

THE REDUCTION OF FALLING DIPHTHONGS : TOWARDS A THEORY OF FEATURE HIERARCHIES

BY

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1. The development of the various Romance languages from Latin has always involved the evolution and dissolution of diphthongs. Taking the term diphthong in the sense of a combination of a syllabic vocalic element and a non-syllabic vocalic element, two types of diphthongs have participated in the history of Romance: *rising* diphthongs; i.e. diphthongs in which the syllabic element follows the non-syllabic one, and *falling* diphthongs, in which the syllabic element precedes the non-syllabic one. The creation of new diphthongs from single vowels (as opposed to a weakening of hiatus combinations, or similar circumstances) may result from one or many phonetic or phonological factors, and generally must be considered concurrently with other forces affecting the language¹. The reduction of existent diphthongs, while also potentially involving a number of structural factors, is more often amenable to an analysis founded on predominantly phonetic principles. The present study is concerned with exploring various instances of diphthong reduction among the Romance languages, in order to gain further insight into more general aspects of diachronic phonology. For the purposes of discussion, attention will be restricted to cases of the reduction of *falling* diphthongs. This restriction has been imposed for several main reasons. First, the evolution of diphthongs is often complicated by a shift of the feature of syllabicity (alternatively, stress) from one element of the diphthong to the other, thus changing rising diphthongs into falling diphthongs, and vice versa. By limiting the study to the simple reduction of falling diphthongs, it is possible to avoid the difficulties encountered during situations of shifting stress. A second factor weighing in favor of exclusively studying falling diphthongs is the fact that, considered as a whole, they behave much more consistently than rising diphthongs do, thus potentially providing more usable data as regards general diachronic trends. In addition, the history of Romance provides us with far richer documentation concerning the reduction of falling diphthongs. From the earliest periods of Latin, a tendency to reduce falling diphthongs has been manifest; in fact, such a tendency seems to characterize the evolution of the Indo-European languages in general². By examining certain recurrent developments

¹ See, for example, Romeo (1968) and Schürer (1936, 1956) for a more detailed discussion of the process of diphthongization in the Romance languages, utilizing a structural/phonetic frame of reference.

² See Milewski (1939) for an excellent study, in many ways paralleling the present endeavor, and utilizing data from the Indo-European languages in general.

concerning the evolution of falling diphthongs in the Romance languages, it will be possible to formulate a partial model to account for these changes. The data to be considered will be primarily drawn from the Hispanic and Italian dialects, since these provide the most easily traceable developments, although data from other Romance dialects will also be used in substantiating data from one of the principal sources.

In the remarks that follow, no attempt will be made in the way of rigorously defining the phonetic or phonological nature of diphthongs. A good review of such attempts may be found in Romeo (1968 : 27-52), and some more recent ideas are offered by Andersen (1972). Instead, the rudimentary definition offered above will be applied to a number of examples, and the results obtained thereby will be interpreted in terms of this definition. In this sense, then, the object of study is clearly defined.

While there are no *a priori* restrictions as to the nature of the non-syllabic element of a falling diphthong, the diphthongs discussed here will contain a non-syllabic *high* vowel as the second element. This is by far the most common configuration to be found among the dialects being considered; it characterizes, in fact, the pattern of falling diphthongs in all the Romance languages. In the case of rising diphthongs, however, this restriction holds less often; Romanian, for example, exhibits rising diphthongs whose first element is a non-syllabic [ɣ], and previously contained diphthongs beginning with a non-syllabic [ɔ], subsequently giving rise to labialized consonants. Spanish frequently manifests diphthongs beginning with [ɣ] in rapid speech, for example, as the result of hiatus-weakening in combinations like *que hizo*.

The diphthongs relevant to the purposes of this investigation, then, consist of a syllabic vowel plus a non-syllabic version of one of the high vowels, the most common of which are [i], [u], [y], and [ɨ]. Of these segments, the former two account for the vast majority of falling diphthongs in the Romance languages, and the investigation will therefore be centered around sequences of the form *Vw* and *Vj*.

2. Beginning first of all with diphthongs terminating in [w], one may, based on the general vocalic patterns present among the Romance languages, consider diphthongs whose first element is any one of the 'maximal Romance vowel system', roughly:

i	y	ɨ	u
e	ø	ə	o
ɛ	œ	ɐ	ɔ
æ			a

Obviously, some of these configurations are much more common than others; in fact, some of the combinations are so rare as to afford only scant possibilities for study. Nonetheless, there are enough common examples to permit the instigation of a general study of this type-form.

The only diphthong of the form *Vw* carried down to the Romance languages from Latin was [aw], spelled *au*. In many of the languages, [aw] reduced to [o]; thus, for example, *causam* > French *chose*, Italian, Spanish and Catalan *cosa*, etc. In Portuguese, Latin [aw] gave [ow], spelled *ou*; thus, *taurum* > *touro*. The later Portuguese development of *ou* to *oi*, exem-

plified by the evolution *causam* > *cousa* > *coisa*, is the result of a number of morphological contaminations, and is unrelated to the purely phonetic development of *au*³. The reduction of *au* generally ensued whether the diphthong (i.e. the [a]) was stressed or unstressed; in the latter case, we have examples like *auriculam* > French *oreille*, Spanish *oreja*, Italian *orecchia*, Catalan *orella*, Portuguese *orelha*, etc. In the case of unstressed *au*, Portuguese shared with the other neighboring Romance languages the reduction to a simple *o*. Some dialects have conserved the original Latin diphthong [aw]; for example, the Gascon dialect of Avan differs from the neighboring Catalan dialects in having left Latin *au* untouched⁴. Thus Latin *tauram* gave Catalan *toro*, Avan *taure*, etc. Romanian also preserved this diphthong (cf. *causam* > *cauză*), as did certain Italian dialects.

In addition to the original Latin heritage, the diphthong [aw] arose as a later development in many Romance languages, through vocalization of *l*, reduction of hiatus, compound formation, etc. Once developed, this new diphthong was often subjected to the same tendency toward reduction as were earlier diphthongs. In some of the Portuguese dialects of the Algarves, the combination *a + o* (i.e. [au]) first became the diphthong [aw], and was later reduced to [o] in rapid speech⁵. In the Portuguese dialect of Rio Frio, the reduction of [aw] to [o] has been generalized in all environments⁶. Such a general reduction has also been reported for the Portuguese dialects of the Cape Verde Islands⁷, and in the 'carioca' dialect of Rio de Janeiro⁸.

In Nariño (Colombia) [aw] > [o] or [u], in the latter case presumably through a shift of stress⁹. We thus have *aunque* > [ónke], *aumento* > [oménto], etc. The generalization of [aw] to [o] has also been noted in some areas of Mexico by Matluck (1952 : 113). The tendency for the Spanish diphthong [aw] to become [au], often eventually yielding [u], is a common trait of many dialects, and accounts for many otherwise unexplainable developments¹⁰.

In some Portuguese dialects, the diphthong [aw], instead of yielding the more usual [o], has reduced to a simple [a]. Although not common in Brazilian speech, this development has been noted in São Paulo speech by Ivar Dahl (1964 : 317). It is the rule in many dialects of rural Portugal. The reason for such a development is simple enough; it concerns the relative duration of each of the elements of the diphthong. To this end, Verrier (1936 : 293) has noted:

Parmi les diphtongues décroissantes, il faut distinguer plusieurs catégories. D'abord en ce qui concerne la quantité respective des deux voyelles. Elles peuvent être égales. D'ordinaire, il y en a une plus longue que l'autre. Quand c'est la première, elle finit quelquefois par absorber la seconde.

³ A more detailed account of this interchange is offered by Moffatt (1948).

⁴ See Schädel (1938 : 146).

⁵ Cf. J. J. Nunes (1902 : 39).

⁶ See Gonçalves Vianna (1887 : 162).

⁷ M. L. Nunes (1956) and Herutano de Carvalho (1962).

⁸ See Houaiss (1958 : 289).

⁹ Cf., for example, Albor (1971 : 522).

¹⁰ See Salvador (1957 : 169) for further examples and discussion.

The longer the non-syllabic element of a falling diphthong, the greater its potential effect during condition of reduction. However, when the first, syllabic element predominates, the diphthong is likely to simplify by merely dropping the second element altogether, with no concomitant change of timbre on the part of the first element. In the Portuguese dialects in which [aw] has been reduced to [a], the majority of the duration of the diphthong is represented by the first element; in this case, the [a]. Such a distribution may be clearly heard; for example, *au* usually emerges as [a^w]; the difference is quantitatively demonstrated in the tracings of Strevens (1954: 23). For this reason, the general Romance tendency for [aw] to reduce to [o], if it reduces at all, is counteracted in many dialects by the unbalanced nature of the falling diphthongs in these dialects.

The diphthongs [ow] and [ɔw] are hard to differentiate among the Romance languages, and generally may be grouped together under a common rubric. Due to the closeness in point of articulation between the two elements of the diphthong, the general tendency is toward a reduction to [o] or to a higher [ɔ], found in Galician. The most fertile territory for studying the development of [ow] is of course Portuguese, where ample instances of this diphthong are provided by the development of Latin *au* and *al*. In the cultured Portuguese of Lisbon and Coimbra, [ow] (spelled *ou*) generally remains unmodified. In Brazil, however, the reduction to [o] occurs in many of the rural dialects, and is the rule in Rio de Janeiro¹¹ and in São Paulo¹². The same development also seems to have occurred in some areas of Catalan, where the development of [ow] to [o] eventually led to a back-formation of [aw]¹³. The reduction of [ow] to [o] is quite general in most rural areas of Portugal. Leite de Vasconcellos (1892a) cited this reduction in Evora, Alandroal, and Beja, while in a later article (1896a), further instances, also from the Alemtejo dialects, were recorded in Villa-Viçosa. In the dialects of the Algarves, this same process has been noted by Leite de Vasconcellos (1896b: 326) in Cabanas da Conceição and by J. J. Nunes (1902) for various other localities. Lüdtke (1954: 217) also noted this shift in the Alemtejo and Algarve dialects.

The diphthong [ow] has reduced to [o] in various Portuguese dialects and creoles throughout the world. It occurred in Portuguese Goa¹⁴ and in other areas of Portuguese-speaking India¹⁵. It also took place in the Portuguese dialect of Hong Kong¹⁶, and in the rapidly-disappearing Portuguese creole of Macao¹⁷. Among the creole dialects of the Cape Verde Islands, the same process has also been generalized¹⁸. In the Portuguese dialects of the Azores, attention was first drawn to this change by Leite de Vasconcellos (1892b). Rogers (1948) found the change gene-

¹¹ Cf. Houaiss (1958: 287).

¹² E. g. Dahl (1964: 317).

¹³ Cf. Moll (1952: 86).

¹⁴ See Dalgado (1900).

¹⁵ Reported by Dalgado (1906: 148).

¹⁶ From Thompson (1959: 293).

¹⁷ Cf. Batalha (1958).

¹⁸ From M. L. Nunes (1956), Herculano de Carvalho (1962: 50, 53).

ralized in the eastern islands of Santa Maria and São Miguel, and in Rogers (1949) the change was reported in the central and western islands, including Terceira, Graciosa, São Jorge, and Flores. Rogers (1946: 249) also cited the general reduction of [ow] in the Madeira Islands.

The reduction of [ow] to [o], quite common in Portuguese, also turns up from time to time in other Romance languages. Since the diphthong [ow] is not common outside of Portuguese, one generally has to turn to isolated dialects for further information. Among such examples as may be found, a noteworthy one is offered by Francescato (1963), who notes the evolution of [ow] to [o] in the Friulian dialect of Erto. Francescato notes that the eastern Friulian dialects are characteristically prone to the reduction of diphthongs, which are conserved in the western dialects.

No records may be found of the evolution of the diphthong [uw], but from the general tendencies observable with respect to [aw] and [ow], one could expect only a reduction to [u] as a possible course of evolution. The extreme similarity of the two members of this diphthong renders it quite unstable in opposition with a simple [u], and consequently it generally functions as an allophonic variant of the latter vowel.

Turning now to the cases of diphthongs involving a front vowel followed by [w], the discussion begins with the diphthongs [ew] and [ɛw]. As in the case of [ow] and [ɔw], it is often impossible to distinguish between these two diphthongs in the history of the Romance languages, although a few examples of differential treatment may be found. In the remarks that follow, [ew] and [ɛw] will be treated together, unless otherwise indicated.

Generally speaking, when the diphthongs [ew] and [ɛw] succumb to a purely phonetic tendency towards reduction, the resulting vowel is a front-rounded segment, variously [ø] or [œ]. This development may be observed in a number of Romance languages. Tagliavini (1926: 23) cites the general reduction of [ew] to [ø] in the Italian dialect of Comelico. The same general change has been reported in the Italian dialect of Piacenza by Gorra (1890: 147) where, however, the end result was a more raised vowel, approximating a [y]. In a cross-dialectal study of various Surselvan dialects, Luzi (1904: 775) has established the evolutionary pattern [ew] > [ɔw] > [ø]. Matluck (1952: 114) has recorded the reduction of [ew] to [ø] in certain dialects of Mexico. Alarcos Llorach (1960: 43) postulates an earlier stage in Catalan, when [ew] alternated with [ø], with the unreduced diphthong eventually predominating. Brekke (1888: 94) discovered the change in progress in Mallorquin Catalan, in the form of the evolution [ew] > [ɔw]; in the modern dialect [ø] may sometimes be heard. Mila y Fontanals (1876) also noted a tendency in standard Catalan for [ew] to become [œ]; thus *seu* > [sœw]. In rapid speech, the present writer has observed a tendency for Brazilian Portuguese [ɛw] (as in *céu*) to reduce to [œ], and for [ew] (as in *seu*) to reduce to [ø]. In certain Portuguese dialects this reduction seems to have resulted in permanent restructuring; one such case is cited by J. J. Nunes (1902: 39) in the Algarvian dialects. Zamora Vicente (1967: 173) has also cited, in certain dialects of Leonese, forms like [mjøw] from *mieu*.

A noteworthy example of the development and reduction of [ɛw] and [ɛw̥] is afforded by the history of French. In French, the developments evidently proceeded as follows: [ɛw] > [øw] > [ø]; [ɛw̥] > [œw̥] > [œ]. The first stage, resulting in a diphthong with a rounded first element, is believed to have occurred in the early 12th century, and the eventual monophthongization in the later 12th and 13th centuries.¹⁹ The entire process has been neatly summed up by Verrier (1936: 298-9):

Dans [ɛy] . . . par suite d'une assimilation réciproque, l'[y] s'est palatalisé en [j], et l'[ɛ] s'est arrondie en [œ] . . . D'où, par fusion des deux voyelles ou absorption de la seconde.

In view of the developments noted above, however, it would be wiser to establish the opposite chronological sequence; namely, rounding of the syllabic element, followed by fronting of the glide, although the reverse development is also plausible, though unattested.

As with the case of [aw], there are sporadic cases of the reduction of [ɛw] in which abnormal stress configurations precluded the more expected evolution to [ø]. For example, due to the Portuguese tendency to emphasize the first element of the diphthong, the development [ɛw] > [e] was cited in Goa by Dalgado (1900: 66). This development may, however, be the result of the delabialization of an [ø], since the Goa dialect exhibited other traces of front rounded vowels. On the other hand, a stress shift of Spanish [ɛw] to [eú] eventually resulted in [u] in the dialect of Cúllar-Baza²⁰.

In a fashion analogous to the development of [ɛw], the diphthong [iw], when undergoing reduction, generally yields [y]. Once again, widely scattered dialects exhibit the same pattern. Meriggi and Galli (1953: 316) cite the development **sturziú* > *sturzü* in certain dialects of Italy. A form of metathesis seems to have resulted in the development of *riuscito* to [rivýši] in the Italian dialect of Sottoceneri described by Keller (1934: 216). In rapid Brazilian Portuguese, one may also observe the reduction of [iw] to [y], and in the Portuguese dialect of Goa, this change has often resulted in restructuring; e.g. *sabio* [sábiu] > [sábiw] > [sáby]²¹. The change appears in transition in certain Lukanese dialects of Italian investigated by Keller (1943). In these dialects, for example, *figlio* [fíʎo] > [fíʎo] > [fíʎo], and then, by shift of the accent, [fjə]. All stages of the development are attested, thus perhaps lending a measure of credibility to Verrier's earlier-quoted remarks concerning the evolution of [ɛw]. In fact, in the dialect of Indemini, Keller discovered traces of a completed reduction of [iw]; for example *decidiu* > *decidü* (p. 206).

The reduction of [iw] to [y] is not peculiar to the Romance languages, but is attested in other languages as well, particularly among the Germanic languages. Andersen (1972: 23) cites such examples as Old Danish *diur* giving modern Danish *dyr*, O. D. *liud* going to M. D. *lyd*, etc. In such cases an intermediate stage [iɥ] has traditionally been

assumed; one might, however, just as well postulate instead the stage [y^w], in keeping with some of the Romance developments noted above. Andersen also notes that English speakers characteristically employ the variable diphthong [iw]/[ju] in rendering foreign words containing [y], such as French *fondue*, *pure*, German *Mueller*, etc.

The data from Romance provide almost no documentation of diphthongs ending in [w] whose first element is either a front rounded vowel or a central or back unrounded vowel, since such types are rare indeed. A few rudimentary remarks may nonetheless be offered. First of all, in view of the general developments noted above, one would expect the diphthongs [øw] and [œw] to reduce to [ø] and [œ], respectively, and for [yw] to yield [y]. Such diphthongs have been postulated as the intermediate stages in the reduction of diphthongs whose first member is an unrounded vowel, and have occasionally been reported in various dialects.

Diphthongs whose first member is a central or back unrounded vowel are also quite scarce among the Romance languages, being found consistently only in Romanian. The present writer has observed in the rapid speech of some Romanian speakers a tendency for [əw] to become reduced to [o] or [ə] and for [i^w] to become reduced to [u] or [ɤ]. Thus, for example, *riu* may occasionally emerge as [ru] or [rɤ], and *rău* [rəw] as [ro] or [rɤ]. With regard to the latter case, one may also observe an analogous situation in many dialects of English, particularly Canadian English. In Canadian English the diphthong [aw] is often raised to [əw], and further reduced to [o] or [ə]; thus *about* is frequently heard as [əbót].

In looking over the reduction of falling diphthongs terminating in [w], several general tendencies become apparent. If one disregards cases involving shift of stress or other abnormal configurations, it may be seen that each instance of reduction yields a rounded vowel; i.e. the rounding value of the final product matches the rounding value of the glide [w]. Moreover, it is seen that in each case the frontness value of the initial segment remains essentially the same; [ɛw], [ɛw̥] and [iw] yield front vowels, [aw], [ow], and [əw] yield back vowels, and, as nearly as can be determined, [əw] and [i^w] yield more centralized vowels. These generalities regarding diphthong reduction hint at the possibility of discovering some more fundamental properties of vocalic evolution. In order to pursue the search for such characteristics, it will be necessary to investigate further cases of diphthong reduction, this time involving diphthongs whose non-syllabic second segment is [j].

3. As before, one may consider affixing the glide [j] to any of the vowel nuclei to be found in the Romance languages. Once again, some of the combinations are far commoner than others, and consequently yield a characteristically greater amount of documentary evidence on which more general conclusions may be based. The first case to be considered is that of [aj], providing the earliest example of reduction among the Romance languages. The Latin diphthong *ae*, thought to have been pronounced [aj], reduced to [ɛ] or sometimes [e] among the Romance languages; thus *caelum* > French *ciel*, Italian *cielo*, Spanish *cielo*, Portuguese *céu*, Romanian *cer*, etc. The reduction did not always result in an open mid vowel, but sometimes yielded [e]. Blaylock (1964: 24) believes

¹⁹ See Pope (1931: 201).

²⁰ Cf. Salvador (1957: 195).

²¹ Reported by Dalgado (1900: 66).

that the variant developments ensued in different areas "simply because a qualitative distinction never existed in that dialect [i.e. in northern Africa] between vowels which originally differed only in length". In evaluating the evolution of Latin *ae*, however, one must not rule out the possibility of a shift in stress to the second mora, which might also account for a deviant evolution.

The history of French is characterized by a reduction of the diphthong [aj] (or more likely [æj]) to [ɛ] or [e]. In Old French, *ai* became first [ɛj], finally [ɛ] or [e], depending upon the position within the word²². The diphthong *ai* which arose in middle French was similarly reduced, although vacillation continued for a long period of time, the change not being fully consummated until the 17th century. Available documentation indicates that the change occurred earlier in the dialects of southern France, and spread slowly to the northern dialects, including Walloon²³.

Catalan is also noteworthy in having reduced most instances of [aj] or [æj] to [e] or [ɛ]. Fouché (1925 : 23) cites such developments as *fraxīnu* > **fraysen* > **freysen* > *freçz*; *laxat* > **laysa* > **leysa* > old Cat. *leixa*; *fascz* > **fays* > **feys* > *fec*; *factum* > *fayt* > *feyt* > *fet*, etc. Moll (1952 : 167) notes evolutions like *racimu* > *reim*. Grieria (1913 : 27) speaks of the change *patèlla* > *paella* > *peyele* and adds: "Aqesta *y* ha tingut tanta influència sobre la vocal precedent en alguns casos que l'ha fet venir a *i*". Pereira (1915 : 53) gives such pronunciations as [ešó] for *ai xo* (modern Catalan [əšó]), thus providing further instances of this general reduction process.

A similar development has been described by Diego Catalán (1961) for certain Spanish dialects. Catalán found in Latin American Spanish partial reductions such as *páis* > *peis*, *cáida* > *queida*, *cáirse* > *querse*, etc. (note the shift of stress). Similarly, in the Spanish spoken in the Canary Islands he noted *malpáis* > *malpei*, *ráih* > *reih*, etc.

In Portuguese, the diphthong [aj] tends to maintain itself, although generally in the raised form [ɛj]. In rapid speech, an occasional reduction may be heard, and the direction taken by the reduction is dependent upon the relative length of each mora, as in the previously cited examples. Dalgado (1906 : 148) notes the reduction of [aj] to [a] in the Portuguese dialects of northern India, and J. J. Nunes (1902 : 37) noted the same change in some Portuguese dialects of the Algarves, but such a development is far from typical.

The diphthongs [ej] and [ɛj] generally behave in an identical fashion, and, as might be suspected, their reduction tendencies lie in the direction of [e]. This reduction is the general rule in Brazilian Portuguese, in particular in Rio de Janeiro²⁴ and São Paulo²⁵. In the Lisbon-Coimbra standard of European Portuguese, [ej] has become [ɛj], and hence does not generally undergo reduction. Among the scattered dialects of Portugal, however, the reduction of [ej] to [e] is extremely frequent. Gonçalves Vianna (1906 : 27) noted that in Alemtejo *peixe* was pronounced as *pêx(e)*

²² See Pope (1931 : 198).

²³ *Ibid.*, p. 198-9.

²⁴ See Houaiss (1958 : 286).

²⁵ From Dahl (1961 : 317).

"com *e* fechado, breve, e *x* longo". Leite de Vasconcellos (1892a) found the reduction of [ej] to [e] generalized in the Alemtejo dialects of Evora, Alandroal, and Beja. The dialect of Villa-Viçosa was added to this list in Leite de Vasconcellos (1896a : 238). In the Algarvian dialect of Cabanas da Conceição, Leite de Vasconcellos (1896b : 325) found the reduction of [ej], while J. J. Nunes (1902 : 37) found more general instances of this process in all the Algarvian region. Lüdtke (1954 : 217) found the change quite prevalent in all the Alemtejo and Algarvian regions. Agostinho Fortes (1944 : 129) registered the general reduction of [ej] in the Portuguese dialect of Gadiana, and Felício dos Santos (1898 : 161) noted the same change in Beira Baixa.

In the Azores, the change was first noted by Leite de Vasconcellos (1896b : 294) and later by Rogers (1948 : 14) in the eastern Azores, and Rogers (1949 : 56) in the western islands, although Rogers also noted cases in which the diphthong was unreduced. Rogers (1946 : 249) noted instances of the reduction of [ej] in the Madeira Islands, while the same reduction has been observed in the Cape Verde Islands by M. L. Nunes (1956) and Herculano de Carvalho (1962 : 53). Dalgado (1906 : 148) cited the reduction in the Portuguese of northern India, while he also recorded the same process in Goa (1900 : 66). Batalha (1958 : 183) reported the reduction of [ej] to [e] in Macao, and Thompson (1959 : 293) noted the process in the Portuguese spoken in Hong Kong.

In Catalan, as noted previously, the diphthong [ej] often reduced to [e]. In other cases, however, an [i] was the outcome, probably first in cases where a palatal element followed the diphthong. Thus Fabra (1906 : 14) gives examples like *exit* > *ix*, *sex* > *six*, *text* > *tix*, *lectu* > *llit*, *delecta* > *delita* (cf. Portuguese *deleita*), etc. The French language also has characteristically undergone reduction of [ej] to [e]. Taverdet (1969 : 107) notes, in connection with the reduction of various falling diphthongs :

... ainsi, en position intérieure, quand les deux éléments de la diphtongue ont un point d'articulation très proche, cette influence est négligeable : *éy* devient *e*, *œy* devient *æ*, *ow* devient *o*. Mais quand les points d'articulation sont plus éloignés, l'influence de l'élément final est plus important : *aw* devient *o*.

These remarks echo those made earlier, and highlight some of the general tendencies which may be observed in the reduction of falling diphthongs. Along these same lines, it may also be noted that, like the diphthong [uw], few instances of the diphthong [ij] come to light, except as variants of /i/, and no instance of a distinctive opposition between [ij] and [i] has been reported among the Romance languages.

Few examples may be found of the purely phonetic reduction of the diphthongs [oj], [oɔj], or [uj] in the Romance languages. The most common development is for the feature of syllabicity or stress to be incorporated into the second mora, thus causing either a hiatus or a rising diphthong; in the latter case the initial glide may subsequently disappear, leaving behind a single vowel. Thus, for example, in old French, the diphthong *oi* [oj] became [oé], later [we]²⁶. A partially similar development

²⁶ See Pope (1931 : 194-5).

may have occurred in the reduction of the old Latin diphthong *oe* to *e*. Grandgent (1934 : 89) believes this evolution involved the intermediate stage [ø]. Such a development would, however, be rather unusual in view of other observations concerning this diphthong and is in fact rendered implausible by the intermediate spelling *Phyebae* for *Phoebe* also cited by Grandgent. This spelling, inasmuch as it indicates anything, seems to implicate a shift of stress resulting in an intermediate rising diphthong, since the letter *y* borrowed from Greek was thought to have represented the sound [y]²⁷.

The history of Catalan offers several examples of the shift of [uj] to [i], presumably through shift of stress to the second element; thus *nocte* > *nuyt* > *nit*, *octo* > *vuyt* > *vit*, etc. Speaking of the development of *nocte* to the modern *nit*, Moll (1952 : 85-6) states :

Se ha debido probablemente a la influencia de la *i* de *dia*, originada por el paralelismo frecuentísimo entre ambas voces en locuciones como *dia i nit*, *de nits i de dies*, etc.

Pierre Rosketh (1921 : 54) believes, however, in a more general phonetic development :

**nueyt* > **nuyt* > **nuit* > *nuyt*, ou, avec chute de l'*u*, *nit*. L'accent, que originairement devait porter sur l'*i* (cf. *nit*) s'est ensuite transporté sur le premier élément de la diphtongue.

It is Fouché (1925) who, in considering a large number of parallel examples, most fully outlined the phonetic process involved :

Nous nous inclinons à voir dans l'amouissement de *w* ou *u* le jeu de la loi que régie la succession des ouvertures à l'intérieur de la syllabe : *u* ou *w* et *i* ayant la même ouverture ou presque, le phonème inaccentué a été éliminé ; cf. le traitement parallèle de *lat. qui, quem* dans les langues romanes.

Such an observation concerning fluctuation in diphthongs both of whose members are high vocalic segments is by no means unique; for example, Avram (1969) has shown the constant fluctuation between the diphthongs [iw] and [ju] in modern Romanian, a phenomenon which also occurs in many dialects of English²⁸.

Although the most common tendency connected with the diphthongs [oj] and [uj] in the Romance languages is shift of stress to create a rising diphthong, one may occasionally observe a more balanced phonetic reduction, maintaining the configuration of a falling diphthong. In rapidly spoken Brazilian Portuguese, the diphthong [oj] may reduce to a back or centralized unrounded vowel, transcribed variously as [ə] or [ɤ]. Similarly, the Spanish diphthong [uj] in such forms as *muy bien* may reduce to a higher unrounded vowel, represented as [i] or [w]. None of the standard Romance languages except Romanian exhibits back or centralized

²⁷ Cf. Kent (1943 : 46, 48).

²⁸ See, for example, Kurath (1964 : 78).

unrounded vowel phonemes, and consequently the above variants, being unrounded, are sometimes interpreted as pertaining to the (front) unrounded vowel phonemes [i] and [e]. This observation suggests that, strictly speaking, it may not be necessary to posit a shift of stress or syllabicity to account for the changes of [uj] to [i] and [oj] to [e]. If, for example, early Catalan *nuyt* had reduced to [nit], the resultant pronunciation might be re-analyzed as /nit/; a similar appraisal is often made by English speakers under analogous circumstances. Andersen (1972 : 23) has noted that when Lithuanian, which has no back unrounded vowels, borrows Russian words containing [i], the diphthong [uj] is used to represent the Russian vowel. Thus, to the Russian *mylo* corresponds Lithuanian *muilas*, while Russian *tyn* gives rise to Lithuanian *tuinas*.

As noted previously, falling diphthongs whose first elements are a front-rounded or back-unrounded vowel have been noted from time to time among the Romance languages and have often been postulated as intermediate stages in the reduction of other diphthongs. The general tendency is for a diphthong ending in [w] to become a rounded vowel, and for a diphthong ending in [j] to become an unrounded vowel. To complete the picture, however, one would have to examine at least the diphthongs whose second element is a non-syllabic [y] or [i]. Of the latter type, no examples have been reported, although intermediate stages involving such a configuration may be posited in certain instances. The former type of diphthong, terminating in a non-syllabic [y], while also figuring in reconstructions, occasionally turns up in synchronic descriptions. The most noteworthy example of such a case is offered by Duraffour (1932 : 161) in a Provençal dialect, where the form [sjaʊ] evolved to [šo].

4. An overview of the entire series of developments covered so far yields a number of interesting generalizations which may be brought forward. It was noticed earlier that reduction of diphthongs of the type *Vw* generally resulted in a rounded vowel, whose frontness value was more nearly that of the first mora than of the second. In the case of diphthongs of the form *Vj*, reduction generally yields an unrounded vowel, again with a frontness value reflecting that of the first mora, although perhaps slightly fronted. Finally, in those cases, observed or postulated, involving diphthongs terminating with a non-syllabic [y], the result is again a rounded version of the first mora. The consistency present in such developments suggests a general principle involved in the phonetic reduction of falling diphthongs in cases of uniform linear distribution of the two morae; namely :

- (1) The reduction of a falling diphthong yields, in the absence of additional factors, a vowel whose frontness value agrees with that of the first mora, whose rounding value agrees with that of the second mora, and whose height value is intermediate between those of the two morae.

This principle is not uniquely confined to the Romance languages, but appears to operate in other languages as well, although perhaps with somewhat different ramifications in each case. It is by no means a general

law, determining the outcome of any diphthong-reduction, but rather an overriding tendency, which may be counteracted by prosodic, analogical, and other similar factors. In fact, it seems that (1) serves to guide the direction taken by a diphthong during reduction, all other things being equal.

To the extent to which (1) is valid, it should allow us to make predictions with reasonable certainty; in particular, it should aid in reconstructing diachronic processes. For example, a diachronic theory employing a statement such as (1) would predict that, under ideal conditions, the diphthong [æw] would be expected to reduce in the direction of [œ] or [ø], probably passing through the intermediate stages [œw] or [øw]. Leite de Vasconcellos (1899: 600-2) noted that the Mirandese dialect of Portuguese exhibited the diphthong [øw] from older forms in the graphy *au*, free of any apparent external conditioning factors. From this, one might suspect that the old diphthong *au* in this area contained a fronted first element, being realized as [æw].

Another inherent prediction emerging from the above analysis is that diphthongs of the sort ending in [w] and in non-syllabic [y] will undergo identical developments during reduction, as will, for example, pairs such as [ej]/[øj], [ew]/[øw], etc. What little evidence may be brought to bear on this subject seems to bear out these predictions. The reduction of [au] to [o] cited above gives the same results as the more common reduction of [aw]. Similarly, the diphthong [eu] posited by some scholars as an intermediate stage in the evolution of French *eu* ultimately reduced to [ø], the same as in cases of the reduction of [ew] to [ø] in which no intermediate steps have been observed. The Surselvan dialects studied by Luzi (1904) apparently effected the reduction of [øw] to [ø], as have some of the Mirandese Portuguese dialects. In the Italian dialect of Comelico, one also finds the diphthongs [ej] and [øj] undergoing an equivalent treatment, in this case being centralized to [øj]; thus, [nøj] > [nøj], [sej] > [søj], etc.²⁹ Interestingly enough, in the development of Faroese, the diphthongs [ej] and [øj] were treated equivalently, with respect to reduction and other modification³⁰.

5. The task now remains of representing the above principle (1) of diphthong reduction into a more general theory of diachronic phonology. The easiest way of effecting such a task would be by means of a general diachronic rule whose structural description defined all falling diphthongs, and whose structural change assigned the proper features to the resulting vowel. Such a rule would take the following form:³¹

$$(2) \left[\begin{array}{c} \text{V} \\ \alpha \text{ back} \\ \beta \text{ front} \end{array} \right] \left[\begin{array}{c} \text{V} \\ +\text{high} \\ \gamma \text{ round} \\ -\text{syl} \end{array} \right] \left\{ \begin{array}{c} \text{C} \\ \neq \end{array} \right\} \rightarrow \left[\begin{array}{c} \text{V} \\ \gamma \text{ round} \\ \alpha \text{ back} \\ \beta \text{ front} \\ -\text{low} \end{array} \right] \left. \right\} \emptyset, 3$$

1 2 3 1

²⁹ From Tagliavini (1926: 68, 79).

³⁰ Cf. Rischel (1968: 104).

³¹ A rule basically similar to (2), although much less general, has been proposed by Vennemann (1972: 865) to deal with the changes of *ai* to *e* and *au* to *o* in Old High German.

The above statement is of course only a rough approximation to the data; further refinements would have to be added before any measure of completeness could be claimed. For instance, a clearer method will have to be devised to represent the height difference between the first mora of the unreduced diphthong and the resulting single vowel. With the appropriate modifications, however, a rule such as (2) could be devised which would correctly perform the necessary feature-changes in each case. Due to the nature of the process being described it is not possible to consider (2) as a true diachronic rule, except when specific developments are being considered, in which case a more specific rule would be appropriate. Instead, a statement of the form (2) must be considered as a form of diachronic template, which influences, to a greater or lesser extent, the detailed development and realization of a diachronic process. Taken in this sense, (2) may be considered as part of the metatheory of Romance diachrony, in the same fashion as the general condition which predicts the facts of intervocalic lenition, in the absence of contravening tendencies.

While a statement such as (2) can ultimately derive the correct data with respect to diphthong reduction, it stands as a purely descriptive representation, indicating nothing of the motivation behind such a configuration. Attempting to pursue the matter further at this point leads one onto the thin ice of seeking explanation in diachronic phonology, a task which is generally beyond the capabilities of contemporary linguistic theories. There is, nevertheless, nothing to be lost in advancing the investigation somewhat in this direction, if not to seek for an explanation, then at least to arrive at a more illuminating historical description. There is a certain amount of regularity which may be observed in the process of diphthong reduction, and it deserves a more explicit representation in the historical perspective of Romance phonology.

One attempt at providing a better description (and hopefully also an explanation) of a situation similar to the one discussed above has been advanced by Sanders (MS). Sanders is primarily concerned with motivating a theory of *simplex features*. In considering the supposedly parallel developments of [aj] to [ɛ] and [aw] to [ɔ], Sanders suggests the following rule:

$$(3) \quad [\text{VOC, LGW}] [\text{VOC, HIGH, X}] \rightarrow [\text{VOC, LGW, X}]$$

Such a statement, while involving a novel conception of the theory of distinctive features, is of course only a partial restatement of (2) above. As a description of historical processes it is by and large inadequate, since it considers only the before and after situation, with no regard for the intervening stages. For example, it is unlikely that a diphthong with a retracted first element such as [aj] could spontaneously evolve to [ɛ] without an intermediate stage such as [æ] or [æj], followed by some sort of phonemic reinterpretation³². Such a course of development is not reflected in a rule which merely states diachronic correspondences separated by a considerable period of time, and involving intervening developments.

³² Cf. Kent (1943: 48).

A most elaborate and far-reaching theory of diphthongization has been worked in the major undertaking of Andersen (1972). Andersen presents his theory in terms of the Chomsky-Halle-Jakobson theory of *markedness*, in which each distinctive feature in each environment is assigned a 'marked' and an 'unmarked' value; equivalently, an 'optimal' and a non-'optimal' value. Although the two elements of most diphthongs are separated by more than one distinctive feature value, Andersen chooses to consider each diphthong as the result of a *primary diphthongization*, in which the opposite values of a (necessarily binary) distinctive feature are distributed over the two elements of the diphthong. This formulation allows Andersen to propose a language-universal which he calls the *principle of intra-segmental variation*, which he defines (p. 23) as:

In a primary diphthongization, the opposite values of the feature with respect to which a segment is diphthongized are distributed over the duration of the segment in the order unmarked-marked.

A great deal of importance is attached to this proposal, which is claimed to 'account' for diphthongization and monophthongization. Andersen goes on to claim for this new 'universal' proposal:

On the one hand, it explains why it is natural for learners of language to introduce phonetic innovations consisting of a heterogeneous implementation of some feature value which defines a segment, and for other speakers of the language to find such deviations from the received pronunciation acceptable; on the other hand, it explains how it is possible for learners of a language to interpret sequential diphthongs as realizations of single segments synchronically diphthongized with respect to some specific feature.

The implications contained in these claims are far-reaching and rather drastic. Most important are those concerning the psychological reality of the proposed marking conventions, and even the distinctive features themselves. With regard to the latter, it is well to recall that, with the exception of certain common features, there is little common consensus on the distinctive features to be employed in describing human languages; in particular, no set of features has been shown to triumph over all others on psychological grounds. Throughout his study, Andersen utilizes the early Jakobsonian binary features, most of which have been replaced or at least called into question in recent years, although not necessarily with more justifiable results. Thus in order for Andersen's claims to have any substance, one must isolate *the* set of distinctive features operative in any given language, a task which remains unaccomplished.

More serious, however, are the claims referring to the 'markedness' of various segments. In determining what constitutes the marked or unmarked value of a feature in a given environment, Andersen employs the criteria of markedness originally proposed by Jakobson and later refined and extended by Chomsky and Halle. The original philosophy behind such interpretations of markedness was to establish a universal hierarchy based on the relative frequency with which various segment-types are found in different languages and to formulate implicational

statements regarding the co-occurrence of certain segments within a given phonemic system. If based on statistical observations, such markedness values are unobjectionable in their function of providing universal segment and language typologies. Recently, however, conditions of markedness have been regarded as absolute in nature, serving to define the feature specifications of every segment in every language. It is assumed that at the deepest level of phonological representation, the feature-values are represented only as Marked or Unmarked, with a universal set of interpretive conventions subsequently inserting the correct feature values. Such a theory, while by now widely accepted, rests on no empirical foundations, since the proposals have never been externally validated. Thus, for example, in order to accept Andersen's remarks concerning markedness during diphthongization, one must be prepared to accept, purely on faith, that for each human language the vowel [u] is more 'marked' than the vowel [i], and that [e] is more 'marked' than either of them. It is true, for instance, that there are languages containing only the vowels /i/, /a/, and /u/, but given a language also containing /e/ and /o/, on what basis is one justified in claiming that the latter two vowels are 'abnormal' as compared with the first three? ³³ And yet, Andersen's remarks require not only that one accept such fine distinctions of markedness, but also that native speakers have explicitly internalized these same marking conventions in a manner which enables them to pass judgement on the 'acceptability' of a given segment. Before any substantive claims regarding markedness can be offered in considering phonological developments, it will be necessary to motivate in a verifiable fashion a complete set of markedness values and provide an explicit statement of exactly what rôle such universal interpretations play in the synchronic or diachronic description of a given language. Clearly, the burden of proof falls on anyone who is willing to assume the validity of the currently available theories of markedness, to say nothing of their completeness. Inasmuch as Andersen has not provided any such proof, his definitions and conclusions must be regarded as completely hypothetical, although not necessarily invalid.

Ultimately, however, it will not be necessary to deal with such theoretical considerations, for Andersen's theory suffers from the defect of internal circularity. As noted earlier, Andersen regards both elements of every diphthong as being separated by the opposite values of a particular distinctive feature, this being considered the 'primary diphthongization'. Any other feature-differences are regarded as 'secondary diphthongizations'. No algorithm is given for determining which feature-difference defines the primary diphthongization; it seems, in fact, that whatever feature may be specified as 'unmarked' in the first element of the diphthong and as 'marked' in the second element will qualify. Thus, for example, the diphthong [iw] is regarded as being diphthongized with respect to the value [\pm grave] (p. 22), thus yielding the order unmarked-marked by the Jakobsonian marking conventions, while the diphthong [ju] is diphthongized with respect to the feature of *intensity* (pp. 23-4), also

³³ For some further discussion on the philosophical and methodological aspects of the theory of markedness, see Lipski (1973).

interpreted as an unmarked-marked configuration. The diphthong [uj] (p. 22) is diphthongized with respect to [\pm flat], since [+flat] is the unmarked value for [+grave] vowels. It is also true, however, that according to the same marking conventions, [-flat] is the unmarked value for [-grave] vowels; therefore, both morae of the diphthong [uj] should be considered as 'unmarked'. The same is true of the diphthong [iw], if one chooses to consider [\pm flat] as defining the primary diphthongization. Given the same marking conventions, it is hard to see how an unmarked-marked configuration could be arrived at for a diphthong such as [øj], unless one chose to utilize a feature such as syllabicity; in this case, however, the diphthong [wi] or [qi] would assume the pattern marked-unmarked! These remarks should show the unavoidable circularity contained in Andersen's line of reasoning. In order to fit all the data into his preconceived notion of an unmarked-marked order, he is forced to make an arbitrary and inconsistent choice as to the feature defining the 'primary diphthongization', thus robbing his attempts of any methodological validity³⁴. In order to justify the choice of the primary feature of diphthongization in each case, Andersen would have to demonstrate that precisely these features are psychologically felt by native speakers to characterize the diphthongs, thereby rendering his theory of markedness at least plausible³⁵. No such demonstration has been forthcoming; indeed, it seems unlikely that it could be given, in view of the current state of psycholinguistics. There is therefore no motivation for accepting Andersen's theory at this point, although parts of it may eventually turn out to be substantiated by other observations.

6. It is evident that the generalities observed in the reduction of falling diphthongs among the Romance languages and elsewhere involve some sort of quasi-universal tendencies. It is not equally evident, however, that these tendencies involve considerations of markedness or simplification. In this study, diphthong reduction has been considered from the standpoint of a purely phonetic evolution, free from structural pressures, analogical patterns, or other complicating factors. Viewed in this way, it seems likely that the results of diphthong reduction may be directly attributed to the phonetic nature of the diphthongs themselves; in particular, the temporal distribution of the various parts of the diphthong. It has already been observed that a disproportionately large relative duration of the first mora of a falling diphthong can lead to abnormal developments, as can a shift of stress or syllabicity to the second mora. These observations emerge upon simple phonetic considerations, and require no appeal to further theoretical devices, although one might wish to offer theoretical proposals to account for the original occurrence of such phonetic properties. Similar phonetic considerations may be brought to bear in evaluating other aspects of the diphthong-reduction process. A diphthong of the form *Vw* represents a heterogeneous vocalic segment ending with lip-rounding; single vowels resulting from the reduction of

³⁴ Foley (MS) has demonstrated that, at least in theory, any vowel may be phonologically derived from a diphthong and vice versa; consequently, any theory of diphthongs involving considerations of markedness must rest on externally-motivated observations of markedness of single, homogeneous sounds.

³⁵ See Andersen (1972: 21) for some suggestions along these lines.

such diphthongs are characteristically rounded. Analogously, *Vj* diphthongs terminate in an unrounded gesture, as do the vowels which stem from the reduction of such diphthongs. In other words, when a falling diphthong is reduced to a single vowel, the resulting vowel generally exhibits the same lip position as the latter element of the diphthong.

The onset of a falling diphthong involves the tongue in a characteristic front-back position, which is generally not drastically altered by the following glide, although the glide [j] exerts a slight assimilatory pressure, due to the greater necessary tongue movement than that which is needed to produce a [w]. Once again, the reduction of falling diphthongs produces a vowel whose front-back specification is approximately that of the first element of the diphthong; i.e. the reduced vowel begins with the tongue in approximately the same position as the beginning of the original diphthong.

Except for diphthongs such as [iw], [uj], [ij], etc., most diphthongs involve changing aperture; i.e. the middle portion of the diphthong represents a shift from a lower segment to a higher segment. The reduction of such a diphthong yields a vowel of aperture between that of each of the two morae of the original diphthong. Thus it may be seen that the vowel resulting from the reduction of a falling diphthong exhibits characteristics of the beginning, middle, and end of the original diphthong. Under ideal circumstances, the reduction proceeds from both endpoints of the diphthong towards the middle, in a sort of mutual assimilation. This accounts for the fact that end products of such reductions appear as an amalgam of the temporal variation of the diphthong. Such an amalgamation is not a unidirectional process, but may proceed in a reverse direction during diphthongization. Andersen (1972) has cited examples of the diphthongization of /y/ to [iw], of /i/ to [uj], of /æ/ to [æw], of /ε/ to [aj], of /o/ to [ow], etc. Desaulniers (1973) presented a host of examples in the spoken French Canadian of Montréal, including the changes /i/ > [ij], /ε/ > [εj], /æ/ > [æj], /y/ > [yɥ], /ø/ > [øɥ], /œ/ > [œɥ], /u/ > [uw], /o/ > [ow], /ɔ/ > [ɔw], etc. Rischel (1968: 107) speaks of the Old West Scandinavian diphthongization of /o/ to [øw]; other examples of similar processes may be found among the Romance languages as well as other language families, thus pointing to the interrelatedness of single vowels and diphthongs³⁶.

7. In terms of the overall evolution of falling diphthongs, it may be said that certain features take precedence over others in determining the final outcome; in other words, some features are *weighted* more heavily than others when it comes to being retained during conditions of reduction. In this sense, there is a hierarchy of feature weighting which, other things being equal, determines the extent to which features present in the original diphthong will be reflected in the vowel resulting from reduction of the diphthong. There are a number of ways in which such a weighting hierarchy might be incorporated into phonological theory. Ideally, a diphthong should be represented as somehow more unified than a combination of two discrete segments, perhaps as two co-occurrent bundles

³⁶ Cf. Foley (MS), Andersen (1972: *passim*).

of features within the same phonological segment. Presently, however, there is no method of depicting this relationship by means of distinctive features or other theoretical devices; diphthongs must be portrayed as a sequence of two vocalic segments. One may propose, nonetheless, to represent the relative weighting of the features of a falling diphthong by means of a series of weight-assigning functions, to be considered as part of the phonological component of the language under consideration. By explicitly assigning a weight value to each distinctive feature under consideration, the rôles which these features play during diphthong reduction may be illustrated. In the case of the diphthongs which have been considered in this investigation, such a series of weighting conventions would be of the general form:

$$(4) \quad \begin{array}{l} \text{a.) } [\text{FRONT/BACK}] \rightarrow [2 \text{ Weight}] / \left[\begin{array}{c} \text{V} \\ +\text{syl} \\ \hline \end{array} \right] \left[\begin{array}{c} \forall \\ -\text{syl} \\ \hline \end{array} \right] \left\{ \begin{array}{c} \text{C} \\ \# \end{array} \right\} \\ \\ \text{b.) } [\text{ROUND}] \rightarrow [2 \text{ Weight}] / \left[\begin{array}{c} \text{V} \\ +\text{syl} \\ \hline \end{array} \right] \left[\begin{array}{c} \forall \\ -\text{syl} \\ \hline \end{array} \right] \left\{ \begin{array}{c} \text{C} \\ \# \end{array} \right\} \\ \\ \text{c.) } [\text{HIGH/LOW}] \rightarrow [1 \text{ Weight}] / \left[\begin{array}{c} \text{V} \\ +\text{syl} \\ \hline \end{array} \right] \left[\begin{array}{c} \forall \\ -\text{syl} \\ \hline \end{array} \right] \left\{ \begin{array}{c} \text{C} \\ \# \end{array} \right\} \end{array}$$

It should be noticed that a phonological weighting scale of the sort proposed in (4) is not a set of interpretive conventions referring to the weight of a particular value of a given feature; rather, these conventions define the overall importance of the particular feature involved, regardless of the actual value of the feature in any given environment. Thus, for example, [a] indicates that the feature of frontness or backness of the first element of the diphthong determines the frontness-backness of the vowel resulting from reduction of this diphthong, while [b] shows that it is the second element of the diphthong which supplies the rounding value during reduction. In [c] it is indicated that neither the first element nor the second element takes precedence in the feature of height, but that the height of each element is weighted approximately equally, yielding a vowel of height intermediate between the two morae of the original diphthong.

As noted earlier, the motivation for the weighting values of features involved in diphthong reduction appears to be predominantly physiological in nature. While they may ultimately turn out to be manifestations of more general processes, at present there is no convincing evidence which argues in favor of considering such tendencies in terms of markedness, or for that matter, any other totally universal theoretical notion. As applied to Romance developments, both in the past and currently observable, the weighting of features serves to guide the development of diphthong reduction. The weights of the relevant features in the diph-

thong are combined to yield a single vowel embodying the weighted feature values. There may of course be other methods of representation which would also serve to illustrate the process of diphthong reduction, but given the primary data, any other descriptive device that might be proposed would probably be formally equivalent to the one offered in this study. It is obvious that diachronic processes do not proceed along a totally random course of development, but emerge as the result of the interaction of a number of diverse factors. Such factors may be roughly divided into external factors, comprising borrowing, substrata, sociological stratification, etc., and internal factors, based on phonetic, phonological, morphological, semantic, and syntactic aspects of the language viewed as a coherent system. In developing a theory to characterize these internal developments, it is necessary to search for the most explicit portrayal of the events in question, and to formulate a theory which embodies predictive as well as descriptive properties.

While it is never possible to determine with exactitude the future developments of a language, a theory which offers rudimentary directions for such future developments is preferable to one that merely describes the past. The concept of feature weighting represents an attempt at establishing a diachronic theory with the ability to judge the likelihood of particular phonological developments, and the remarks contained in this study constitute a first attempt at formulating such a notion of weighting. Hierarchization of phonological features, segments, and environments is a recognized aspect of sound change, and if future investigation shows the concept of phonological weighting to be valid over a wider range of data, it will take its place among the previously catalogued hierarchies characterizing the phonological history of the Romance languages.

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REFERENCES

- ALARCOS LLORACH, EMILIO. 1960. 'La constitución del vocalismo catalán'. In *Studia Philologica: Homenaje Ofrecido a Dámaso Alonso* (Madrid: Greces), v. 1, p. 35-50.
- ALBOR, HUGO R. 1971. 'Observaciones sobre la fonología del español hablado en Nariño.' *Thesaurus* (Boletín del Instituto Caro y Cuervo) 26.515-533.
- ANDERSEN, HENNING. 1972. 'Diphthongization'. *Language* 48.11-50.
- AVRAM, ANDREI. 1969. 'Les diphthongues roumaines [ju] et [jy]: Quelques données expérimentales'. In *Mélanges de philologie offerts à Alf Lombard* (Lund: C. W. K. Gleerup), p. 22-28.
- BATALHA, GRACIETE NOGUEIRA. 1958. 'Estado actual do dialecto Macaense'. *Revista Portuguesa de Filologia* 9.177-212.
- BLAYLOCK, CURTIS. 1964. 'The monophthongization of Latin Æ in Spanish'. *Romance Philology* 18.16-26.
- BREKKE, K. 1888. 'L'e (= ē, ĩ) latin en ancien français et en mayorquin'. *Romania* 17.89-95.
- CATALÁN, DIEGO. 1961. 'El español canario, entre Europa y América'. *Boletim de Filologia* (Lisboa) 19.317-337.

- DAHL, IVAR. 1961. 'The pronunciation of Brazilian Portuguese'. In *To Honour Jones* (ed. D. Abercrombie), p. 313-319.
- DALGADO, SEBASTIAO RODOLPHO. 1900. 'O dialecto Indo-Português de Goa'. *Revista Lusitana* 6.63-84.
1906. 'O dialecto Indo-Português do Norte'. *Revista Lusitana* 9.142-166, 193-228.
- DESAULNIERS, L. 1973. 'Le système des voyelles en Montréalais'. Paper presented to the Canadian Linguistic Association, Kingston, Ontario, May 1973.
- DÓS SANTOS, FELICIO. 1898. 'Lingoagem popular de Trancoso'. *Revista Lusitana* 5.161-174.
- DURAFFOUR, A. 1932. 'Phénomènes généraux d'évolution phonétique dans les dialectes franco-provençaux étudiés d'après le parler de la commune de Vaux (Ain)'. *Revue de Linguistique Romane* 8.1-280.
- FABRA, POMPEU. 1906. 'Les e toniques du catalan'. *Revue Hispanique* 15.9-23.
- FOLEY, JAMES. MS. 'Phonological investigations'. Unpublished manuscript, Simon Fraser University.
- FORTES, AGOSTINHO. 1944. 'Nótulas acêra da margem esquerda do Guadiana, acompanhadas de algumas notícias folclóricas'. *A Língua Portuguesa* 3.128-137, 186-199, 217-225, 313-320, 353-360.
- FOUCHÉ, PIERRE. 1925. 'La diphtongaison en catalan'. *Bulleti de dialectologia catalana* 13.1-46.
- FRANCESCATO, GIUSEPPE. 1963. 'Il dialetto di Erto'. *Zeitschrift für romanische Philologie* 79.492-525.
- GONÇALVES VIANNA, A. R. 1887. 'Falar de Rio Frio'. *Revista Lusitana* 1.158-166.
1906. 'Quantidade prosódica das vogais em português'. *Revue Hispanique* 15.24-27.
- GORRA, EGIDIO. 1890. 'Fonetica del dialetto di Piacenza'. *Zeitschrift für romanische Philologie* 14.133-158.
- GRANDGENT, C. H. 1934. *An Introduction to Vulgar Latin*. New York: Hafner.
- GRIERA, A. 1913. 'Notes sobre'l parlar d'Eivissa i Formentera'. *Bulleti de dialectologia catalana* 1.26-36.
- HERCULANO DE CARVALHO, JOSÉ G. 1962. 'Sincronia e diacronia nos sistemas vocálicos do crioulo caboverdiano'. In *Miscelânea Homenaje a André Martinet*, ed. Diego Catalán (La Laguna, Canarias), v. 3, p. 43-67.
- HOUAISS, ANTÔNIO. 1958. 'Tentativa de descrição do sistema vocálico do português culto na área dita carioca'. *Anais do Primeiro Congresso Brasileiro de Língua Falada no Teatro* (Bahia), p. 217-317.
- KELLER, OSCAR. 1934. 'Die Mundarten des Sottoceneri'. *Revue de Linguistique Romane* 10.189-297.
1943. 'Die präalpinen Mundarten des Alto Lukanese'. *Vox Romanica* 7.1-213.
- KENT, ROLAND G. 1945. *The Sounds of Latin*. Baltimore: The Waverly Press (published for the Linguistic Society of America), 3rd edition.
- KURATH, HANS. 1964. *A Phonology and Prosody of Modern English*. Heidelberg: Carl Winter.
- LEITE DE VASCONCELOS, JOSÉ. 1892a. 'Dialectos Alemtejanos'. *Revista Lusitana* 2.15-45.
- 1892b. 'Dialectos Açoreanos'. *Revista Lusitana* 2.289-307.
- 1896a. 'Dialectos Alemtejanos'. *Revista Lusitana* 4.215-246.
- 1896b. 'Dialectos Algarvios'. *Revista Lusitana* 4.324-338.
1899. 'Phonologia Mirandesa'. *Romania* 28.598-620.
- LIPSKI, JOHN M. 1973. 'The survival of a "marked" segment in Portuguese'. *General Linguistics* v. 13.
- LÜDTKE, HELMUT. 1954. 'Fonemática portuguesa, II: vocalismo'. *Boletim de Filologia* (Lisboa) 14.197-217.
- LUZI, JOHANN. 1904. 'Die sutselvischen Dialekte (Lautlehre)'. *Romanische Forschungen* 16.757-846.
- MATLUCK, JOSEPH. 1952. 'La pronunciación del español en el Valle de México'. *Nueva Revista de Filología Hispánica* 6.109-120.
- MERIGGI, P. and ETTORE GALLI. 1953. 'Testi in pavese orientale'. *Vox Romanica* 13.302-366.
- MILA Y FONTANALS, M. 1876. 'Phonétique catalan: œ'. *Revue des Langues Romanes* 10.146-147.
- MILEWSKI, M. T. 1939. 'Sur la monophthongaison des diphtongues dans les langues indo-européennes'. *Commentarii Societatis Philologicae Polonorum* 10.1-16.
- MOFFATT, LUCIUS GASTON. 1948. 'Considerations on the interchange of -ou- and -oi- in Portuguese'. In *Mediaeval Studies in Honor of Jeremiah Denis Matthias Ford*, ed. Urban T. Holmes and Alex J. Dromey (Cambridge: Harvard University Press), p. 161-173.
- MOLL, FRANCISCO DE B. 1952. *Gramática histórica catalana*. Madrid: Gredos.
- NUNES, JOSÉ JOAQUIM. 1902. 'Dialectos Algarvios'. *Revista Lusitana* 7.33-55.

- NUNES, MARY LOUISE. 'The phonologies of Cape Verdean dialects of Portuguese'. *Boletim de Filologia* (Lisboa) 21.1-56.
- PEREIRA, J. ARTEAGA. 1915. *Textes catalanes avec leur transcription phonétique*. Barcelona: Institut d'Estudis Catalans.
- POPE, M. K. 1934. *From Latin to Modern French*. Manchester University Press.
- RISCHEL, JØRGEN. 1968. 'Diphthongization in Faroese'. *Acta Linguistica Hafniensia* 11.89-118.
- ROGERS, FRANCIS M. 1946. 'Insular Portuguese pronunciation: Madeira'. *Hispanic Review* 14.235-253.
1948. 'Insular Portuguese pronunciation: Porto Santo and Eastern Azores'. *Hispanic Review* 16.1-32.
1949. 'Insular Portuguese pronunciation: Central and Western Azores'. *Hispanic Review* 17.47-70.
- ROMEO, LUIGI. 1968. *The Economy of Diphthongization in Early Romance*. The Hague: Mouton.
- ROSKETH, PIERRE. 1921. 'La diphtongaison en catalan'. *Romania* 47.532-546.
- SALVADOR, GREGORIO. 1957. 'El habla de Cúllar-Baza: contribución al estudio de la frontera del andaluz'. *Revista de Filología Española* 41.161-252.
- SANDERS, GEROLD. MS. 'The simplex-feature hypothesis'. Unpublished manuscript, The University of Minnesota.
- SCHÄDEL, B. 1908. 'Le frontière entre le gascon et le catalan'. *Romania* 37.140-156.
- SCHÜRR, FRIEDRICH. 1936. 'Umlaut und Diphthongierung in der Romania'. *Romanische Forschungen* 50.275-316.
1956. 'La diphtongaison romane'. *Revue de Linguistique Romane* 20.107-144, 161-248.
- STREVENSON, PETER D. 1954. 'Some observations on the pronunciation and phonetics of modern Portuguese'. *Revista do Laboratorio de Fonetica Experimental* (Universidade de Coimbra) 2.5-29.
- TAGLIAVINI, CARLO. 1926. 'Il dialetto del Comelico'. *Archivum Romanicum* 10.1-200.
- TAVERDET, GÉRARD. 1969. 'Le système des diphtongues dans les parlers dijonnais'. *Revue de Linguistique Romane* 33.95-109.
- THOMPSON ROBERT WALLACE. 1959. 'O dialecto português de Hongkong'. *Actes du 9ème Congrès International de Linguistique Romane* (Lisbonne), v. 2, p. 289-293.
- VENNEMANN, THEO. 1972. 'Phonetic detail in assimilation: problems in Germanic phonology'. *Language* 48.863-892.
- VERRIER, PAUL. 1936. 'Origine et évolution des anciennes diphtongues françaises'. *Romania* 62.289-301.
- ZAMORA VICENTE, ALONSO. 1967. *Dialectología Española*. Madrid: Gredos.