THE FEATURE TENSENESS IN THE MODERN FRENCH VOWEL SYSTEM: A DIACHRONIC PERSPECTIVE

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1. Introduction

The point of departure for this article[1] is a distinctive feature analysis of the vowel system of Conservative Standard French (by this term I denote the language described e.g. in Nyrop 1951, Togeby 1951, and Grammont 1914). I follow Jakobson and Lotz (1949) in my use of the feature [tense] (section 2). This part of the paper makes no claims for originality.

The crucial part of the present paper is section 3, where we consider some language changes involving the feature [tense] in more advanced French standards, viz. the disappearance of distinctive vowel quantity and the raising of word-final [ɛ] to [e]. These changes in connection with the distinctive feature analysis given in section 2 make some specific predictions as to the possibility of distinguishing between two a-phonemes in the advanced standards in question.

The primary purpose of the present paper is not to give new data on or analyses of the French vowel system, but is of a more theoretical nature. The article aims at showing that a given distinctive feature analysis of a certain language, viz.

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1) This is an abbreviated version of sections 2 and 4 of a manuscript (entitled 'Notes on the phonological role of the feature Tenseness in the Modern French vowel system') which I wrote during my stay in the spring 1973 at the University of Paris, Vincennes. I am indebted to Eli Fischer-Jørgensen and Oluf M. Thorsen for helpful comments on the manuscript, and to Richard Carter for stylistic suggestions.

Conservative Standard French, makes some quite specific predictions as to how this language can change. The predictions described here have the form of logical implications: Presupposing a certain analysis of the language before the change, if A changes to B, then C must also change to D. Or, in other words: the change A to B logically implies the change C to D if a certain analysis of the input language is "correct" (in the psychological sense). We can then test whether C is changed to D everywhere where A is changed to B. Such implications can, of course, only lead to falsification of the initial analyses, not to definite confirmations. Furthermore, they are only very indirect ways of "testing" the input analyses, as compared to psycholinguistic test methods. Nevertheless, I think it may be worth while to call attention to such implications of distinctive feature analyses.[1]

I think the arguments to be given below apply in basically the same way both to structuralist theories of distinctive features according to which these features build up phonemes (i.e. to the theoretical framework of Jakobson), and to generative theories according to which essentially the same distinctive features build up segments at any level of the phonological component. Throughout the paper I shall speak about the distinctive feature analysis at a level which accounts for the notion of phonetic contrast, and at which all feature coefficients are categorial (i.e. mainly binary, and always with a finite (small) number of values), cf. Rischel 1974, p. 361ff.

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1) The intentions of the present paper are related to those of Skousen (1972, 1973). However, Skousen's treatment of the Finnish material which is the core of his papers, and the conclusions he draws from it, have been severely criticized by Kiparsky (1973, p. 92ff).

2. The feature [tense] in Conservative Standard French

Since the main function of section 2 is to serve as a basis for section 3, a survey of the vowel system in Conservative Standard French which is rather brief (except for problems related to the feature [tense]) will suffice, and the reader is referred to other treatments of the subject (e.g. Togeby 1951, p. 56ff, Delattre 1966, p. 95ff, and Malmberg 1969, p. 27ff) for more discussion and information, and further bibliography.[1]

The inventory of phonemically distinct stressed vowels in Conservative Standard French is different in open and closed syllables (where closed syllables in this paper means that the stressed vowel is followed by a pronounced consonant when the word is spoken in isolation):

open stressed syllables	i	e	ɛ	y	ø	u	o	ɑ	a	ɛ̃	œ̃	ɔ̃	ã
closed stressed syllables	i	ɛ:	ɛ	y	ø:	œ	u	o:	ɔ	ɑ:	a	ɛ̃:	œ̃:	ɔ̃:	ã:

All stressed vowels are long when they occur in the position before "lengthening" consonant(s), i.e. /z, ʒ, r, v(r)/, belonging to the same word.[2] Since vowel length in this position

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1) The views adopted here are in several respects related to the viewpoints expressed by Oluf M. Thorsen in his treatment of the French vowel system, see Kongsdal, Landschultz and Thorsen 1973, p. 82ff and 119ff.

2) This formulation, which for the sake of brevity will be used throughout the paper, is not entirely correct: Lengthening occurs only before word-final /z, ʒ, r, v, vr/ (where the qualification "word-final" in fact should allow these consonants to be followed by an optional word-final shwa). It is necessary to state the environment with an optional r, viz. as /v(r)/, and not as X_1^2 where X is one of the consonants /z, ʒ, v, r/, in view of the existence of the word-final clusters /rv, rʒ/ which do not cause the preceding vowel to be lengthened (e.g. verve, large [vɛrv, larʒ]), as opposed to /vr/ (e.g. vivre [vi:v(r̥)]).

is thus completely automatic, the vowels [i:, y:, œ:, u:, ɔ:, a:] have not been included in the inventory, [i:] being a bound variant of [i], etc. (emphatic lengthening phenomena are, of course, disregarded in this connection).

It appears from the table that all vowels in open stressed syllables are short. Since, furthermore, only stressed vowels can be long, it follows that all long vowels occur in closed stressed syllables. In such syllables all nasalized vowels as well as all occurrences of the vowels [ø, o, ɑ] are long. All of these vowels, together with certain instances of [ɛ:] (including all those which do not occur before a lengthening consonant, see below), can be called "inherently long vowels".[1] This term is in agreement with the fact that the "inherently long" vowels are long when they occur in the only position where vowel length is not neutralized (all long vowels are shortened by rule when they occur word-finally and in unstressed position).

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1) In 1948, Hjelmslev (1970) proposed that the nasalized vowels manifest the sequence of an oral vowel phoneme plus a nasal consonant phoneme (cf. bon, bonne; bain, baigner [bõ, bɔn; bɛ̃, bɛɲe] etc., also see Togeby (1951, p. 58 (2nd ed.: p. 40)). This analysis has been generally accepted within generative phonology (e.g. Rohrer 1967, Schane 1968, Selkirk 1972, Dell 1973). Schane (1968, p. 50ff) further proposes that /o:/ is derived from /al/ in cases like chevaux [ʃəvo] (cf. cheval [ʃəval]), and from /ɔs/ in cases like côte [ko:t] (cf. costal [kɔstal]), cf. also Rohrer 1968. Selkirk's thesis (chapter IV, section 3) contains a number of arguments that the rules coalescing a vowel and its following consonants in cases like those mentioned above are really unitary transformations (whereby two segments become one) and not sequences of rewrite rules. Among other things, she points to the fact that the outputs of these processes show up as long vowels when they occur in closed stressed syllables, which I agree is a linguistically significant generalization, and which is in agreement with the term "inherently long vowels".

(Although Selkirk (p. 377) presupposes a rule of "L-vocalization" preceding the coalescence of /a/ and /u/ to /o:/ in e.g. chevaux, I am not convinced that the coalescence rule in question does not have /al/(instead of /au/) as its input, i.e., I doubt the existence of an L-vocalization rule. So long as a phonological rule turning /ai/ to /e:/ is not well motivated in French, Selkirk's own arguments for coalescence processes as unitary transformations should apply to the coalescence of /al/ to /o:/ too, since in all cases where L-vocalization applies, coalescence will also apply.) (continued on the next page)

Since all nasalized vowels are inherently long, their vowel quantity is most reasonably considered phonemically as an automatic consequence of their nasality.

The oral non-high vowels present particular problems of analysis, since there is an intricate combination of quantity and quality difference in closed stressed syllables before non-lengthening consonants:

open stressed syllables:	e		ɛ		ø		o		ɑ	a
closed stressed syllables:	ɛ:	ɛ	ø:	œ	o:	ɔ	ɑ:	a		

The problem is now: how shall the six phonemically distinct vowels in open stressed syllables and the eight in closed ones be analyzed into phonemes? The most economical solution will be one according to which each of the triplets [e ɛ ɛ:], [ø œ ø:] [o ɔ o:] and [ɑ a ɑ:] are reduced to two phonemes, i.e., a solution which recognizes eight distinct oral non-high vowel phonemes in Conservative Standard French. All other solutions would necessarily lead to unexplained gaps in the vowel pattern. (Notice that the language investigated here obligatorily distinguishes jeûne and jeune, pôle and Paul, mâle and mal, bât and bat, dês and dais, maître and mètre; the fact that some of these distinctions are not maintained in other French standards need not concern us here, and at any rate it has no influence on the principal points made in the discussion.)

Two analytical possibilities immediately suggest themselves: that vowel quantity depends on vowel quality, or the other way round.

(continued)

It follows from the considerations above that within a generative framework all coalescing processes in French which have a vowel as their output have a vowel-consonant sequence as their input, and also that the output vowel is inherently long (i.e. it is manifested as a long vowel when it occurs in closed stressed syllables). Furthermore, it seems to be a significant generalization that the vowel and consonant of the input sequence are always homosyllabic, cf. my article on the phonological syllable in this volume, p. 63ff.

First, if vowel quality is taken to be distinctive, and vowel quantity to depend on it, then we must recognize the vowel phonemes /e ɛ ø œ o ɔ ɑ a/ (in addition to /i y u/, shwa, and the nasalized vowels). When /e ɛ/ occur in closed stressed syllables, the distinction between them will be realized as a pure quantity distinction (this problem will be taken up below). /ø o ɑ/ will be realized as long vowels when they occur in closed stressed syllables. In open stressed syllables, the opposition between /ø o/ and /œ ɔ/ is neutralized in favour of the former, a neutralization which can be argued for morphologically on the basis of alternations like sot, sotte [so, sɔt] and saut, saute [so, so:t], and - with examples where the conditioning factor for the alternation, viz. the deletion of the stem-final consonant, is due to a minor regularity - (b)oeuf, (b)oeufs [(b)œf, (b)ø]. Apart from the [e ɛ ɛ:]-vowels, where the phonemic distinction should be purely qualitative but its phonetic manifestation purely quantitative (which is certainly an unattractive feature of the solution), this does not seem an unreasonable description.

According to the other possible solution, viz. that only vowel quantity is distinctive and that the difference in vowel quality between [e ø o ɑ] and [ɛ œ ɔ a] depends on the quantity distinction, the phonemic quantity distinction will in closed stressed syllables be accompanied by a concomitant difference in vowel quality, except for [ɛ: ɛ] as in maître, mètre. The opposition between phonemically short and long round vowels is neutralized in open stressed syllables (cf. the examples sot, sotte; saut, saute; boeuf, boeufs mentioned above). This solution has the serious drawback, however, that what in open stressed syllables is supposedly a purely quantitative distinction phonemically, viz. /e:, e; a:, a/ (e.g. in dés, dais; bât, bat), is manifested phonetically as a purely qualitative distinction, viz. [e, ɛ; ɑ, a].

To avoid the situation that a purely qualitative phonemic distinction is manifested as a purely quantitative phonetic distinction, or vice versa, one thus seems forced to use a combination of the proposed solutions, viz. that there are nine oral non-high vowel phonemes, i.e.: /e ɛ ɛ: ø œ o ɔ ɑ a/. According to this solution, Conservative Standard French has one phonemically long (oral) vowel, viz. /ɛ:/. However, this solution has some important drawbacks. First of all, the stressed vowel phonemes /e/ and /ɛ:/ occur in complementary distribution, whereas all the other stressed vowels are in contrast (in unstressed syllables several other vowel oppositions tend to be neutralized, see below). Second, in the position where /ɛ:/ occurs, viz. in closed stressed syllables, the vowel phonemes /ɑ, o, ø/ are also always manifested by long vowels, but this lengthening is, within the proposal under discussion, a phonetic lengthening; however, the vowel length of fête, baisse, and the vowel length of pâte, basse, etc. clearly seem to be instances of the same phenomenon.

Are all possible solutions of this problem, then, equally unsatisfactory? No, since there is another analysis which seems, in fact, to be clearly superior to those we have discussed so far: in this analysis there are eight stressed oral non-high vowel phonemes, viz. /e:, ɛ, ø:, œ, o:, ɔ, ɑ:, a/, i.e. the distinction is a combined one of quality and quantity. If, for the moment, we accept the apparent ad hoc manifestation principle that /e:/ is realized as [ɛ:] in closed stressed syllables, then we need only make use of independently motivated principles of manifestation and neutralization in order to account for the realization everywhere in stressed syllables, viz. that all vowels in open stressed syllables are short, and that the opposition between round non-high oral vowels is neutralized in open stressed syllables in favour of the manifestation [ø o].

Which is the independent motivation, if any, for the manifestation principle that /e:/ is realized as [ɛ:] in closed stressed syllables? Notice that it is a general constraint on phonetic forms in French that the vowel [e] never occurs in closed stressed syllables, cf. alternations like céder, cède [sede, sɛd] where a phonetic form *[sed] would be structurally excluded in French. If the opposition between [e] and [ɛ] is neutralized in closed stressed syllables in favour of [ɛ], then it is not at all surprising that /e:/ is obligatorily manifested as [ɛ:] in such syllables, the pronunciation [e:] being excluded by a general surface constraint.[1]

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1) Within generative phonology, where it is taken to be important that morphologically related forms be derived from a common underlying form by rules, it would seem to be a drawback of the solution proposed here that céder has a tense vowel in its first syllable, whereas there is a short and thus lax vowel in the stressed syllable of the present tense form cède; a similar apparent drawback is the fact that a word like fête [fɛ:t] has a tense stressed vowel /e:/, whereas there is a lax [ɛ] in the related verb form fêter [fɛte], see below in the text. There can be no question about a reclassification of [e] as lax and [ɛ] as tense within the present framework (cf. footnote 2 on p. 182f). These problems, which have been raised within a generative model, also have a solution within such a model, however. It was argued in the preceding footnote that long vowels are, within the descriptive framework of generative phonology, derived from underlying homosyllabic vowel-consonant sequences. This analysis accounts for the short vowel of cède etc. (since it is not derived from any vowel-consonant sequence) and, more importantly, it can explain why the tense vowel of fête alternates with [ɛ] and not with [e] in fêter etc.: if fête in its most abstract form has an underlying /s/ (cf. the related forms festin, festoyer etc.), then the underlying /e/ of the first syllable of fêter will be changed to [ɛ] by the rule of closed syllable adjustment because /e/ occurs in a closed syllable, viz. before a homosyllabic /s/, at the point of the derivation where closed syllable adjustment applies (on this phonological rule, see Selkirk 1972, p. 367ff, Dell 1973, p. 198ff, and Basbøll forthcoming). Within a non-generative framework, this account would probably be considered diachronic rather than synchronic.

However, in order to make the proposed solution really attractiv we have to show that there can be found a non ad hoc distinctive feature which, as a consequence of its general definition, combines quality and quantity distinctions, i.e. that those two aspects of the feature have not been randomly associated for this specific purpose in French. Here the feature [tense] in the sense of Jakobson (e.g. Jakobson and Lotz 1949, Jakobson, Fant and Halle 1952, p. 36ff, Jakobson and Halle 1956, p. 30, Jakobson and Halle 1962) comes into the picture.

As already mentioned, the combination of phonetic quality and quantity distinctions is manifested in closed stressed syllables where we have the oppositions [ɑ:, a], [o:, ɔ], [ø:, œ]. These oppositions are quite similar to those which are found in closed stressed syllables of Standard German (cf. Fischer-Jørgensen 1973, p. 144-148), e.g. Mass, hass [mɑ:s, has][1] (cf. French lasse, glace [lɑ:s, glas]), Tod, Gott [to:t, gɔt] (cf. French haute, sotte [o:t, sɔt]), Söhne, könne [zø:nə, kœnə] (cf. French jeûne, jeune [ʒø:n, ʒœn]). For such German examples (with the possible exception of the two a-phonemes), there is widespread agreement that a common qualitative-quantitative distinction "Tense-lax" is relevant (although there is disagreement as to the precise phonetic nature of this distinction). Furthermore, the proposed phonemic distinction in French maître, mètre as one between /e:, ɛ/ (where /e:/ is realized as [ɛ:], see above), is the one found phonetically in German, e.g. beten, Bette [be:tn̩, bɛtə].

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1) The classification of the two German a-phonemes used here is based upon Moulton's discussion (1962, p. 61-64). However, it seems to be the case that many German speakers do not make a consistent quality distinction between these two phonemes (for some acoustic measurements, see Jørgensen 1969).

Jakobson and Lotz (1949, p. 153) give the following general definition of the opposition TENSE/LAX: "The former are produced with walls stiffened by muscular tension and the latter by lax articulation. The stiffening of the walls of the resonance chambers causes a more definite formant ('clangs' the sound), while the damping of a lax wall is greater. The prolonged duration of the sound is an accessory effect of the tension".[1] In Jakobson and Halle 1956, the definition is (p. 30): "TENSE/LAX acoustically: higher (vs. lower) total amount of energy in conjunction with a greater (vs. smaller) spread of the energy in the spectrum and in time; genetically: greater (vs. smaller) deformation of the vocal tract - away from its rest position. The role of muscular strain affecting the tongue, the walls of the vocal tract and the glottis requires further examination."

The tense vowels [e ø o ɑ] in comparison to the corresponding lax ones [ɛ œ ɔ a] have a greater constriction, either in the palatal ([e ø] vs. [ɛ œ]), or the velar ([o] vs. [ɔ]), or the pharyngeal region ([ɑ] vs. [a]); the phonological relevance of this difference in vowel constriction was emphasized by Oluf M. Thorsen in a lecture in 1969.[2] Thus the tense vowels

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1) Jakobson and Lotz (1949, p.153) in their footnote 17 give the following interesting quotations: "Il est très visible que les longues sont plus tendues que les brèves" - Durand [1946 p.] 151. However, "ce n'est pas tant la durée qui est en jeu que tout le déroulement de la voyelle" - ibid. 162. Cf. Rousselot's statement about the difference between tension and laxness: "Dans ma prononciation, il se confond avec la quantité, une voyelle tendue étant longue et une voyelle relâchée brève" [1897-1908 p.] 859."

2) The analysis adopted here of [e] being [+tense] and [ɛ] being [-tense] is at variance with the analysis of Jakobson and Lotz (1949), as shown by their matrices (p. 158) and by the following quotation (p. 154): "The tense vowels with the feature of pure or joint saturation [i.e. the non-high vowels; HB] are long when not in the word final, where French levels off the duration. The qualitative distinction is still valid though accompanied by a quantitative difference: the tense ê is opposed to the lax e as 'è ouvert' to 'é fermé' in the word final and as 'è: ouvert' to 'e moyen' elsewhere." That word-final [e] should be lax

are more distant from the neutral vowel than the corresponding lax vowels. The more extreme articulation of the tense vowels is concomitant with a longer duration. (We shall discuss some of the details of Jakobson and Lotz' use of the feature [tense] in French below.)

The main arguments for treating oppositions like [ø-œ, o-ɔ] in terms of tenseness and not of (say) vowel height can be summarized as follows: (i) Oppositions like jeûne-jeune and saute-sotte are of both a quantitative and a qualitative nature, and it seems quite arbitrary e.g. to assign the quantity distinction to one between relatively high and low mid vowels - or the other way round, for that matter - whereas the combined quality-quantity distinctions follow from the conception of the feature [tense] in the sense of Jakobson et al. (ii) The pair [ɑ-a] also exhibits a combined quality-quantity distinction (e.g. mâle, mal), in accordance with the expected behaviour of the feature [tense] (cf. some German pronunciations of Dame-Damme), and this can by no means be ascribed to the same sort of vowel height distinction. (iii) All the vowel pairs which are claimed to be distinguished by means of the feature [tense], but no others, tend to be neutralized in unstressed syllables: the vowels [e-ɛ, ø-œ, o-ɔ] can merge, whereas in normal speech vowels like [i-e, i-ɛ, i-y, y-u, ɔ-ɑ] cannot merge.

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and word-final [ɛ] tense is in disagreement with the whole vowel pattern, as we have argued above. And in fact, in the reprint of the article in Jakobson 1962 (p. 426-434), in the matrices (p. 434) word-final [e] has been classified as [+tense] and word-final [ɛ] as [-tense] (it is, of course, out of question to analyse long [ɛ:] occurring before non-lengthening consonants as anything else than tense /e:/); and the passage quoted above has been changed to: "The tense vowels with the feature of pure or joint saturation are long when not in the word final, where French levels off the duration, while there is a constant qualitative distinction, though differently implemented" (p. 429). Jakobson made this rather important change in silence, despite his words in the Preface: "The papers contained in the present book reproduce the original text with a few abridgements and some small lexical, phraseological, and stylistic changes."

(Of course, the third argument mentioned above only suggests that there is a common feature distinction between the vowel pairs in question, but not which one it is, whereas argument (i), as well as the fact that the distinction [ɑ-a] is of the same type as the other three, shows this feature to be something like [tense].)

As already pointed out, the opposition between tense and lax vowels in French is thus manifested by a combination of vowel quality and vowel quantity distinctions. In most positions, however, only one of these aspects of the distinction is manifested: Only the quantity distinction is retained for the opposition /e:, ɛ/ in closed stressed syllables. Only the quality distinction is retained for non-round vowels in open stressed syllables, and for all vowels in closed stressed syllables before a "lengthening consonant" (i.e. the distinction /e:/ : /ɛ/ is neutralized in stressed syllables before "lengthening consonants"). Neither distinction is retained, i.e. the opposition tense/lax is neutralized, for round vowels in open stressed syllables. Furthermore, as mentioned above, there is a clear tendency towards neutralization of the opposition tense/lax in unstressed syllables, the manifestation being regulated by vowel harmony, by analogy to the occurrence of morphologically related vowels under stress, and by the distinction open-closed syllable. However, this neutralization is not carried through in Conservative Standard French.

Note further that a great number of "gaps" in the phonetic representations of French words can be found exactly where the feature [tense] is concerned: e.g. there are no words ending phonetically in [o:r, ø:r, ø:v, œ:z, ɔ:z, a:z, ø:ʒ, œ:ʒ].[1]

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1) However, there is an isolated example with a stressed oral non-high round front vowel before [ʒ], viz. the name Maubeuge which ends in either [ø:ʒ] or [œ:ʒ]. According to Kongsdal, Landschultz and Thorsen (1973, p. 206c), [œ] never occurs before dental obstruents. As the examples show, the position before [z] is different from the others in that only the round lax

I do not pretend all these gaps to be structural (i.e. systematic), but it is significant that very often only one member of the tense/lax opposition is found exactly before the lengthening consonants (compare the fact that a great number of words vary between [a:ʒ] and [ɑ:ʒ]). The reason may be that in this position the quantity distinction (which it is argued here is an important part of the tense/lax opposition) is never manifest. (Note that within a generative framework, I have not committed myself as to whether these regularities - to the extent they are systematic at all - should in fact be expressed by means of the feature [tense], which would then have to be present in underlying forms in about the same distribution on lexical items as it has on the surface. I have only given a rather evident reason why exactly this feature should have difficulty in maintaining its distinctive power just before the "lengthening" consonants.)

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vowels are missing (in all other cases the missing vowels are tense, or both tense and lax([ø:ʒ œ:ʒ])), just as Schane's rule predicts (1968, p. 51):

$$\begin{bmatrix} V \\ +\text{round} \end{bmatrix} \longrightarrow [-\text{low}] \; / \; \_\_\_ \; \begin{Bmatrix} \# \\ z \end{Bmatrix}$$

I agree with Selkirk's uncommented judgement (p. 392f) that Schane's rule collapsing is "purely by way of description", since the rule in the environment ___ # (accounting for sot, boeufs [so, bø], etc.) is a phonological rule which must apply after such other phonological rules as Final Consonant Deletion and Truncation, whereas the rule applying before z expresses a regularity in the lexicon (and it can therefore be formulated as a morpheme structure condition). Anyhow, Selkirk's explanation ("that only [o], and not [ɔ], appears before [z] [...] is, I think, due to the lengthening effect of /z/.[...] Yet, I do not understand at present why long /ɔ/ becomes [o] in French") is not sufficient since it would predict just the same thing for /v, ʒ, r/, in contradistinction to the facts (cf. innove, loge, Faure [inɔ:v, lɔ:ʒ, fɔ:r]). The only way to save her explanation would be to assign to the rule which lengthens vowels before /z/ a much earlier place in the ordering than the rule which lengthens vowels before the other lengthening consonants (as done by Rohrer 1968), but I know of no independent arguments pointing in that direction.

Before we set up a distinctive feature matrix for the stressed vowel phonemes in French, a few words should be said about Jakobson and Lotz' (1949) additional uses of the feature [tense] in their account of the French phonemic pattern. They also use this feature to distinguish between two sets of obstruents, viz. fortes ([+tense]) and lenes ([-tense]). Whether this distinction among obstruents can really be identified with the distinction discussed here among non-high oral vowels, is a question which has no impact on our paper, and which I shall therefore leave uncommented here.

Jakobson and Lotz also make a third use of the feature [tense] in French; they use it to distinguish between the high vowels [i y u] ([+tense]) and the semivowels [j ɥ w] ([-tense]). This proposal appears in several respects to be quite elegant:
(i) The distinction between [i y u] and [j ɥ w] seems to correspond rather well to the definition of the opposition tense/lax, the high vowels normally at the same time being longer and more precisely articulated than the corresponding semivowels.
(ii) This proposal permits [i y u] to be classified as [+tense] in agreement with the fact that these vowels have an even greater constriction than the tense vowels [e ø o] (cf. above).
(iii) The proposal permits the statement that all round vowels in word-final position are tense, thus at the same time accounting for two (apparently disjoint) sets of facts: that there is a distinction in word-final position between [e ɑ] and [ɛ a] but not between [ø o] and [œ ɔ], where only the former pair is found; and that there is a distinction in word-final position between [i] and [j] (e.g. pays, payes [pɛi, pɛj]), but not between [y u] and [ɥ w], where only the former pair is found.
(iv) The proposal seems to account for the fact that the set of vowels which have corresponding semivowels and the set of vowels which enter into an opposition between long more constricted and short less constricted vowels are non-overlapping, and that the union of these two sets equals the set of all oral vowels in French.

It is, of course, the first clause of (iv) above which has made it possible - and the second clause which has made it attractive - for Jakobson and Lotz to identify phonemically the feature [tense] of the non-high vowels and the feature which is usually called [syllabic] of the high vowels. The Jakobsonian practice of phonemically identifying features which are phonetically quite different can evidently be challenged on general grounds (cf. McCawley 1967). It is important in this connection to remember that the set of distinctive features is supposed to be universal (e.g. Jakobson, Fant and Halle 1952), i.e. the identification in question presupposes that a language can never have a three-way contrast between high tense vowels (e.g. [i: y: u:]), high lax vowels (e.g. [ɪ Y ʊ]) and semivowels (e.g. [j ɥ w]). I.e., a language with a vowel system like that of Standard German could never in addition have a set of semivowels like that of French, if the analysis of Jakobson and Lotz (1949) is to be upheld.

Even if this claim should be universally true, the justification of the identification in question can still be questioned. First of all, it cannot be a <u>general</u> principle for the manifestation of the Jakobsonian feature [tense] that it is one of high vowels vs. semivowels, as evidenced by the Standard German distinction [i: y: u:] vs. [ɪ Y ʊ]. Second, with regard to the rules governing vowel quantity in French, [i y u] go together with [ɛ œ ɔ a], not with the tense vowels [e ø o ɑ] (see above); thus we must distinguish between high tense vowels and non-high tense vowels everywhere where vowel quantity is concerned, and this casts doubt on the classification of [i y u] as [+tense] since exactly the vowel quantity phenomena were crucial in the arguments given above for the use of the distinctive feature [tense]. Furthermore, the principle which accounts for the distribution of high vowels and the corresponding semivowels (basically that we have semivowels in the position before vowels) has no relation to the principles of vowel quantity

(see above). Third, I think the generalization (cf. Jakobson and Lotz 1949, p. 154) mentioned under (iii) above is only a spurious one, since the general restriction on the occurrence of the semivowels [ɥ w] is that they only occur before vowels, and the fact that they do not occur in word-final position is only one consequence of this general restriction; the restriction on [œ ɔ] is quite different, on the other hand, and it really concerns word-final position, cf. jeune, sotte [ʒœn, sɔt], etc.

As a consequence of these considerations I shall in the matrix below not specify the coefficient for the feature [tense] in the high vowels. The matrix includes all stressed oral vowels in French (for shwa and the nasalized vowels, see below).

	i	e:	ɛ	y	ø:	œ	u	o:	ɔ	ɑ:	a
HIGH	+	-	-	+	-	-	+	-	-	-	-
BACK	-	-	-	-	-	-	+	+	+	+	+
ROUND	-	-	-	+	+	+	+	+	+	-	-
TENSE		+	-		+	-		+	-	+	-

The four nasalized vowels [ɛ̃ œ̃ ɔ̃ ã] have the same features as the oral vowels [ɛ œ ɔ a], except that they are [+nasal], of course. They are all very low vowels (even lower than suggested by the transcription), and the fact that they are always long when they occur in closed stressed syllables may be dependent on that. Within a more abstract generative framework, however, their "inherent length" can be connected with the fact that they are derived from underlying homosyllabic vowel-nasal-sequences (see the footnote on p. 176f).

I said above that the matrix includes the stressed vowels only, but the set of vowel phonemes occurring in unstressed syllables is, in fact, identical to, or a subset of, the inventory of stressed vowels (the main difference being that the feature [tense] may be neutralized in unstressed position, see

above). However, the vowel symbol [ə] ("shwa, e caduc") is often used in phonetic transcriptions in addition to the stressed vowel symbols. But [ə] in fact means a vowel identical either to unstressed [œ], or to a neutralization product of [ø/œ], and it is thus already defined in terms of distinctive features.[1] The reason why a special symbol, viz. [ə], is often

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1) Thus I do not follow Schane (1968, p. 30ff) who uses the feature [tense] at the phonetic level to distinguish between shwa ([-tense]) and all other vowels ([+tense]). At the phonological level, Schane uses [tense] as a "diacritic" feature distinguishing between two classes of underlying vowels classified according to whether they undergo certain alternations. This description presupposes a phonological rule which tenses all vowels except shwa. Selkirk does not explicitly discuss the role of the feature [tense] in her thesis, but scattered remarks indicate that the specification [-tense] characterizes the shwas which drop, whereas all vowels which are manifested phonetically are [+tense]. The following quotation is particularly informative: "The rule which prevents /ə/ from dropping before an h aspiré (call it H-EX and understand it to cause tensing of a pre-"h" schwa) operates, needless to say, before the operation of the rule of final schwa deletion" (p. 374).

Selkirk's use of the feature [tense] is more reasonable than Schane's, but it is still an "abstract" use, i.e. the feature is not defined phonetically (but only as characterizing 'the vowels which drop'). It is possible that the underlying shwas should be defined as [-tense] in distinction to all full vowels (and furthermore as [-high, -back, -round]) within a generative framework (see Basbøll forthcoming), but the shwas which are manifested phonetically must then be changed to non-high round front vowels by a phonological rule, cf. Dell loc. cit. Forms where shwa occurs under stress in an open syllable, like prends-le, parce que! [prãlœ̃/prãlø̃, parskœ̃/parskø̃], support the existence of such a rule. Furthermore, the possibility of both [œ̃] and [ø̃] in such forms, as opposed to "normal words" where only final [ø̃] occurs, can be described by means of rule ordering: If shwa-rounding applies before raising of word-final [œ,ɔ], we get forms like[prãlø̃], but if the order is the reverse, we get [prãlœ̃], etc.

used for this vowel is probably that it alternates with zero - partly in free, partly in bound variation - in distinction to the vowel /œ/, cf. Dell p. 196f.[1]

3. Some evolutionary tendencies in more advanced French standards, involving the feature [tense]

It will be remembered that the language used as basis for the preceding discussion was a rather "conservative" variety of Modern French, and it is well known that younger standards deviate from the more conservative norms on (among other things) several of the points which were discussed in section 2, and which provided the arguments for the phonetic role of the feature [tense]. The import of these evolutionary tendencies for the present analysis will be taken up below. It should be added, however, that the sound changes mentioned in the present section are viewed in isolation, and if they are in fact only specific cases of more general changes in French grammar, my remarks below may in certain cases miss the point.

In many younger French standards the quantity of oral vowels is completely predictable from other traits of the phonetic surface without regard to quality. Thus the phonetically long vowels in non-emphatic speech are exactly those which occur in closed stressed syllables and which are nasalized

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1) However, I do not wish to exclude a priori the possibility of an extra-weak stress on certain [ə]-syllables as opposed to (unstressed) [œ]-syllables.

and/or followed by a lengthening consonant.[1] Since the main reason for postulating the (phonetic) distinctive feature [tense] in the French vowel system was the interrelationship between quality and quantity among the oral vowels (see section 2), there is thus no longer any strong reason for maintaining this low-level feature in these younger standards.

The speakers in question pronounce maître and mètre, fête and faite, etc. identically, whereas they still maintain a quality distinction between haute and sotte, Beaune and bonne, etc. This means that the vowels [u o ɔ], and generally also [i e ɛ] (see below), are distinguished phonemically (whereas the phonemic distinction between [ø œ] is often not

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1) However, the effect of this latter vowel lengthening seems in certain young standards to be so little pronounced that it may, in fact, be explainable by the physiologically conditioned (and thus universal) effect lengthening vowels before voiced obstruents, particularly fricatives (note that [r] is phonetically a voiced fricative in Modern French). In this case the vowel lengthening rule will, of course, have disappeared from the French grammar (a particularly clear indication that this is the case would be the "outfading" or even more the disappearance of the apparent particularity that sequences of voiced fricatives have exactly the opposite effect in the case /vr/ which lengthens the vowel, e.g. vivre, versus /rv, rʒ/, which do not, e.g. verve, large; note, however, that /vr/ is a possible syllable-initial cluster as opposed to /rv, rʒ/). If the duration of the nasalized vowels by the speakers of the young standard in question should also be explainable by physiological factors alone, then there will be no principles specific to the grammar of French which govern vowel quantity in that language (and in that case there would be no reason for indicating (non-emphatic) vowel length in phonetic transcriptions of French).

maintained in these younger standards[1]). Since the main argument for the existence of the distinctive feature [tense] in these innovating dialects has disappeared, another feature must distinguish between [o ɔ] (and [e ɛ]), and it seems evident that "degree of opening" or (with a better terminology, since [ɑ] is, strictly speaking, a narrow (pharyngeal) vowel) "vowel height" is the relevant choice here. If we say that the feature [tense] has been replaced by the feature [low] in the younger standards in question, or - equivalently within the present framework - that the feature [tense] has disappeared while the feature [high] has become ternary, we can thus account for the evolution from Conservative Standard French. Within a binary framework, the following distinctive features thus seem necessary and sufficient to account for all oppositions among stressed oral vowels in the Modern French Standards in question: [high, low, back, round]. (The vowel pairs which may be neutralized in these standards, i.e. [e-ɛ, ø-œ, o-ɔ], are still distinguished by one feature, namely [low].)

Now observe that it is <u>impossible</u> to distinguish between two <u>a</u>-phonemes within this framework of distinctive features (without introducing, of course, additional features or coefficients of features which will then necessarily be entirely ad hoc; cf. Westring Christensen 1969, p. 120f). Thus the distinctive feature analysis of the French vowel system made in

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1) The merger of /ø/ and /œ/ which can be observed in many speakers, is probably to be explained in terms of the universal tendency to reduce oppositions among round front vowels (and non-round back vowels) as opposed to non-round front and round back vowels. Such universal tendencies have been studied notably by Jakobson (e.g. 1941) and Martinet (e.g. 1955), and the tendency in question is found independently in many languages, e.g. Danish.

section 2, together with the observed change in the principles of vowel quantity in more advanced French standards, makes the prediction that those standards will not distinguish between two a-phonemes in any environment.[1] As far as I know, this prediction is borne out.

Thus we argue for the following distinctive feature analysis of the French vowel system after the sound-change mentioned. This analysis is identical to that of Dell 1973, p. 284, whose dialect, actually, seems to represent exactly the stage of evolution discussed here. Only the stressed oral vowels are included in the matrix:

	i	e	ɛ	y	ø	œ	u	o	ɔ	a
HIGH	+	-	-	+	-	-	+	-	-	-
LOW	-	-	+	-	-	+	-	-	+	+
BACK	-	-	-	-	-	-	+	+	+	+
ROUND	-	-	-	+	+	+	+	+	+	-

There appears to be in Advanced Standard Parisian a coalescence between dés and dais which are both pronounced [de], fée and fait both [fe], etc., i.e. (in diachronic terms) word-final [ɛ] has been raised to [e]. This process could be a generalization of at least two different regularities in French phonology.

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1) I here refer to speakers who have given up a real phonemic distinction between two a-phonemes in their own language. However, it is well known that a few minimal pairs like mâle-mal and pâte-patte are systematically taught in school; but it appears to me that the very fact that a new pronunciation of a few words can be learnt should not force the analyst to postulate a restructuring of the phoneme system. An investigation of the speech of pre-school children would probably be relevant in this context. In the final analysis, it is of course a psychological question whether (or: under what conditions) people restructure their sound pattern when they learn new words which contain a new "taxonomic phoneme" or a hitherto unknown phoneme combination.

The first of these is the principle that [e] and [ɛ] tend to occur in complementary distribution in unstressed syllables, [e] occurring in open syllables and [ɛ] in closed ones. If this principle is generalized so that it applies to stressed and unstressed syllables alike, it will have the effect that both dés and dais are pronounced [de], etc. If this is in fact the explanation for the sound change in question, then this sound change makes no predictions at all concerning the phonological role of the feature [tense] after the change has been carried through. Since there is thus one perfectly reasonable explanation for the sound change which does not involve the feature [tense] in any crucial way, the case to be made below, which is built upon another explanation of the sound change, really seems a weak one. However, since the present paper is mainly an illustrative one, I shall demonstrate below which consequences can be drawn if the second explanation for the raising of word-final [ɛ] is correct.

According to this second explanation, the raising of word-final [ɛ] to [e] is a generalization of the rule which says that the distinction between [ø o] and [œ ɔ] is neutralized in word-final position in favour of the manifestation [ø o] (e.g. sot, boeufs [so, bø]). If this rule is generalized to cover [e ɛ] too, it predicts that all word-final [ɛ]s will be raised to [e].

Now, this generalization could theoretically occur either (i) while the feature [tense] was still in operation in the French vowel pattern, or (ii) after the phonological role of the feature [tense] has been taken over by the feature [low] (see above).

In case (i), the generalization of the rule which predicts that [ø o] will occur in word-final position, but not [œ ɔ], would have to involve the feature [tense], and simply consist of removing [+round] from the definition of the input segment;

but there would then be no non ad hoc means of also preventing [ɑ a] from being neutralized in favour of the manifestation [ɑ] (see the distinctive feature matrix on page 188). I.e., if the raising (in the diachronic sense) of word-final [ɛ] is a generalization of the raising (in the synchronic sense) of word-final [œ ɔ], and if the language still has a phonemic distinction between [ɑ:] and [a] in closed stressed syllables, and thus two a-phonemes and the distinctive feature [tense], then there should be a neutralization of the opposition [ɑ/a] in word-final position in favour of the manifestation [ɑ].[1] Such a neutralization is completely unknown in French, as far as I know.

We thus conclude that if the raising of word-final [ɛ] is a generalization of the raising of word-final [œ] and [ɔ] (in the synchronic sense), then the raising of word-final [ɛ] does not take place until the feature [tense] has ceased to play the phonological role ascribed to it in section 2 above, i.e. until the two a-phonemes have merged in any environment. As far as I know, this prediction is also borne out by the facts (notice that this prediction does not follow logically from the facts of the first sound change mentioned in section 3, i.e. the disappearance of distinctive vowel quantity).

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1) If, furthermore, Jakobson and Lotz' (1949) analysis of the distinction between [i y u] and [j ɥ w] as [+tense] vs. [-tense] were correct, and if the feature [tense] still played the phonological role ascribed to it in section 2 at the time of the raising of word-final [ɛ], and if this raising were due to a generalization of the rule accounting for the fact that lax round vowels (including semivowels) do not occur word-finally, then we should expect a concomitant change of word-final [j] to [i] (i.e. a tensing in word-final position, parallel to that of [ɛ] to [e]). Such a change does not occur in French at all, as far as I know. All this is, of course, very hypothetical.

One final remark. If the tendency (which is found in certain dialects) to merge the vowel pairs [e-ɛ, ø-œ, o-ɔ] in any environment - except for purely phonetic variation (including bound variation) - should be carried through in Standard French too, one aspect of the evolution from the language considered in section 2 above could be stated briefly as follows: The feature [tense] in the Jakobsonian sense has ceased to be relevant for the vowel pattern of French, without being substituted by any other feature(s). The vowel system of such a variety of French could thus be given the following distinctive feature analysis:

	i	e	y	ø	u	o	a
HIGH	+	-	+	-	+	-	-
BACK	-	-	-	-	+	+	+
ROUND	-	-	+	+	+	+	-

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