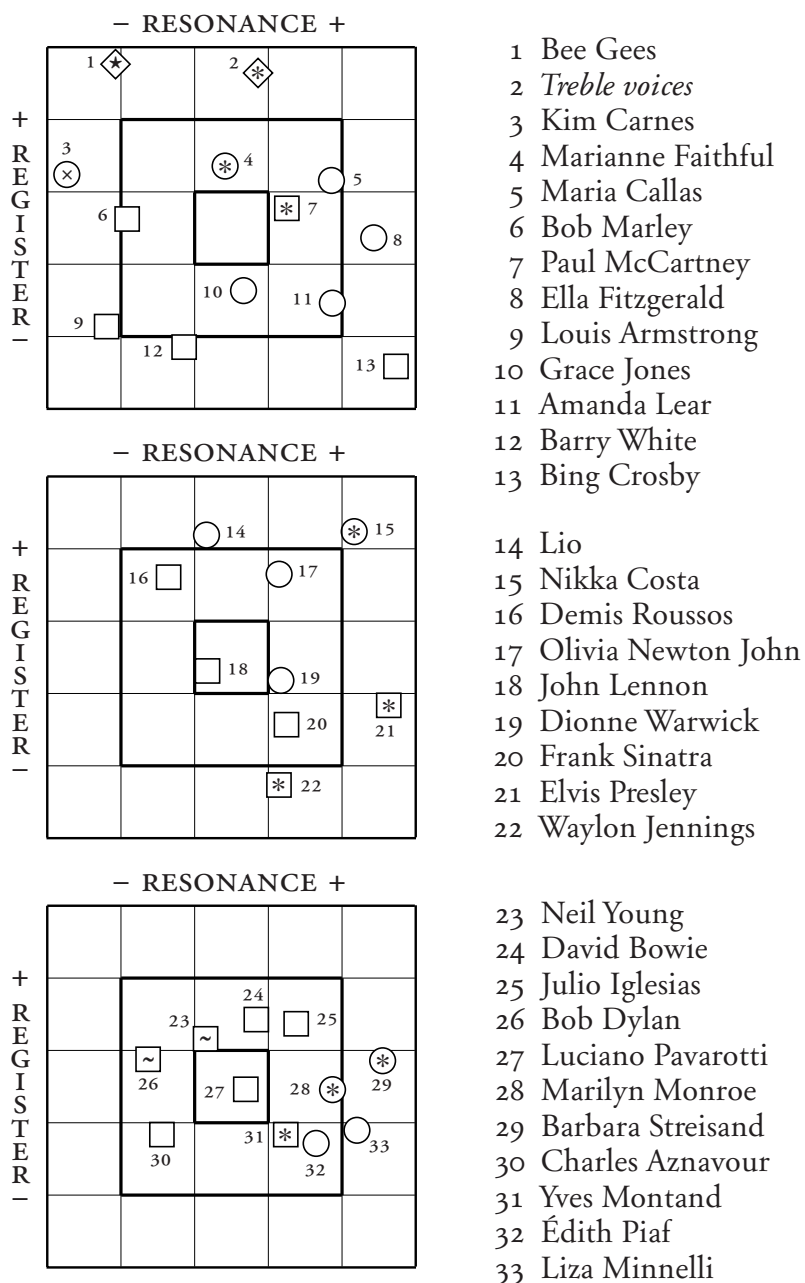
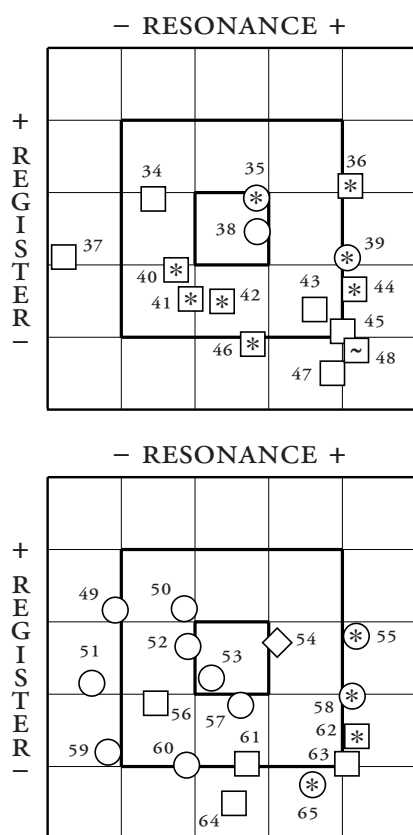


fig 14.9.c. Idiophonograms with 32 further voices.



- 34 Little Richard (also with ★)
- 35 Astrud Gilberto
- 36 Paul Anka
- 37 Ray Charles
- 38 Mariah Carey
- 39 Patsy Cline
- 40 John Denver
- 41 James Taylor
- 42 B.B. King
- 43 Gene Autry
- 44 Frankie Laine
- 45 Fats Domino
- 46 Don Williams
- 47 Jim Reeves
- 48 Willie Nelson
- 49 Billie Holiday
- 50 Dinah Washington
- 51 Norah Jones
- 52 Chrissie Hynde (*Pretenders*)
- 53 Blondie
- 54 Beach Boys
- 55 Françoise Hardy
- 56 Harry Belafonte
- 57 Judy Garland
- 58 Doris Day
- 59 Amy Winehouse
- 60 Nina Simone
- 61 Dean Martin
- 62 Hank Williams
- 63 John Lee Hooker
- 64 Johnny Cash
- 65 Tracy Chapman

differences in the use of paraphonic features made by the various cultures all over the world.

It is not so hard, however, even to determine whether a newborn baby is male or female from its first wailings. As a matter of fact, generally, a newborn-male voice has intense resonance and stronger strength, and a relatively lower register, though only a little, and still (very) high, even in comparison with child voices, not to mention (both female and male) adult voices. A newborn female voice, instead, generally has reduced resonance and weaker strength, and a relatively higher register: very high, then.

Sex can be indicated by means of a dot for *female*, or a square for *male*; when no distinction is needed or possible, as for particular groups, we use a rhomb. *Age* can be indicated according to four general classes: *childhood*, *youth*, *adulthood*, and *old age*. They could be shown by attaching a little bar to their symbol of sex, respec-

tively: under it, on its left-hand side, upon it, or on its right-hand side.

Of course, the two five-degree continuous parameters of register and resonance, and the sex and age classifications are only a rough approximation to a full identification of individual voices. As a matter of fact, each voice shows –in different ways– particular mixtures of individual paraphonic characteristics, together with more or less remarkable idiophonic, social, and geographical features. All of them could be singled out and quantified, and then indicated by means of the appropriate phonetic, prosodic, and paraphonic signs. Of course, the last-mentioned ones are those for pitch, strength, duration, emission, and articulatory and phonatory qualities, plus –at least– two further ones: *brightness*, when a voice (not: pronunciation) is distinct and clear ⟨*⟩; or, on the contrary, *harsh* voice ⟨×⟩, or even ‘falsetto’, or *false* voice ⟨*_{*}⟩; and, lastly, *nasal* voice ⟨~⟩. So, a few voices, although located nearby in the diagram, may still be different enough, because they have –or lack– (more or less frequently) certain paraphonic features.

Some illustrative examples –mostly singing in English– are shown in fig 14.B-C. They have been chosen among (rather) well-known entertainment people, whose actual voices can be heard quite easily on the radio and from recordings practically all over the world, although most of them are no longer performing, or living.

Let us simply add that the paraphonic symbol for *singing* is ⟨♪⟩ (cf § 11.20).

