# CHAPTER ONE PHONETIC CHANGE

The investigation of the nature and the types of changes that affect the sounds of a language is the most highly developed area of the study of language change. The term sound change is used to refer, in the broadest sense, to alterations in the phonetic shape of segments and suprasegmental features that result from the operation of phonological processes. The phonetic makeup of given morphemes or words or sets of morphemes or words also may undergo change as a by-product of alterations in the grammatical patterns of a language. Sound change is used generally to refer only to those phonetic changes that affect all occurrences of a given sound or class of sounds (like the class of voiceless stops) under specifiable phonetic conditions.

It is important to distinguish between the use of the term sound change as it refers to phonetic processes in a historical context, on the one hand, and as it refers to phonetic correspondences on the other. By phonetic processes we refer to the replacement of a sound or a sequence of sounds presenting some articulatory difficulty by another sound or sequence lacking that difficulty. A phonetic correspondence can be said to exist between a sound at one point in the history of a language and the sound that is its direct descendent at any subsequent point in the history of that language. A phonetic correspondence often reflects the results of several phonetic processes that have affected a segment serially.

Although phonetic processes are synchronic phenomena, they often have diachronic consequences. The phenomenon whereby nonnasal vowels are nasalized in the environment of a following nasal consonant commonly occurs as a predictable and regular process in the world's languages. The introduction of such a process in a language where it formerly did not occur represents a sound change. When we characterize this type of dynamic phenomenon as a productive process in a descriptive grammar we use an arrow, as in  $V \rightarrow \tilde{V} / \underline{\hspace{1cm}} N$ . In the formal characterization of that same process as a historical event, we

use a shaftless arrowhead similar to the mathematical symbols for greater than or less than, as in  $V > \tilde{V} / \underline{\hspace{1cm}} N$ . A formal statement of the type x > y is not, however, restricted to sound changes that result from the introduction of a single new process in a language. The expression x > y, like the term sound change itself, is generally used to refer to any phonetic correspondence. In the history of Greek, for example, the following sound change occurs:  $s > \emptyset / V \longrightarrow V$ . There is a significant body of evidence suggesting that intervocalic s first becomes h in Greek ( $s > h / V \longrightarrow V$ ), and that h is subsequently lost in that position  $(h > \emptyset / V \longrightarrow V)$ . In other words,  $s > h > \emptyset / V$  V can be collapsed in the statement  $s > \emptyset / V$  \_\_\_\_ V. The sound change  $s > \emptyset / V$  \_\_\_\_ V is the result of the introduction of at least two innovative phonetic processes in Greek, each of which represents a sound change. The statement  $s > \emptyset / V$  V expresses a phonetic correspondence but does not describe a phonetic process. Similarly some tokens of the Modern Greek vowel i are derived from a vowel u that occurred at a very early stage of Greek. (We shall, for the moment, term that early stage Pre-Greek.) There occurs, then, in the history of Greek a sound change u > i. It can be demonstrated, however, that Pre-Greek u becomes i as a result of the operation of at least two sound changes. In Ancient Greek u first becomes [y], by a process that might be termed fronting; it then becomes i by a process of unrounding. The sound change u > i (a straightforward phonetic correspondence) is more fully elaborated by the statement u > y > i, where the processes that affect u as it develops toward i are identified.

Of course, the most interesting and important aspect of the study of sound change is its explanation. This issue will be considered extensively in chapter 6. In the remainder of this chapter we will be concerned simply with a presentation of many common types of sound change and of the classificatory terminology widely used in the literature to describe such changes. Certain problems presented by traditional descriptive taxonomies of sound change will also be highlighted.

# CLASSIFICATION OF SOUND CHANGES

The grossest classification for distinguishing types of sound change makes reference to the range of occurrence of a given change. The fundamental distinction between context-free and context-sensitive processes is well known to students of descriptive (synchronic) linguistics. In historical linguistics the terms unconditioned and conditioned sound change are more common than context-free and context-sensitive, respectively. An unconditioned sound change may be described as one that affects the phonetic value of a sound uniformly in all environments. Unconditioned sound changes are sometimes termed spontaneous sound changes. A conditioned sound change affects the phonetic value of a sound in a given, statable, and usually phonetic environment. Conditioning factors are widely varied; sounds may be affected by other sounds that precede or follow, by suprasegmental factors such as stress, by the relative difficulty of producing or perceiving phonetically complex sequences of sounds, as well as by other factors.

Conditioned sound changes may be classified according to the following four categories: assimilation, dissimilation, reordering of segments, insertion or deletion of segments. This is not the only possible taxonomy of conditioned sound changes, and indeed there is some overlap in the categories delimited here. Nevertheless, this classification serves well for purposes of presentation.

## **ASSIMILATION**

Assimilation describes any situation in which two sounds having a syntagmatic, or linear, relationship become more like one another. With reference to the phonological features phonologists use to describe speech segments, we might say that in assimilation a segment's marking (+ or -) for a given feature, such as voice, or for a group of features is changed so as to agree with the specification for that feature or complex of features in a given segment of its vicinity. Any feature or complex of features may be affected by assimilation. Examples of historical assimilation are legion in the historical gram-

mars of languages. Consonants may assimilate to other consonants or to vowels. As a case of the former consider Latin factum, which has become fatto in Italian. (The various Romance languages—French, Spanish, Portuguese, Italian, Rumanian, and others—are descended from a language whose most stylized form is Classical Latin.) Note the assimilation of [k] to [t]. In the prehistory of Italian all clusters of stops and of nasals assimilate in this manner; for example, Latin septem 'seven', somnum 'sleep' become Italian sette, sonno. Consonants may take on features of adjacent vowels. Palatalization and labialization, for example, are common historical processes. The initial palatal affricates in English words like church (OE cirice), chide (OE ciden), and cheek (OE  $c\bar{e}ace$ ) develop from k (spelled c in Old English), which has undergone palatalization in the environment of following palatal vowels.

Stops may become continuants in the context of other continuants, commonly vowels. In the prehistory of Hindi, intervocalic stops become glides; consider the form gata- 'gone' in the ancient Indic language Sanskrit and gayaa, its descendent in Modern Hindi. Similarly, Ancient Greek voiced stops develop as fricatives in Modern Greek; compare the pronunciation of  $\delta$  in Ancient Greek ' $\alpha\delta\epsilon\lambda\phi\sigma$ s [ádelphos] and Modern Greek  $\alpha\delta\epsilon\lambda\phi\sigma$ s [aðelfos].

Assimilation may be complete or partial. The result of complete assimilation is a pair of identical segments. The consonant assimilations of Italian are examples of complete assimilation. It should be noted that many, perhaps most, complete assimilations are the result of a series of separate processes that have operated in the course of the progressive development of a language. In the case of It. sonno, for example, it is known that a form of the shape swepnom predates Lat. somnum, which itself is the source of It. sonno. The medial cluster of sonno has undergone at least two assimilatory processes in its prehistory: a partial assimilation whereby the labial stop [p] becomes the labial nasal [m] so as to agree with a following [n] with respect to the feature [nasal], and a second assimilation for point of articulation. As the result of a partial

assimilation, the sound undergoing phonetic change and the conditioning sound come to share identical markings for a greater number of features. The terms complete and partial assimilation are generally used to refer to changes that affect sequences of consonants.

In many of the examples of assimilation we have considered so far, the conditioning segment follows the sound that changes. The Italian consonant assimilations and the English palatalization of velars just described are examples. A change such as this, in which a sound is altered through some form of anticipation so as to conform in any degree to a segment that follows, is termed a regressive assimilation. In other situations the conditioning element precedes the assimilated sound. The fronting t to ch [ $\check{c}$ ] in Spanish words like fecho from earlier feito (< factum) is an example. The term progressive assimilation describes such changes. The Slavic languages offer a similar example of progressive assimilation.

Because of alternations that occur in all of the Slavic languages, we can be sure that the affricates c [ts] and z [dz] are not original but are historically derived from the velar stops k and g. One context where such a change occurs is in the environment of certain preceding front vowels. The so-called Slavic progressive palatalization may be formulated as follows: k, g > c,  $(d)z / \{i, i, \tilde{e}\}$  \_\_\_\_. For example, Old Church Slavic (OCS) ovica 'sheep' < \*ovika, compare Skt. avikā 'sheep': OCS sti(d)za 'path' < stiga, compare Gk. stokhos'line': OCS  $k \bar{u} n \bar{e}(d) z \bar{i}$ ,  $k \bar{u} n \bar{e} z \bar{i}$  'king, prince' < \*k u n i n g a z, compare Old High German kuning 'king'. It is interesting to note that some tokens of c and (d)z develop as a result of a regressive assimilation, the so-called second regressive palatalization of Slavic. When followed by front vowels that are historically derived from diphthongs (i and  $\check{e}$  [ $\alpha$ ] < ei and oi, ai, respectively), k and g become c and (d)z in Slavic.

In all of the instances of assimilation given thus far, the conditioning segment has been immediately adjacent to the changed sound. This is not always the case, and we consequently distinguish between adjacent assimilation and distant assimilation. It often happens, for example, that vowels are

fronted or backed, raised or lowered, in the context of a vowel of corresponding quality in an adjacent syllable. When the conditioning vowel follows the vowel that undergoes a change in quality, the German term *umlaut* is commonly used to describe the change. If the conditioning vowel is first in the sequence, the term *vowel harmony* is used. An example of vowel harmony for height in Irish is discussed extensively in chapter 3.

#### DISSIMILATION

Dissimilation describes a situation in which one sound has become less like another in its vicinity. Not all sequences of like sounds are as liable to dissimilation as others. Liquids, nasals, and segments that demand complex readjustments in the glottis, such as aspirated, murmured, and glottalized stops, seem particularly prone to dissimilation. Dissimilation of liquids is especially common in the world's languages. English offers examples in a number of Latin words borrowed into English; compare for example Latin peregrinus and purpur with English pilgrim and purple. Compare also French flairer 'to scent' with earlier fragrare 'to smell' in Latin. The name of the Italian city Bologna offers an example of dissimilation in a sequence of nasals. The earlier form of that place name is Bononia.

Perhaps the most well-known example of a historical dissimilation is a phenomenon in Ancient Greek and Sanskrit known as Grassmann's Law. In Greek an aspirate stop becomes a plain voiceless stop if another aspirate appears in a following syllable. Similarly in Sanskrit, a voiced aspirate (murmured) stop becomes a plain voiced stop in the context of a following voiced aspirate (murmured) stop. The results of these developments are particularly notable in reduplicated verb forms. Compare (Gk.) tithēmi, (Skt.) dadhāmi 'I place' with (Gk.) didōmi, (Skt.), dadāmi 'I gave'.

## REORDERING OF SEGMENTS

It is sometimes the case that the order of segments will be reversed in specific lexical items or in a class of forms that show specific sequences of segments. The term *metathesis* 

describes a situation in which the shift of order affects adjacent segments. Spoonerism refers to such shifts when the segments involved appear in different syllables, or more commonly, in different words. The example, "Sew her shadylip to her sheet," is attributed to the Reverend William A. Spooner, who reportedly wanted to say "Show her ladyship to her seat." Spoonerisms are generally sporadic, reflecting one-time-only errors of production. The phenomenon has little if any long-term effect and is of minimal interest in the study of linguistic change. Metathesis, on the other hand, can be sporadic or regular and often results in linguistic change.

Metathesis can be sporadic in both a linguistic and temporal sense. A certain shift of order may affect a given sequence in one or a few words, once or on occasion, in the speech of a particular individual. Most speakers of English have heard or produced a form like [aks] for [ak] 'ask' on occasion. Such alterations are not, however, restricted to occasional lapses. They can and often do result in linguistic change. Some Ancient Greek dialects regularly show the metathesis ps > sp / # \_\_\_\_. Attic Psyche corresponds to dialectal Spyche.

Historical metatheses are not necessarily restricted to specific words or small classes of words. Armenian (Arm.) shows an excellent example of a completely regular metathesis. It affects all clusters of the shape consonant (C) plus liquid (L) in any position. For example Arm. surb 'bright' is known to be derived from an earlier form subhro-; compare the related Sanskrit form śubhra- 'bright'. The Armenian metathesis affects CL clusters, even when they occur in word-initial position. Compare Skt. bhrātar- and Arm. etbayr 'brother'. The r sometimes becomes t in Armenian, and a prothetic, or word-initial, vowel develops regularly in words that begin with a liquid.

Metatheses are, for the most part, restricted to certain types of sequences of segments, namely clusters that include a sibilant and a stop, as well as sequences of liquids and vowels (V) or consonants. A regular metathesis of VL to LV occurs in Slavic (for example, Pre-Slavic \*gordu > OCS gradŭ 'town'). Metathesis is unquestionably used appropriately as a

descriptive device in the case of this Slavic sound change. It describes a formal relationship that holds between the shapes of a set of forms at two stages in the history of a language. It describes a phonetic correspondence. As is the case with many of the types of sound change discussed in this chapter, however, all historical metatheses do not necessarily reflect the operation of a phonological process of metathesis. This Slavic development is, perhaps, a case in point. Many phonologists believe that historical metatheses of the type VL > LV or LV > VL reflect the end result of a sequence of events that might be characterized as follows: . . . CVLC . . . > . . . CLC . . . > . . . CLVC . . . (L represents a syllabic liquid); the opposite processes would affect original sequences like . . . CLVC . . . The alternant pronunciations of English words like western as [western ~ westrn ~ westren] apparently exemplify the operation of the very same processes that may explain historical metatheses of the type noted in Slavic.

Ancient Greek offers another example of a historical correspondence that has been called a metathesis, but which probably reflects a more complex sequence of events. The verb  $bain\bar{o}$  'I go' and the noun moira 'fate' are derived from the forms (Pre-Greek)  $g^{U}my\bar{o} > bamy\bar{o} > bany\bar{o}$  and morya, respectively. These words exemplify a change whereby clusters of nasals or liquids plus glides are said to metathesize. There is, however, an extraordinary restriction on the metathesis. The shift occurs only when the vowel preceding the cluster is nonhigh and nonfront, that is, a or o. The following series of processes has been suggested to explain the apparent metathesis:

(1.1) glmyō > bamyō > banyō > bańyō > baińyō > baińō > bainō

Note that this series of developments suggests a palatalization of the liquid or nasal in the environment of nonsyllabic i ( $bany\bar{o} > ba\dot{n}y\bar{o}$ ), and the subsequent introduction of what might be termed a transition glide between a nonpalatal vowel and a following palatalized consonant ( $ba\dot{n}yo > bai\dot{n}y\bar{o}$ ). This would explain the restriction on the introduction of the glide in pre-

consonantal position, since a and o are the least palatal vowels, and a major articulatory transition is necessary. Moreover, we know from many other developments in Ancient Greek that there was indeed widespread palatalization of consonants in the environment of following nonsyllabic i, and that there was a subsequent loss of nonsyllabic i and loss of palatalization. Although the term metathesis might be considered a useful description of the relationship between the early form  $bany\bar{o}$  and the Gk. form  $bain\bar{o}$ , it should be noted that it does not describe the actual development (in this case, series of developments) that brought about the phonetic correspondence to which the term refers.

It should be pointed out that the term metathesis, as used in the historical linguistic literature, is not restricted to the description of changes that affect full segments. The Attic dialect of Ancient Greek, for example, is said to have been affected by a quantitative metathesis in the course of its prehistory. Sequences of the type  $\nabla \nabla$  are replaced by  $\nabla \nabla$ . Consider the genitive case of certain Ancient Greek nouns with stems that end in a long vowel. The regular genitive case ending is -os (as in podos; nom. pous 'foot'). However, words like basileus 'king' have genitive case forms with a long vowel in the ending; basileōs comes from earlier basilēos (compare the archaic genitive basilēos, which occurs in Homer, and which does not show the quantitative metathesis).

A metathesis of resonance may also occur. Such a phenomenon affected the Germanic language, Gothic. The plural of the word sunus 'son' is sunjus. We know that sunjus is derived from a form \*sunewes (\*sunewes > Goth. suniws > sunjus, where j represents nonsyllabic i). After the loss of vowels in the last syllable of a word and the raising of e to i in Germanic, the sequence VR (R = resonant) is replaced by a corresponding RV sequence (iw > ju) in Gothic. Words with similar sequences are altered in a like manner. The factors responsible for changes of this type may be varied and complex. We might expect them to be related to shifts of accent that often affect syllable structure.

### INSERTION OR DELETION OF SEGMENTS

We have seen that the phonetic value of segments can change in a great variety of ways in the course of the development of a language. It is also common for segments to be lost under specifiable conditions, and in some instances a particular segment may be entirely eliminated from the sound system of a language. Moreover, segments may be introduced into contexts where they did not exist previously. Such *intrusive* segments may be sounds that occur in the language, or they may be entirely new to the sound system. Several technical terms are used to classify the historical introduction or deletion of sounds.

Vowel loss is commonly associated with the development of an innovative accentual system (commonly a stress system) or with a change in the position of accent. Loss of an initial vowel is termed aphesis (or aphaeresis). The dialectal English possum from opossum is an example. Apocope is the loss of word-final vowels. The so-called mute e of English or French represents an orthographic archaism attesting to the earlier presence of word-final vowels in many of the words spelled with a word-final vowel that is no longer pronounced. The English word tale was in Early Middle English pronounced with final  $\partial$ , as [ta:lə]. Syncope refers to the loss of vowels within a word. Old English munecas 'monks', for example, becomes Middle English munkes ~ monkes. (The Modern English singular monk is introduced on the basis of the syncopated plural form discussed in chapter 4.)

Vowels are often inserted between consonants to facilitate pronunciation in forms that have developed articulatorily difficult consonant clusters. *Epenthesis* is the most common term for such a phenomenon. The terms *anaptyxis* or *svarabhakti* (Greek and Sanskrit, respectively) are likewise commonly used to refer to the epenthesis of vowels, the quality of which can be predicted on the basis of segments in their phonetic environment. Latin *facilis* 'easy' and *pōculum* 'goblet' from earlier *faclis* and *pōclum* show anaptyctic vowels whose quality is dependent on that of the vowels in following syllables. The development of word-initial vowels is called *prothesis*. In

the earlier discussion of the historical metathesis of Armenian consonant plus liquid clusters, the introduction of a prothetic vowel before word-initial liquids was noted, as in etbayr 'brother'. Spanish shows prothesis in the environment of s plus stop clusters. Compare escuela 'school' with the earlier form noted in Lat. schola. The term paragoge is generally used for the development of word-final vowels, but this is probably an uncommon sound change, possibly arising only as a result of the development of final clusters that are articulatorily difficult. Most paragogic vowels are the result of language contact, developing when words ending in a consonant are borrowed by speakers in whose native language all words end in a vowel. The following schema gives the major terms for the introduction and loss of vowels:

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Addition	Initial prothesis	Medial anaptyxis epenthesis svarabhakti	Final (paragoge)
Loss	aphaeresis aphesis	syncope	apocope

The loss of a whole syllable in a sequence involving duplicated or nearly duplicated syllables is called *haplology*. This process has yielded Latin *nūtrīx* from earlier *nūtritrīx*, and *stīpendium* from *stīpipendium*. Similarly, in English *interpretative* has become *interpretive*; *phonemicization* has given *phonemization*.

Of the possible ways in which consonants may be added, the most frequently attested is the development of excrescent plosives in clusters of nasals plus consonants. These plosives usually share point of articulation features with adjacent sounds, and their development can be explained by a change in the timing of the articulatory gesture involved in the closing of the nasal passage. By such a process Old Spanish vendré 'come' developed from a form like Latin venire, with earlier syncopation of medial i. In Spanish such excrescent consonants develop even in Arabic loan words, such as Alhambra

from <sup>?</sup>alḥámra. Excrescent consonants less commonly develop in clusters that do not include a nasal. Vulgar Latin *essere*, for example, has developed into Old French *estre* (after syncope of the vowel of the second syllable), from which developed Modern French *être*.

There exist no special terms for the loss of consonants. Consonants may be lost in a variety of contexts, most commonly in complex consonant clusters; compare Middle English answerie 'answer' and gospel with earlier andswerien and godspelle. Consonants are also commonly lost in intervocalic position. The loss of intervocalic consonants is often the ultimate result of a series of processes. In most cases of intervocalic consonant loss, intermediate stages with h or a glide are attested or can be reconstructed.

It is commonly the case that the loss of a consonant is associated with an increase in the quantity of a preceding vowel. Such developments are termed compensatory lengthening and generally serve to maintain the quantitative integrity of a syllable. The spelling of the Modern English word night points to an earlier word final consonant cluster. In Old English night was pronounced [nixt]. Associated with the loss of the consonant x, we note a lengthening of the vowel i to i. The source of the diphthong in Modern English night [nait] is the long vowel i. Hence, the first step in the development of the word night from Old English to Modern English is an example of compensatory lengthening, whereby nixt > nit > nait.

Compensatory lengthening often refers to a phonetic correspondence that can be shown to result from a series of phonetic processes. Consider words like Sanskrit  $nid\bar{q}$  'nest' It is known that the source of the word is the compound form ni 'down' + sd (a morphophonemic alternant of sad) 'sit'. The development of the root of the word from nisd- to nid- results from (1) a regular voicing assimilation, nisd- > nizd; (2) a regular retroflexion of z after i-, nizd- > nizd; (3) regular retroflexion of dental stops after retroflex sibilants, nizd- > nizd-; (4) a regular change of z > i, nizd- > niid-; and (5) a regular contraction of a palatal vowel and palatal glide, niid-

> nid-. To recapitulate: nisd- > nizd- > nizd- > nizd- > nid-.

#### DOMAIN OF PHONETIC CHANGE

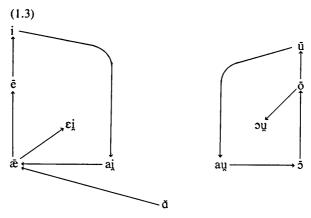
The domain of a phonetic process or a set of processes in a language is sometimes greater than the word. The loss, introduction, or alteration of a sound in the context of a transition from one word to another is termed sandhi. Such processes often have far-reaching historical effects, especially when conditioning elements are lost. In the prehistory of Irish, word-final segments conditioned sound changes in the initial segments of following words in syntactic phrases, such as noun phrases and verb phrases. Most final syllables were subsequently lost, obscuring the conditions on the mutation of word-initial consonants. As a result Old Irish appears to inflect words at the beginning and at the end. A more thorough discussion of the historical effects of sandhi in Irish is given in chapter 3.

#### CLASSIFYING UNCONDITIONED SOUND CHANGES

The classification of unconditioned sound changes is far less well developed than that of conditioned sound changes because context-free processes are, in general, less well understood than context-sensitive processes. The terminology for changes in tongue position and lip rounding in the articulation of vowels is obvious—centralization, raising and lowering, fronting and backing, rounding. Consonants may be similarly affected by unconditioned changes in their articulatory dimensions, that is, in their manner and point of articulation.

Frequently, unconditioned sound changes affect entire classes of sounds in a language. Such developments are called sound shifts. English shows the reflexes of two far-reaching sound shifts, one affecting consonants—the so-called first Germanic consonant shift, and one affecting long vowels, the so-called great English vowel shift. It is widely assumed that as a result of the first Germanic consonant shift, voiceless stops become fricatives, voiced stops become voiceless, and aspi-

rate stops become simple voiced stops. That is to say, p, t, k > f,  $\theta$ ,  $\chi$ ; b, d, g > p, t, k;  $b^h$ ,  $d^h$ ,  $g^h > b$ , d, g. The great English vowel shift results in a general raising of long vowels, and the diphthongization of the high vowels, i and u. Consider the following diagrams:



#### CHANGES IN PROSODIC FEATURES

Not only may phonological change affect the system of segmental sounds, but the prosodic system of a language may undergo various types of changes, which, in turn, may affect the segmental system. Each of the three prosodic features—quantity, tone, and stress—may be involved in the change. Languages may lose an original quantity opposition or develop a new one; languages may lose or acquire distinctive tone; formerly free and distinctive stress may become fixed and acquire the value of a boundary signal, or stress shift patterns may develop that acquire linguistic function. All these prosodic changes may interact with segmental changes, either resulting from a change in the segmental system or producing a change in the segmental system as a result of the change in the suprasegmental system.

The following example illustrates some possibilities. It is well known that Latin at one time possessed a quantity op-

position in vowels; words like populus 'people' and populus 'poplar' constituted minimal pairs. Developing into the various Romance languages, the parent language lost the original quantity opposition, replacing it by a system involving a larger number of vowels differing in phonetic quality. Latin started with a basic system of five vowels, which could be either long or short:  $\bar{i}$ , i;  $\bar{e}$ , e;  $\bar{a}$ , a;  $\bar{o}$ , o; and  $\bar{u}$ , u. At an intermediate stage (often referred to as Vulgar Latin), the length opposition was lost; long  $\bar{i}$  and  $\bar{u}$  continued as [i] and [u], short i merged with long  $\bar{e}$  as [e] and short u merged with long  $\bar{o}$  as [o]; short e became phonetic [ $\epsilon$ ] and short o developed into [ $\delta$ ]; the length distinction between  $\bar{a}$  and a disappeared, leaving a seven-vowel system without a length opposition. Individual Romance languages have undergone further developments; Italian, for example, shows diphthongs in words that, in Latin, contained short e and short o in open syllables.

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Vowel	Latin	Italian	
ī	cinere	cenere	'ashes'
ē	cēra	cera	'wax'
ě	děcem	dięci	'ten'
ŭ	crŭce	croce	'cross'
ō	corōna	corona	'crown'
ŏ	bŏnu	buono	'good'

(Italian 
$$e = [e], e = [e], o = [o], o = [o].$$
)

The Italian stressed vowels in open syllables are phonetically longer than unstressed vowels. Note that the development of diphthongs from short vowels implies that the loss of the quantity opposition must have evolved by way of lengthening of short vowels rather than through a reduction of the duration of long vowels. In Latin, vowel length was independent of stress; in Italian, stress conditions the length of vowels, and vowel length may be considered a stress cue. The change in one suprasegmental feature (quantity) has brought about a restructuring of several different aspects of the phonological system.

#### RECOMMENDED READING

Bloomfield, L. (1933) Language, Holt, Rinehart and Winston, New York, chapters 20 and 21.

Sapir, E. (1921) Language, Harcourt, Brace and World, New York, chapter 8.