

NOTES ON THE DANISH VOWEL PATTERN.

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The vowel pattern of Danish exhibits several features which are interesting from the point of view of general phonological theory. And indeed, Danish is among the languages that have attracted the attention of phonologists already at an early time. The literature on Danish phonology will not be listed in its entirety, let alone discussed in detail, in this report (a critical survey has been given quite recently by Basbøll in an unpublished thesis (2)), but it goes without saying that the results of the various contributions to Danish phonology have been utilized as a basic source of knowledge about contrastive and distributional facts. The reader may be referred to the monograph by Martinet (14) and to the most recent papers on the vowels by Basbøll (in this report) and by Ege (5) for additional, more or less taxonomically oriented information. Aage Hansen (9) is a rich source of general information on the Modern Danish language.

The purpose of this report is to discuss quite informally some controversial aspects of the Danish vowel pattern. Definite solutions to the problems dealt with are offered only occasionally, mainly because the morphophonemics of Danish has not been analyzed in sufficient detail for safe conclusions to be made, neither by this author*) nor in the available literature on Danish. Nevertheless, it is the conviction of the present author that there is a widespread interest in data on Danish phonology even in this modest form. To my knowledge there are only two papers that deal essentially with the morphophonemic aspect, viz. Hjelmslev's paper from 1948 (10) and an unpublished paper by Hamp (8) held before the Linguistic Circle of Copenhagen in 1966.

 *) The contents of this paper are largely based on my preparatory notes to courses in Danish phonetics (given by me at the University of Odense in 1967-68) and in generative phonology (Copenhagen, 1968).

Both of these are of course quite crucial to the present study, but as might be expected the summaries available are more oriented towards solutions (in Hjelmslev's case: reduction of the phoneme inventory, in Hamp's case: positing of feature matrices and rules) than towards a lucid presentation of data. On the whole one finds that in spite of the fact that considerable research has been done on certain aspects of the Danish language, general information on the gross features of the "standard language" is not very easily accessible, at least to nonnative scholars.

1. Preliminary survey of the phoneme system.

This report will contain three main sections: firstly, a tentative scetch of the phoneme system in "traditional" terms, secondly, a (likewise entirely tentative) analysis of the phonemes into distinctive features, and thirdly, some scattered reflexions on the vowel morphophonemics. - The introductory, essentially taxonomic, survey is kept very brief, since most of the relevant phenomena are dealt with at length in Basbøll's paper. (Notice, however, that he describes a local, or even individual, variety of Danish which differs on some points from the perhaps somewhat arbitrary "general" norm dealt with here.)

1.1. Tentative phoneme inventory.

Danish may be assumed to have ten long and ten short vowel phonemes:

i:	y:	u:	i	y	u	
e:	ø:	o:	e	ø	o	(plus shwa)
ɛ:	œ:	ɔ:	ɛ	œ	ɔ	
a:			a			

since all of these entities are mutually commutable (or at least potentially commutable).

The phonemicists have been and still are in disagreement about several points including the phonemic status of length, the interpretation of [œ], the interpretation of the various a-sounds found in Danish, and the interpretation of shwa, but the arrangement given here is an expedient starting-point for the subsequent discussion.

1.2. Main rules of (alleged) allophonic variation.

The alphabet of the International Phonetic Association is used in this paper, but it must be said expressly that Danish is badly suited for representation in the IPA alphabet, particularly because most of the vowel are situated nearly halfway between the cardinal vowels, so that narrow transcriptions require an extensive use of diacritic marks, and broad transcriptions involve a certain amount of arbitrariness in the choice among symbols (also compare Poul Andersen (1) and Hjelsmlev (10)). It is necessary, therefore, to define the use of some of the IPA symbols in this paper:

e ø o are IPA e⁺ ø⁺ o⁺; ε œ are roughly IPA e⁺ ø⁺

ɔ is almost mid and rather centralized, i.e. IPA ɔ⁺

ɒ is roughly IPA ɔ⁺ or ɒ⁺ but generally rather centralized, and nearly unrounded in a widespread pronunciation (i.e. Δ⁺ or a⁺). — A more retracted (pharyngealized) [ɒ] is here given as [ɒ̠].

ɑ is a back to central vowel of individually varying quality.

A more retracted (pharyngealized) ɑ is given as [ɑ̠].

æ is rather close to IPA æ.

œ denotes a very open rounded front vowel.

ɨ ʉ ɔ̠ are nonsyllabic; the last one (from underlying /r/) is more or less pharyngealized.

Long vowels are symbolized as V:, and stress is indicated by an acute mark on the vowel V́.— Stød (accentuation characterized by a glottal constriction or sometimes closure) is indicated by ? after the vowel or consonant in which it is heard. When the stød "falls on" a vowel, the vowel is half-long (V?).

The exact phonetic values of consonants are of little concern in the present study, and these are given in a very rough transcription (which disregards allophonic variation of voice and aspiration in the stops). It should be noted that the symbol "r" is used to denote a somewhat fricative uvular occurring syllable-initially (the "vocalic r" is represented by the symbol "p"). A narrower transcription is used in Basbøll's paper.

1.2.1. Main allophones.

The main allophones of /i: y: u: e: ø: ε: œ:/ are respectively [i: y: u: e: ø: ε: œ:]. The corresponding short vowels are quite similar in quality, i.e. there is no easily perceptible difference in height or in "tenseness".

The main allophones of /a: o: ɔ:/ are respectively [æ: o: ɔ:], whereas short [æ o] have a highly limited distribution; [æ] occurs in some cases where it represents a shortened /a:/ (see 1.2.6. below), and [o] occurs in pretonic and posttonic syllables and in a few other cases (e.g. [fóto]'photo', [sort] 'black'), otherwise the two sounds are found only in special cases where they represent shortened /a:/, /o:/ (see later). Some people have short [o] as a commonly occurring sound, but it has been widely replaced by [ɔ] (quite commonly in the younger generation), so that it is reasonable to assume the latter pronunciation (e.g. [hɔl] rather than [hol] 'hole') in a description of modern Danish.

The three short vowels readily available to be taken as main allophones of /a o ɔ/ are respectively [a ɔ v]. This classification postulates a common lowering rule for short /o/ and /ɔ/ (note that /o/ does not go with /e, ø/ in this respect), as well as a rule stating the difference between /a:/ and /a/.- It is clear, however, that one must seriously consider the possibility of considering this lowering as a purely diachronic phenomenon, a phonemic shift, which the implications that /o/ is lacking in most environments, /ɔ/ is [ɔ] in most environments, and there is an additional phoneme which is phonetically [v]. In fact this may be the only tenable analysis from a strictly taxonomic point of view.

Long vowels are (regularly or optionally) shortened in certain types of environments. The grammatical conditions for this will not be dealt with in any detail in this paper, but it must be mentioned that the presence of shortened long vowels may pose awkward problems for a taxonomic analysis.- Shortened /ɔ:/ is [ɔ] in some cases but [v] in others. If, for the sake of "symmetry", [ɔ] is considered the (main) allophone of /o/ it seems imperative to formulate a morphophonemic alternation

rule /ɔ:/ → /o/ in order to account for forms like [pɔdn] 'on it' from [pɔ?] 'on' (notice that this form is distinct from [pɔdn] 'the pot' in most people's speech), although the quoted rule is phonetically vacuous in respect of vowel quality change. See further 2.4. and 3.5. below.

1.2.2. r-conditioned allophones.

Several of the vowels have special allophones adjacent to /r/. The short close vowels are somewhat lowered before [ɹ], which is assumed here to be an allophone of /r/, and it is generally contended that i/e, y/ø, and u/o are neutralized and may vary more or less freely in this position (cp. Diderichsen (4)), although there seem to be some words that are invariably pronounced with a close vowel, and others that are invariably pronounced with a half-close vowel. In the same position /ɛ œ/ have very open allophones [æ œ] (of which the former closely resembles the main allophone of long /a:/). /a ɔ/, both long and short, fuse with vocalic r and are actualized as back vowels [ɑ(:) ɔ(:)], cp. [fɑ?t] 'speed', [tɔ?n] 'tower' (orthographically fart, tårn).

After /r/ the vowels /e ø ɛ œ a/ are lowered and/or retracted to a greater or lesser extent. In particular, short /ɛ œ a/ and long /a:/ are [æ œ ɑ] and [ɑ:]. With some speakers of Danish (particularly in the Copenhagen variety of the younger generation) these vowels (including long /e: ø: ɛ:/) are lowered so much that it is possible to make a restatement in the taxonomic analysis to the effect that these persons have /ɛ œ/ instead of /e ø/, and /ɑ/ instead of /ɛ/. This analysis probably necessitates that two additional phonemes be posited, viz. /æ, ɑ/.

Since /a ɔ/ fuse with immediately following /r/ to form one phonetic segment, viz. [ɑ ɹ] or [ɑ ɹ] it can be, and indeed has been, argued that /ɑ ɹ/ must be set up as extra vowel phonemes (cp. Koefoed (12) and Basbøll elsewhere in this report), which further may imply that "vocalic r" is phonemically a vowel in all instances.

There are two features which I shall discuss separately here. Firstly one might argue that [ɑ ɹ] are single segments

phonemically. This can hardly be maintained quite generally (cp. contrasting forms like [pɑk] 'scum' versus [pɑ·k] or [pɑ̄·k] (less commonly [pɑ̄k]) 'park', of which the latter can hardly be analyzed as a long vowel phoneme since long vowels in words of this structure invariably take the stød). From a generative point of view the analysis is definitely untenable, cp. section 3.3. below. - Secondly one might argue that "vocalic r" is a vowel also phonemically, i.e. that forms like [bæp] 'berry' contain a phonemic diphthong. This latter point can probably be defended with much more efficiency. In the following it is assumed that [p̄] represents /r/, but most of the discussion will be almost unchanged even if the restatement mentioned is made.

1.2.3. Allophones of short /a/.

As stated above, short /a/ may be assumed to have at least two allophones: [ɑ] or [ɑ̄] in the sequences /ar/ and /ra/ (probably with many speakers more retracted before than after /r/), and [a] elsewhere. However, with some speakers of Danish this description does not suffice. It is common to have a rather retracted (central or even back) vowel before labials and velars, and in eastern varieties of Danish (cp. the Copenhagen dialect treated by Basbøll elsewhere in this report) this vowel is similar to the allophone found adjacent to /r/ (and before clusters containing /r/), cp. [kafə] 'coffee', [tak] 'thank'. (Other local varieties have [kafə] but [tak] or even [kafə], [tak].) - If a separate phoneme /ɑ/ is set up some of the a-sounds before labials or velars must of course be assumed to belong to this phoneme, too, with the perhaps disturbing result that slight differences in the pronunciation of words with a before labials or velars must be interpreted as phonemic differences.

1.2.4. Short vowels before nasals.

The close vowels [i, y] occur only sporadically before nasals (in words like pinje, hymne which can obviously be considered "[+foreign]"). Since the opposition between [ø] and [œ] is largely confined to this position several scholars (cp. Martinet (14), pp. 18-19, Spang-Hanssen (15), p.66) have

considered the possibility of reducing the short vowel series [y ø œ] to two phonemes whose allophones are [y ø] in most environments but [ø œ] before nasals. By generalizing the lowering rule before nasals one might further postulate that [e] before nasals is phonemically /i/. However, with the back vowels this distribution does not hold, since there is a handful of common words with [u] before [ŋ], e.g. [hunʔ] 'dog'.

1.2.5. Rounded front vowels before /r/.

The distinction of [y:] vs. [ø:] vs. [œ:] is found only before [r] or [p] (i. e. in sequences containing the phoneme /r/). Example are ([sdy:rp] or normally) [sdy:p] 'steer' versus ([kø:rp] or normally) [kø:p] 'drive' versus ([gœ:rp] or normally) [gœ:p] 'do'. An often cited series with stød is more problematic because the vowel is often pronounced short: [dyʔp̥] or [dyʔp̥ʔ] 'deer' versus [døʔp̥] or [døʔp̥ʔ] 'dies' versus [dœʔp̥] or [dœʔp̥ʔ] 'door'. Otherwise only two vowels are distinguished, viz. [y:] and [ø:] ([œ:] before /n/ and possibly after /r/). Some scholars, therefore, wish to reduce this series to two phonemes /y:/, /ø:/ just as the short series (Martinet (14), pp. 12-13, Hjelmslev (10)). The distributional relationships are quite complex (both with regard to stød and vowel-length: many speakers of Standard Danish do not have long vowels in all of the forms cited above), and the possibility of such restatements will not be considered further here.

1.2.6. Vacillating vowel-length.

The contrastiveness of vowel-length in surface forms is beyond dispute, at any rate in words of two or more syllables, cp. [vi:lə] 'rest' vs. [vilə] 'wild (plur.)'. In monosyllables we find instead an opposition between half-long vowels with stød and short vowels, cp. [duʔ] 'be of value' vs. [du] 'you', [lɛʔs] 'read (imperative)' vs. [lɛs] 'load'. (The phonemic status of the stød is not at issue here.)

In monosyllables with vowel followed by [ð ʔ i̇ u̇ ṗ] many people have little or no distinction of length. In numerous cases there is, however, a difference of stød (stød "on the consonant" versus no stød), which from a generative point of

view signals an underlying difference of vowel quantity, cp. [uʔð] or [uðʔ] 'out' vs. [buð] 'message'.

In those cases where short vowel phonemes and long vowel phonemes have different allophones, the qualitative difference is generally preserved even if the vowels are all phonetically short, cp. [bɛʔp̃] or [bɛp̃ʔ] 'carry (imperative)' vs. [bæp̃] 'berry', but not in all cases by all people, cp. [bæʔð] or [bæðʔ] or [bað] 'begged' vs. [bað] 'bath'. For an interesting attempt to give a taxonomic description of an idiolect with generalized short vowels in all of these cases see Basbøll's paper elsewhere in this report.

1.3. Vowels in unstressed syllables.

In pretonic and posttonic syllables we find a number of distinct vowels in words of foreign origin (sofa, brutto, pari etc.), but in posttonic syllables of the genuine vocabulary including productive suffixes of native origin only four vowel qualities occur, viz. [e, p, i, e] ([u] in [vendu] 'window' is quite exceptional). The first three of these are commutable, cp. [fadi] 'poor' vs. [fade] '(to) comprehend' vs. [fadp̃] 'comprehends', whereas [e] occurs only before [ŋ] ([rainɛŋ] 'bill') where the other vowels do not occur.*) It is thus possible to consider this unstressed [e] as phonemically identical with [i] or with [ə].

[ə] can be considered a separate phoneme, a variant of one of the half-close or half-open front vowels, or a neutralization of several vowels. Unstressed [ɐ] can be interpreted in the same way as stressed [ɐ], cp. 1.2.1&2. above, or it can be taken to be a combination of vowel plus /r/, possibly of shwa +/r/ so that its phonemic identity depends on the interpretation of [ə].**)

*) It can be added, though, that family names with the suffix spelled -ung are pronounced with [ɔ] (also pronounced [o]), e.g. Hartung [hɑ:toŋ].

**) As Basbøll has pointed out to me this latter identification involves morphophonemic considerations, i.e. there is hardly any conclusive "surface" evidence in favour of it. See section 3.3. below for a restatement in generative phonological terms.

1.4. Diphthongs.

There are several phonetic diphthongs in Danish. The final component of these diphthongs is either palatal, labiovelar, or velar/pharyngeal. Examples are [a_{ɪ̯} u_{ɪ̯} æ_{ɪ̯}], e.g. [m_{aɪ̯}]'me', [h_{ɔ̥}u] 'sea', [bæ_{ɪ̯}] 'berry'. It is hardly worth while giving an exhaustive list of these diphthongs here.

The three final components [i̯ u̯ ɔ̯] can be interpreted either as vowel phonemes (/i/, /u/, and /ɔ/ or /ɒ/) or as consonant phonemes (viz. /j/, /v/, and /r/). A hybrid solution with /i, u, r/ is of course feasible, too. It does not appear easy to argue entirely convincingly for any of these solutions on the basis of purely phonetic-distributional evidence (see Basbøll's report for a detailed account within that framework.)

2. Feature analysis.

In this section it will be assumed that the table of vowel phonemes presented in section 1.1. is adequate. Some different versions of the distinctive feature theory will be tried out with reference to this set of phonemes, viz. those found in Jakobson-Fant-Halle, Preliminaries (11), Ladefoged, Linguistic Phonetics (13), and Chomsky-Halle, The Sound Pattern of English (3). These three sources will be referred to as Prl., LP, and SPE.

2.1. Length as a feature.

Apparently the most natural way to account for differences like [lɛ:sɛ] 'read' versus [lɛsɛ] 'load' is to posit a distinctive feature of length. Both Prl. and SPE refer to long versus short as a prosodic opposition, apparently because it is based on the temporal relation between phonemes in a sequence, not on their absolute duration (in SPE no explanation is offered). LP suggests that oppositions of length belong to a parameter called "rate", which also serves to account for such distinction as flapped versus trilled sounds.

A very common way of distinguishing between long and short in modern phonological work (including SPE) is to posit a classificatory feature "tense", whose phonetic correlates may

include differences of duration as well as differences of formation. This analysis does not make much sense phonetically for Danish since the opposition in this language is strictly durational and phonetically restricted to vowels. If there is a feature "tense" which is relevant in the consonant system, it is not matched by anything in the vowel system.

A third possibility is to assume underlying geminates: /ii/ → [i:], etc. This solution may seem a costly one, since it requires that all feature values of a long vowel be specified twice. However, it is possible to take the second member of these geminates as an unspecified vowel, the unspecified features being specified by a redundancy rule of the form

$$\left[\begin{array}{l} +\text{vocalic} \\ -\text{consonantal} \end{array} \right] \rightarrow \left[\begin{array}{l} \alpha F_1 \\ \beta F_2 \\ \gamma F_3 \\ \vdots \end{array} \right] \quad \text{---} \quad \left[\begin{array}{l} +\text{stress} \\ \alpha F_1 \\ \beta F_2 \\ \gamma F_3 \\ \vdots \end{array} \right]$$

Where $F_1, F_2 \dots F_n$ are distinctive features.

Such a rule can be formulated in perfectly general terms provided that there are no bisyllabic sequences of stressed short vowel plus short vowel (in zoologi, and the like, we must assess [-stress] on the initial syllable before the rule applies, since here [o-o] can be heard), and no phonemic diphthongs (with different first and second member). Thus the formulation hinges on the interpretation of forms like [ai̯ən] 'own', [hau̯] 'sea', [bæ̯p] 'berry', whose postvocalic segment must be defined as a consonant or glide in order not to invalidate the rule. Such a solution is possible and indeed correct (for the forms cited, but perhaps not for all cases of phonetic diphthongs), see later.

The interpretation of vowel-length as gemination is phonetically reasonable, since long vowels are roughly twice as long as short vowels in Danish, see Eli Fischer-Jørgensen (6).

2.2. Lip-rounding.

The distinction between /i e ε a/ and the other vowels is beyond dispute: the former are [-flat] or [-round] depending on the terminology, the latter [+flat] or [+round]. - LP has a

ternary distinction of spread lips, neutral lips, and close rounding; it is not entirely clear to me how the Danish vowels should be placed along this parameter, since for example /o:/ and /ɔ/ differ very much in their degree of rounding.

2.3. Place of articulation.

Except for /a/ and shwa, the Danish vowels fall in two fairly well-defined categories: front and back, i.e., in the terminology of Prl., "acute versus grave" or, according to SPE, [-back] versus [+back]. LP suggests that vowels may be placed in four or five distinct regions along a parameter called "articulatory place". For instance, i may be defined as postalveolar or palatal, u as velar, o as uvular, and ɔ as pharyngeal if there are phonological criteria supporting this subdivision. On the classificatory level there is probably no need for such differentiation in Danish, although /a/ and shwa pose certain difficulties which may eventually be solved by recognizing a ternary distinction of front-mid-back, see next section.

2.4. Tongue-height.

Phonetically speaking, Danish has a clear distinction of four degrees of tongue-height or aperture. The phonemic distinctness of four values is plainly demonstrated in the unrounded front series, cp. these examples from Fischer-Jørgensen (7):

[mi:lə]	'miles'	[lit]	'suffered'
[me:lə]	'sprinkle with flour'	[let]	'a little'
[mɛ:lə]	'speak'	[let]	'light'
[mæ:lə]	'paint'	[lat]	'loaded'

Extensive examples of oppositions among Danish vowels may be found in Ege (5).

Prl. distinguishes "diffuse" and "compact" vowels, and it has been customary in more recent work to split this distinction into two in order to get a ternary opposition. It is, however, hard to see how four degrees of tongue-height can be distinguished in this way, since no phonetic meaning can be attached to a distinction between $\begin{bmatrix} +\text{diffuse} \\ +\text{compact} \end{bmatrix}$ and $\begin{bmatrix} -\text{diffuse} \\ -\text{compact} \end{bmatrix}$.

This restriction on the combinability of the two features is expressly stated in SPE, which speaks of "high" instead of "diffuse", and "low" instead of "compact". According to SPE it is a universal constraint (entering the marking conventions) that segments cannot be $\begin{bmatrix} +\text{high} \\ +\text{low} \end{bmatrix}$.

It is a possible objection against this whole treatment that the constraint on the combinability of "high" and "low" is not a characteristic of the speech organs of man, or at all a constraint on the way he uses language, but simply part of the general definition of the words "high" and "low" as forming a contradictory opposition. The authors of SPE, however, contend that "high" and "low" are different parameters and define a neutral tongue-position such that $[\text{+high}]$ and $[\text{+low}]$ both stand for deviations from this position, although in different directions.

Wang (17) has suggested a feature "mid" instead of "low", since "mid" can combine with "high" to form a four-way opposition:

$$/i/ = \begin{bmatrix} +\text{high} \\ -\text{mid} \end{bmatrix} \quad /e/ = \begin{bmatrix} +\text{high} \\ +\text{mid} \end{bmatrix} \quad /ɛ/ = \begin{bmatrix} -\text{high} \\ +\text{mid} \end{bmatrix} \quad /a/ = \begin{bmatrix} -\text{high} \\ -\text{mid} \end{bmatrix}$$

Wang has used this type of analysis to account for tone systems with four registers. However, this use is criticized by Ladefoged (LP, pp. 67-69) on the grounds that the difference between $[\text{+high}]$ and $[-\text{high}]$ is relatively the same as between $[\text{+mid}]$ and $[-\text{mid}]$, i.e. the features cannot be defined phonetically independently of each other and can only be used in a purely abstract sense. The same objection may be raised against the use in connexion with tongue-height unless it is possible somehow to define a "mid" tongue position in absolute terms.

LP suggests instead a multi-valued parameter of "auditory height". It is assumed that 3 values will suffice to characterize the vowel phonemes of any language, additional oppositions being taken care of by oppositions like "tense-lax". As said above this makes no sense for Danish, and thus the proposal of LP is no more adequate for Danish than the others. - LP refers elsewhere to a ternary parameter "articulatory stricture" (normally used to distinguish stops, fricatives, and approximants including vowels), which can be made four-valued so that it

provides a distinction of "near vowels", i.e. vowels with a pronounced constriction somewhere in the vocal tract (including the pharyngeal region), and "far vowels" without any pronounced constriction. /i/ and possibly /a/ would be "near vowels", /e/ and /ɛ/ would be "far vowels", and so this parameter might solve the problem by taking into account the pharyngeal constriction of [a]. However, there seems to be nothing in the rules of the language to support a classification of /a/ together with /i/ as against /e ɛ/, and the phonetic realization of /a:/ as a very advanced and not entirely low vowel [a:] may contradict the classification of /a:/ as "near".

A remaining possibility is to rearrange the system in such a way that only three distinct degrees of tongue-height are assumed:

i	y	u	
e	ø	o	
ɛ	œ	a	ɔ

Since /a/ is actualized with phonetic values ranging from front over mid to back it would be entirely reasonable to define /a/ as central and to account for the variation by means of fronting and assimilation rules. This means that a ternary opposition "front-central-back" must be posited for Danish. However, the values "central" and "back" are not minimally distinctive in the resulting classificatory matrix, so it may be claimed that we should end up with a binary distinction "front-back" by classifying /a/ as [+back]. It will be shown later that there may indeed be some evidence in favour of this solution.

We can now set up a (fully specified) matrix for the vowels entirely according to the feature theory of SPE:

	i	e	ɛ	y	ø	œ	a	u	o	ɔ
high	+	-	-	+	-	-	-	+	-	-
low	-	-	+	-	-	+	+	-	-	+
back	-	-	-	-	-	-	+	+	+	+
round	-	-	-	+	+	+	-	+	+	+

This matrix is not very satisfactory, however.

Phonetically it seems rather strange to define /e, ø, o/ as [-high] i.e. neutral, since these vowels are clearly produced [-low]

with the tongue raised to a considerable extent (the vowel /ɛ/ would conform better to the description of "neutral position" given in SPE, but /ɛ/ cannot possibly be [-low], since there is then no way to distinguish /e/ from both /i/ and /ɛ/).

Moreover, it is clear that if /a/ is [+back] this vowel must become [-back] in most environments by the operation of several rules. Clearly these cannot be early rules, since they would then make /ɛ/ and /a/ fall together, i.e. they must be preceded by another phonological rule making /a/ more open than /ɛ/, so that the resulting difference along the vertical dimension can take over the differentiating function as soon as the front-back difference is deleted. But this looks conspicuously like a trick made with the sole purpose of avoiding to posit more than three degrees of tongue-height on the systematic phonemic level.*)

If instead we posit a four-valued parameter of tongue-height with values from "1" (highest) to "4" (lowest), /ɛ/ and /a/ (long or short) are distinguished as "3" versus "4". Moreover, it is possible that the half-open and open back vowels can be given a more satisfactory treatment in this way. As stated above (section 1.2.1.) it is not altogether clear how the long vowels [o: ɔ:] and the short vowels [ɔ ɒ] should be interpreted in relation to each other. If [o:] is defined as tongue-height "2", [ɔ: ɔ] as "3", and [ɒ] as "4", the actual pronunciations of forms with rounded back vowels can be deduced by rather simple rules. We may well symbolize [ɔ] by /o/ (if this is convenient) but define it as tongue-height "3" in contradistinction to long /o:/, which is "2".

*) The rule making /a/ "extra-low" is in principle a redundancy rule

$$\begin{bmatrix} +\text{low} \\ +\text{back} \\ -\text{round} \end{bmatrix} \rightarrow \text{"extra-low"}$$

but it cannot be stated as a redundancy rule in Stanley's (16) sense, i.e. operating to specify the input to the phonological component, without making "extra-low" a phonemic feature. This shows the fallacy of the approach suggested above.

Similarly [ɔ] may be symbolized by /ɔ/ but defined as "4" in contradistinction to /ɔ:/, which is "3". If /ɔ:/ is shortened it either stays "3" or becomes "4" according to rules that can be stated with reference to grammatical structure (see 3.6. below).

The matrix now looks like this:

	i	e	ɛ	a	y	ø	œ	u	o	ɔ	ɒ
height	1	2	3	4	1	2	3	1	2	3	4
back	-	-	-	-	-	-	-	+	+	+	+
round	-	-	-	-	+	+	+	+	+	+	+

although I do not insist on this arrangement.

3. Morphophonemic considerations.

The following remarks are for the most part confined to problems associated with the quality of open vowels in stressed and unstressed syllables, not because these problems are necessarily the most interesting ones but because they constitute a (limited) field which is rather inadequately accounted for in current textbooks and dictionaries.

3.1. The status of /a/.

According to the analysis outlined above /a(:)/ is the only unrounded vowel with tongue-height "4". We are thus free to define it as [-back] or [+back] according to which choice serves us best. It seems immediately obvious that it should be defined as [-back] in the classificatory matrix, but the problem is not quite simple after all. The kind of evidence that is particularly relevant here can be indicated rather briefly:

There is in Danish a dorsalfricative or rather frictionless continuant which appears after long vowels as more or less palatal or velar depending on the quality of the vowel, cp. [e:ɣən] or [e:i̯ən] 'own' (slightly old-fashioned pronunciation, except in certain compounds), [rø:ɣə] or [rø:i̯ə] 'smoke (meat or fish)', [dæ?ɣ] or [dæ?i̯/dæ?] 'day', [tɔ?ɣ] or [tɔ?u̯] 'train'. After short vowels it often appears as the second part of a diphthong: [ai̯ən] 'own' (more common pronunciation), [rvi̯ə] 'smoke', [dayli] or [dau̯li] 'daily'. - The diphthongs given as "ai̯, pi̯"

*) This symbolization is used in the morphophonemic discussion later in this paper but not in the matrices below.

vary much in quality: in general Standard Danish the first component is central or rather front in the former and centralized back in the latter, but the latter may also be heard with a more front first component: [œ̥i̯]. In the Copenhagen dialect the first component of both diphthongs may be quite back: [ɑ̯i̯ ʊ̯i̯].

Note that the postvocalic consonant becomes [i̯] after those short vowels which alternate with long non-open front vowels (i.e. with front vowels whose tongue-height coefficient is less than "4"), but not after those short vowels which alternate with long open or long back vowels. This holds true no matter whether the short vowel is front or back (cp. Copenhagen speech), and it is thus quite clear that the quality of the second component is not at all determined by the surface quality of the first component, cp. (Copenhagen Danish) [ɑ̯i̯(ə)n] versus [dɑ̯uli]. This suggests that it must be an underlying difference of [-back] versus [+back] in the vowel (first component) that determines whether the following dorsal approximant appears as [i̯] or [u̯] when the vowel is short, i.e. [ɑ̯i̯, ʊ̯i̯] must have underlying front vowels, and [ɑ̯u̯] must have an underlying back vowel. The quality of the first component of [ɑ̯i̯, ʊ̯i̯] must then be determined by two successive rules: (1) a rule changing the tongue-height to "4" (i.e. [a̯ œ̥]), (2) a rule according to which each vowel is retracted more or less depending on the idiolect or style of speech.

According to this analysis /a/ is [+back] in the underlying matrix and should thus be written /ɑ̯/. This implies that the long vowel must be fronted and somewhat raised

ɑ̯: → œ̯:

by a later rule, which nevertheless is early enough to make fricative [ɣ] front after this vowel if it remains long.

As a result of these considerations the classificatory matrix may be given in the following alternative form:

	i	e	ɛ	y	ø	œ	ɑ	u	o	ɔ	ʊ
height	1	2	3	1	2	3	4	1	2	3	4
back	-	-	-	-	-	-	+	+	+	+	+
round	-	-	-	+	+	+	-	+	+	+	+

The status of [ə] is a difficult problem even within this arrangement of the matrix, since there is still no way to characterize a "neutral" vowel.

3.2. Phonetic diphthongs and underlying forms.

It will be apparent from some of the examples given in section 3.1. that the diphthongs in $-i̇$ and $-u̇$ can be shown to alternate in some forms with sequences of long vowel plus palatal or velar approximant. Moreover, the dorsal approximant alternates in some forms with a stop (when followed by a stop), cp. [sbø:yælsə] or [sbpi̇lsə] 'ghost' versus [sbøgt] 'haunted (past participle)'. In other cases the diphthongs in $-u̇$ alternate with sequences of long vowel plus [v], cp. [hau̇] 'sea' - plural [ha:və], which moreover may alternate with [f] (when followed by a stop), cp. [sdi?v] or [sdiu̇?] 'stiff' (with the derivation [sdiu̇nə] 'stiffen') versus neuter [sdift].

Such examples indicate that some of the diphthongs at least must be generated from underlying vowel-consonant sequences, but it is certainly not obvious that this is true of all diphthongs, or even of all occurrences of a specific diphthong. This cannot be discussed without a detailed analysis of the behaviour of vowel length (and of stød) and of the morphophonemic relationship between continuants and stops in Danish.

The diphthongs in $-ṙ$ are mostly taken to be phonemically sequences of vowel plus /r/ (see, however, Koefoed (12) and Basbøll in this report for alternative analyses). The evidence supporting the phonemic identification of prevocalic [ṙ] and postvocalic [ṙ] is hardly decisive as far as the inflected and derived forms belonging to the genuine vocabulary go, but in foreign words with alternating stress pattern the syllable division may alternate accordingly, and in such cases [ṙ] and [r] do alternate, cp. [klo?ṙ?] 'chlorine' - [kloríð?] 'chloride'. In some (now less common) varieties of Danish an r-sound (with a constriction exceeding those generally found with vowels) is heard also in syllable-final position ([klo?r] etc., often with unvoiced r); for idiolects of this type the identification raises no problem at all.

Although the evidence is not of the same kind as that adduced for diphthongs in $-i̇$, $-u̇$, it may suffice to show that diphthongs in $-ṙ$, too, may be generated from vowel-consonant sequences, the consonant in this case being /r/.

3.3. The two-segment status of a(:), p(:).

3.3.1. Root syllables.

In the discussion in section 3.1. above it was tacitly assumed that there is no phonemic opposition between front /a(:)/ and back /ɑ(:)/. However, surface forms like [gæ:və] 'gift' and (gɑ:və] or) [gɑ:və] 'tan (verb)' must somehow be distinguished in their underlying representations. The general solution is to analyze the back vowel as a sequence of two phonemic segments; this solution is confirmed by alternations like

[q̣?m] 'arm' (- plur. [q̣:mə]) versus [æp̣mə] 'sleeve'
 [bq̣?n] 'child' - plur. [bæp̣?n]

Such examples further show that the second component of the sequence underlying [q̣:] is phonemically identical with [p̣], i.e. it represents the consonant /r/.

It was suggested earlier that [æ:] may perhaps be generated from an underlying back vowel "/ɑ:/". If this is to work, the rules must operate in such way that (disregarding the problem of underlying or secondary length)

1. a(:) → æ:(in some contexts)
2. a(:)r → q̣:

which would probably be fairly close to the historical development.

The long vowel [p:] can similarly be shown to represent an underlying sequence of two segments, cp. the parallel between

[gɔ?] 'go' - present tense [gp̣?]
 [se?] 'see' - present tense [sep̣?]

that is, [p:] must be derived from underlying vowel plus /r/; thus the rules say (disregarding the status of length in the underlying matrix):

1. ɔ(:) → ɔ:
2. ɔ(:)r → p̣:

Unstressed [p] in root syllables has a multiple origin, which may be illustrated by a few examples:

(1) Some monosyllabic interjections and particles ([nɔ] 'well', [sp] 'now then; then; so') must be assumed to have an underlying single segment

(ɔ →) ɔ stressed and unstressed

The actualization being invariant in the presence or absence of stress.

(2) The conjunction og 'and' has a diphthong [vɔ̃] when pronounced distinctly*) but normally loses the second component. This reduction

(?ɔ̃) → vɔ̃ → ɔ

may be compared to a similar, fairly common reduction in pronominal forms with a_i, a_i → a, cp. [daĩ/daĩ] 'you' (accusative) but often [mɛ̃da] 'with you' in the Copenhagen variety of Danish.

(3) The preposition /adverb for has a retracted (pharyngalized) [ɹ̠] when stressed, but the vowel is reduced to [ɔ] when unstressed, cp. [sbɛnə fɹ̠] 'harness' but [sbɛnə fɔ vóʊnən] 'hitch (a horse) to the carriage'. - Note that in its stressed form the vowel is distinct from that of [nɔ̃], [sɔ̃] by being more back; this indicates that for has underlying /ɔr/ and reduction

ɔr → ɔ when unstressed

(4) Present tense forms like [gɹ̠?] 'goes' - with underlying ɔ: + r as shown above - may be more or less reduced when unstressed, cp. [han gɹ̠ jém?] ~ [han gɔ jém?] 'he goes home', i.e.

ɔ:r → ɹ̠ → (opt.) ɔ when unstressed

(5) The adverbs [vɔ̃?/vɔ̃?] 'where', 'how', [he?/he?] 'here', [de?/de?] 'there' (the last two also occur with [ɛ?/ɛ?]) are reduced in unstressed position to [vɔ̃ hɛp̃ dɛp̃] and often further to [vɔ̃ hɔ̃ dɔ̃], cp. der kommer nogen,

*) The pronunciation [vɔ̃], which may be found in the official dictionary: Ordbog over det danske Sprog, is hardly current usage (cp. Diderichsen (4), p.55).

literally 'there comes somebody' [dɔ kómʔɔ nɔ:un]. This reduction

$$\left. \begin{array}{l} e(:)r \rightarrow \text{əp} \\ o(:)r \rightarrow \text{ɔ} \end{array} \right\} (\text{opt.}) \rightarrow \text{p}$$

is related to processes found in words with alternating stress placement (see 3.3.2. below), but as a process conditioned by syntactically conditioned stress reduction it seems confined to the forms just cited. Such forms as [seʔ_p/sepʔ] 'see (present tense)', [troʔ_p/tropʔ] 'think (present tense)' do not have reduction to [p] no matter how much the stress is reduced, cp. [han sep ɛfdɔ] 'he checks (it)', [trop du dé] 'do you think so?'. It is possible that the three adverbs should be listed in the dictionary with [-stress], the full forms occurring only when the words are emphasized.

3.3.2. Sources of posttonic p.

There are numerous instances of [p] in unstressed syllables after the stress-syllable of the word. These cases in which [p] is generated from an underlying matrix with [-stress] must be distinguished from those treated above where the weak stress was due to a syntactically conditioned reduction of the word stress.

A comparison of monosyllabic and bisyllabic verb forms:

[seʔ]	'see'	- present tense	[seʔ _p /sepʔ]
[tɛlɛ]	'count'	- " "	[tɛlp]

shows that [p] may be taken as equivalent to [ə] + [p]. Since the latter segment was shown above to be generated from /r/, we may generate unstressed [p] from shwa plus /r/:

$$\text{ər} \rightarrow \text{əp} \rightarrow \text{p}$$

(I disregard the various problems associated with present tense forms: whether the morpheme border is before or after shwa, whether shwa is epenthetic, etc., since these are not immediately relevant here.)

The behaviour of the nomen agentis suffix [p] before the feminine suffix [éne] may further support the identification of unstressed [p] as a vowel-consonant sequence, cp.

[mæ:lə]	'paint'
[mæ:lp]	'painter'
[mæ:lpéne]/[mæ:lpréne]	'woman painter'

In the speech of some people the underlying /r/ is distributed over two syllables (as if the spelling were malerrinde instead of malerinde). The final suffix is unquestionably [éne], cp.

[vén]	'friend'
[venéne]	'girl-friend'

so the r-sound in derivations from nomen agentis forms can only be explained if these contain a final /r/.

However, it can be shown that unstressed [p] may also represent underlying consonant-vowel or even consonant-vowel-consonant sequences.

Verbs whose stems end in a consonant form their infinitive by adding shwa: [tɛlə], [mæ:lə], etc. A comparison of such infinitive forms as

[tɛlə]	'count'
[ku:ə]	'cow'
[ændrɔ]	'change'
[sbæpp]	'block'
[ku:(r)p] or [ku:p]	'slide'

shows that some occurrences of unstressed [p] must be generated from final shwa preceded by /r/, since the last three verbs obviously contain stem-final /r/ (in accordance with the orthography: ændre, sparre, kure). - In order to get the correct output we must set up three rules, two of which (the last two) may be optional only:

1. $e \rightarrow p/r_$ $ku:rə \rightarrow ku:rp$
2. $r \rightarrow p/V_$ ($sbərə \rightarrow sbærp \rightarrow sbæpp$)
3. $rp \rightarrow p/V_$ $ku:rp \rightarrow ku:p$

If now we consider the present tense forms of the verbs, we find in ordinary conversational pronunciation

[tɛlɒ]
 [ku:v]
 [gnisdrɒ]
 [sbæpp]
 ([ku:rɒ] or) [ku:v]

It is quite common to pronounce the present tense of kue and the infinitive and present tense of kure alike: [ku:v]. If now we consider the verbs to have the same structure in their infinitive and present tense forms, we get

tɛlɒ → tɛlɒ	tɛlɛr → tɛlɒ
ku:ə → ku:ə	ku:ər → ku:v
ku:rə → ku:v	ku:rər → ku:v

i.e.

$$\left\{ \begin{array}{l} rə \\ ər \\ rər \end{array} \right\} \rightarrow v$$

in a certain (colloquial) style of speech. This fusion and merger takes place in other forms as well, cp. the nouns

bu?r → bu?v	'cage' - plur.	bu:rə → bu:v
bu:ə → bu:ə	'bow' - "	bu:ər → bu:v
fu:rə → fu:v	'furrow' - "	fu:rə → fu:v

(the output forms given here are still strictly colloquial).

In the cases above [v] was generated from underlying forms containing shwa but the status of this vowel was not considered further. In words with alternating stress placement it can be seen that posttonic [v] alternates with stressed [e?r e:r] and [o?r o:r] (partly also with pretonic [or]). This is probably best accounted for if one posits underlying /er/ and /or/, cp.

[é?dɒ] (possibly [é?tɒ]) 'ether' and [ɛté?risg]
 or [ɛtév?isg] 'ethereal'
 [fágtɒ] 'factor' — [fagtó:rɒ] or [fagtó:v] 'factors'
 and [fagtoré?v] 'factorize'

It is not immediately evident whether posttonic /er or/ become [ə] via a reduced common form or by lowering and retraction rules, i.e. whether

posttonic $\left. \begin{array}{l} er \\ or \end{array} \right\} \rightarrow \text{ər} \rightarrow \text{p}$

or

posttonic $\left. \begin{array}{l} er \rightarrow \text{ər} \rightarrow \text{əp} \\ or \rightarrow \text{or} \rightarrow \text{p} \end{array} \right\} \rightarrow \text{p}$

Poul Andersen (1b, p.82) has pointed out that words with underlying full vowel in a posttonic syllable may be distinct from similar words with underlying shwa if the vowel is preceded by a stop, cp.

fakt+ər → fəgd̥p 'gestures'
faktor → fəgt̥p 'factor'

since the preceding stop is aspirated or not according to a gradation rule which must be formulated with reference to several factors including the quality of the immediately following vowel (Poul Andersen formulates the relationships rather differently: he considers words like faktor as phonological compounds: 'fak,tår).

If we have the same underlying consonants in the two words above (and it is not unreasonable to assume that we do), it seems clear that shwa must be phonologically distinct from the full vowel /o/ in the underlying matrix (the example might suggest that the consonant quality is a matter of morpheme border, but it is not that simple), unless words like faktor are marked as [+foreign] in the dictionary. In words with underlying /er/ the aspiration of the stop before [p] does not seem to be used very consistently: æter is [ɛʔd̥p] rather than [ɛʔt̥p] in ordinary usage, so the evidence against a common underlying matrix for /e/ and shwa is not as strong.

Words with underlying /or/ may be assimilated to the native vocabulary and pronounced with unaspirated stop before [p], e.g. [d̥p̥gd̥p] instead of [d̥p̥gt̥p] 'doctor'. In a case like this the surface form has been reinterpreted and assumed to contain underlying shwa, which is evident from the formation of a secondary plural of native type:

like [d̥p̥gd̥p] - plural [d̥p̥gd̥pp]
 [m̥é:l̥p] - " [m̥é:l̥pp]

as against the "correct" inflection

[dʊgʊp] - plural [dʊgʊtʊ:rp]

3.4. Alternation full vowel ~ shwa.

/e/ and to some extent also /ɛ/ frequently reduce to shwa when the stress is reduced. The problems raised by this alternation are less complex than those associated with unstressed [ɒ], and a few typical examples may suffice to give an idea of the pattern:

(1) "Small words" like [de] 'it', [dɛm] 'them' have the vowel reduced to shwa in enclitic position: [də, dɛm], cp.

[ædə sánʔt] 'is it true?'

[fɔdəm éʔnʔ] 'get them in!'

(2) In foreign words [e ɛ] alternate with shwa in unstressed syllables, most regularly in noninitial pretonic syllables. The underlying form is clearly seen in words with alternating stress placement, e.g.

[fonéʔtɪgɒ] 'phonetician' versus [fonetík]/[fonətík]

It is clear that this phenomenon is related to the alternation between [e(:)r] and [ɒ] discussed above, although the distribution is not the same. The generality of these alternations between [e(:)] and the reduced vowel qualities point to the identification of shwa with /e/ in terms of classificatory features as a reasonable solution.

In colloquial (particularly "non-educated") speech also other vowels vacillate or are replaced by shwa in non-initial pretonic syllables (in connection with a general assimilation of the word to the native pattern). This is typically found with /a/ followed by /r/:

aparátʔt → abarátʔt → aberaʔt (or abprátʔt)

The pronunciation with [ə] is given by Martinet (14, p. 22) as the normal one but by Hansen (9, p. 39) as substandard speech. - I presume that all the pronunciations in the series above can be found in contemporary Danish usage.

Conversely, we find (sporadically) a shift

e, ə → a

when adjacent to /r/, cp.

parenté?s → paranté?s → pəqnté?s

3.5. Some further remarks on length.

Although length is unquestionably phonemic in Danish the relationship between underlying quantity and phonetic length is not a simple one-to-one correspondence. A glance at paradigms of inflected forms reveals that both vowel lengthening and vowel shortening rules seem to operate in Danish:

lengthening takes place typically before a voiced approximant that is followed by a vowel, cp. [hɑu̯] 'sea' - plural [hæ:və], [glað] 'glad' - plural [glæ:ðə],

shortening occurs both as a process conditioned by the internal structure of the word and as a process conditioned by the syntactical relationships among words. There are two main types of intra-word conditioned shortening:

(a) before certain suffixes with initial consonant, e.g. neuter or past participle /t/, long vowels are shortened in some cases, cp. [sdi?v] (or more commonly [sdi?u̯, sdiu?]) 'stiff' - neuter [sdift]. The rule capturing this alternation between long and short vowels must be stated differently for verbs and adjectives (cp. [ly:sə] 'give out light, publish the banns for somebody' - past part. [ly?sd] versus [ly?s] 'light' - neuter [lysd]), and also for derivations from such words (cp. [ly:sneŋ] 'banns' versus [lysneŋ] 'dawn, clearing'). Moreover, the application of the shortening rule is to some extent dependent upon the quality of the vowel.

(b) As mentioned in 1.2.6. above long and short vowels are not consistently distinguished in monosyllables containing a postvocalic voiced approximant. We may speak here of optional vowel shortening ([sdi?v, sdi?u̯] ~ [sdiu?]) being an example of this). This phenomenon can be taken care of by a late rule. (According to Aage Hansen (9), p. 87 the individual vowels behave somewhat differently before [ð] ; however, the descriptions he gives do not altogether correspond to the usage familiar

to me.)

Finally, vowel shortening may occur in the first part of compounds and conditioned by stress reduction, cp. 3.6. below).

A paradigm like [bað] 'bath' - plural [bæ:ðə] can be described as a case of vowel lengthening in "open syllable" under the conditions summarized above. The verb [bæ:ðə] 'bathe' with its preterite and past participle forms [bæ:ð(ə)ðə], [bæ:ð(ə)t] can apparently be explained in the same way, as derived from underlying forms with short vowel. However, the imperative of this verb is [bæ?ð], which rather points to underlying long vowel in the verb. Thus it may seem that vowel-length is generated by a simple rule in plural forms like [bæ:ðə] but is due to a stem formation feature of length in infinitive forms like [bæ:ðə].

There is, however, some evidence that the behaviour of the imperative is due to special formation features and thus should not be taken as decisive in assessing the underlying quantity. It is necessary here to point to the fact that stød, too, functions (on the surface) to distinguish imperative forms from otherwise phonetically similar noun forms, cp. the noun [sbel] 'play' (definite form [sbel?əð]) versus the imperative [sbel?] 'play!' (infinitive [sbelə]).

On the whole the quantity problems are too complex to be handled in this brief paper.

3.6. The quality of shortened ɔ:

As mentioned in 2.4. above /ɔ:/ may appear with two different qualities when it is shortened. It will be apparent from the remarks below that the distribution of these can be put into rule form without too much difficulty.

(1) In combinations of vowel plus voiced fricative or "approximant" the vowel may be alternatively short (see 1.2.6.), but the quality of /ɔ:/ (half-open, i.e. "3") is retained: [vɔ?ð] or [vɔð?] - 'wet'.

(2) When shortened before suffix /t/, however, the vowel is opened to "4":

[vɔ?ð] - neuter [vɔt].

(3) When the shortening is otherwise conditioned, the distribution of the two qualities, "3" and "4", is at first sight confusing. There is certainly much individual variation, and Poul Andersen (1, p. 338) describes the variation as if it were entirely a matter of usage: most people have [ɔ], but some have [ʊ], when a long ɔ is shortened because the word containing it occurs "in a special position in the sentence or in compounds". It is, however, my impression that there is a regular alternation between the two short reflexes in the usage of probably most speakers of Standard Danish, and this regularity is interesting because it is not - as might be expected - a matter of "stressed" versus "unstressed" position but rather a matter of grammatical type.

Put briefly, it holds true for the usage most familiar to me that (A) monosyllables (essentially prepositions or auxiliary verbs) which have their vowel shortened before the word they govern, retain quality "3", whereas (B) such words occurring as the first part of a compound exhibit a shift "3" → "4" if the vowel is shortened. The latter is true particularly of open syllables.*)

Thus (A):

[ta d(ə)n pɔʔ] 'put it on'

[pɔd(ə)n] 'on it' (less commonly: [pɔd(ə)n] i.e. like potten 'the pot')

[pɔ dɛnʔ] 'on that one' (- " - : [pʊ dɛnʔ])

but (B):

[pɔmɛnʔə] 'remind'

[pɔlɪʔðɛli] 'reliable'

Aage Hansen (9, p. 25) claims that blågrå 'blue - grey', blålig 'blueish' should be pronounced with the closer sound, i.e. [ɔ] in the first syllable. Such pronunciations are quite alien to me.

(4) Note that [ʊ] occurs as an unstressed representation of underlying /ɔɾ/, which thus (in the usage described here) remains distinct from shortened /ɔ:/, cp.

*) I disregard here a number of compounds like bådsmand, rådsmedlem, which do not follow a fixed pattern.

fɔr de færsdø → fɔdø fæpsdø 'firstly'
 fɔ: de gjorʔt → fɔdø gjɔpʔt 'have it done!'

4. Final remarks.

As stated in the beginning this paper does not contend to give a definitive account of any major aspect of Danish phonology. The main problems, viz. the stød, vowel-length, umlaut and ablaut, and the relationship between stops and fricatives, have on purpose been left almost fully aside. Nevertheless, it seemed to me worth while to discuss some features of the vowel system within the framework of modern feature and rule theory, especially because this account can be contrasted directly with that of Basbøll, which, as an experiment (less so a manifestation of Mr. Basbøll's personal preferences!), he has kept as rigidly within the limits of taxonomic phonemics as practically possible. It may be of some interest that the results obtained by the two approaches agree on many details, after all.

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