A Study of the Economy of Articulatory Movements Introduced Through the Resolution of Medial Consonant Combinations in Castilian.

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A STUDY OF THE ECONOMY OF ARTICULATORY MOVEMENTS
INTRODUCED THROUGH THE RESOLUTION OF MEDIAL
CONSONANT COMBINATIONS IN CASTILIAN

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by

Robert Anthony Quinn
M.A., Florida Atlantic University, 1971

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ABSTRACT

In this dissertation an articulatory, diachronic approach is used to investigate the economy of effort introduced through the resolution of medial consonant combinations as they evolve from Latin into Castilian. A "resolution," for the purposes of this study, is a change that is brought about by processes such as epenthesis, metathesis, or palatalization to facilitate the pronunciation of a combination.

In this study, the medial consonant combinations are grouped into four major classes, their resolutions are discussed and are illustrated with diagrams, and then the general trends in the resolutions are summarized. To investigate these resolutions, an articulatory, historical approach has been chosen because it allows us to describe the resolutions in distinctive features that are factually documentable and to observe the restructuring of a base form as we watch the changing environment of the evolving sounds.

The introduction gives the limits of the study, tells why Castilian was chosen, and elaborates on the reasons an articulatory, historical approach was selected. Chapter 1 discusses the format for the sections on consonant combinations, explains symbols and abbreviations, presents charts showing the distinctive features and articulatory features of the sounds of Latin and Castilian, and explains the rationale behind
the four major classes of consonant combinations.

The remainder of the dissertation consists of a prefatory chapter (Chapter 2: The Formation and Resolution of Unacceptable Medial Consonant Combinations), four chapters dealing with the four classes of combinations, and a concluding chapter. Each chapter dealing with a class of combinations includes a discussion of the resolutions of combinations belonging to that class plus illustrations and commentaries on representative consonant combinations. Each commentary concludes with a statement of the economy brought about by the changes.

The combinations are either primary or arise through syncope or the elimination of hiatus. The combinations either are resolved through a process that is a type of assimilation, are resolved through a process that is not a type of assimilation, remain unchanged, or are relatively unchanged.

The vast majority of combinations that change are resolved through various types of assimilation. As shown in numerous instances in the commentaries, assimilation results in economy of effort. A few combinations that change are resolved through a process that is not a type of assimilation: metathesis, epenthesis, or the interchange of [l], [r], and [n] (which includes dissimilation). As shown in several commentaries, these resolutions also introduce economy. In combinations that remain unchanged, no economy is introduced, but no increase in effort is introduced either. In those that undergo little
change, the change introduces economy.

In the medial consonant combinations that undergo change, therefore, economy of articulatory movements is introduced through the resolution of the combinations as they develop from Latin into Modern Castilian.
INTRODUCTION

0.1.0. **Purpose and nature.** This dissertation investigates the articulatory changes by which medial consonant combinations are resolved in the development of Castilian.

In it, medial consonant combinations are grouped into four classes based on degree of closure. By illustrating and discussing the various resolutions of combinations belonging to each of these classes, we will show that the most frequently occurring type of resolution is assimilation. We will also show that assimilation simplifies combinations and thus brings about economy.

The development of a simpler syllabic structure, which accompanies the resolution of medial combinations, is also illustrated and discussed.

0.2.0. **Limits of this study.** The comments made herein are intended to refer specifically to Castilian and its development, but this is by no means another phonology of Spanish, such as those in Heinrich Lausberg's *Romanische Sprachwissenschaft*, Ramon Menendez Pidal's *Manual de gramática histórica española*, Sol Saporta's *Phonological Grammar of Spanish*, and *Spanish Phonology* by James W. Harris. Rather than a definitive listing of the sound changes of Castilian, this
investigation examines as closely as possible the physical reality of the changes in the movements of the articulatory organs. It is not an explanation of why articulatory changes occur, but an attempt to illustrate the changes as clearly as possible and to group them according to combinations which undergo similar changes. Changes in sounds come about because habits of articulation change. This investigation is primarily concerned with changes in articulations in the development of Latin into Castilian.

In studying sound changes, the Neogrammarians discovered that they had to consider a sound's entire environment before they could formulate valid generalities concerning the evolution of sounds in Indo-European. That is, they found that they had to take into account numerous factors influencing the changing sound, such as: 1) the sounds in the same syllable; 2) the sounds in the neighboring syllables; 3) the position of the changing sound in the word; 4) the position of the changing sound in relation to the stress in the word; 5) the position of the changing sound with respect to the stress in the phrase; 6) the frequency of the word in which the sound occurs; 7) borrowing and dialectal variations; 8) inaccuracies of spelling, etc.

Many of the above factors are considered in this study. For example, syllabic stress (the position of sounds in the combination with respect to the stress, and the simplification of combinations that are brought about by syncope) and syllabic patterns (the favored arrangement
of consonants and vowels in syllables in Latin and Castilian) are illustrated. The role of syllabic structure is discussed briefly.

Just as it is necessary to study a single sound's entire environment, it is also necessary to relate phonology to its entire environment. Phonology does not function in a vacuum, i.e., phonology, morphology, syntax, and lexicon do not develop independently, even though we may find it convenient to segment language into such elements. In addition to these elements, the evolution of the language as a whole is also ultimately affected by an interrelated, complex set of socio-economic, political, and psychological factors involving the speakers of the language. Since language is primarily a means of communication, the human element--the speakers--cannot be disregarded. It is, however, profitable to focus attention on one portion of language (such as phonology), momentarily isolating that portion from the interacting matrix of variables that influence the development of the language, in order that the inner workings of that portion may be carefully examined, as in this study.

Because consonant combinations do not appear in word-final position in Castilian except in loan words or in technical words, morphology (which in Latin and the Romance Languages usually involves inflections added at the end of nouns, adjectives, verbs, and so forth) is considered only to a very limited extent (in 4.1.2.).

Since this investigation is concerned with medial consonant
combinations, by definition it does not deal with consonant combinations that extend across word boundaries.

0.3.0. **Reasons Castilian was chosen.** Rather than any other Spanish dialect, Castilian has been chosen as the object of this study because there is a well-documented line of development for the thousand years of evolution from Latin to Modern Castilian. It is the dialect recognized as the standard by the Real Academia de la Lengua.

0.4.0. **Reasons an articulatory, historical analysis was chosen.** Although the resolution of consonant combinations has been touched on to a small degree through distinctive feature analysis and has been studied from a structural, or distributional point of view, the trends involved in this resolution have not been studied previously with a specifically articulatory analysis. Articulatory description and auditory description (e.g., distinctive feature analysis) are actually two complementary ways of approaching the same subject: phonology.

In this study, a description of the phonemes involved in each resolution is given in articulatory terms and accompanies the mouth diagrams to provide further clarification of what occurs in the resolution. These descriptions, although similar to those used in distinctive feature analysis, go no further than listing established articulatory facts and are intended to complement the mouth diagrams.

The historical approach (customarily employed by philologists in
diachronic studies) uses phonemic features based solely on articulatory
criteria. Distinctive feature analysis (an integral part of transforma-
tional grammar, a synchronic approach) uses features based on audi-
tory and acoustic criteria, as well as articulatory criteria. The his-
torical approach is more suitable for this study than distinctive feature
analysis because of the following:

1. the nature of our information about the phonology of older
   forms of language;
2. the nature of the information needed to specify the sounds
   in medial consonant combinations;
3. the concatenated nature of sound changes;
4. the fact that the nature of an articulatory study allows one to
   examine the developing sounds in the contexts in which they
   occur, while distinctive feature analysis removes them from
   the context of their environment.

These points will be explained in detail in the following sections.

0.4.1. Nature of our information. First, an historical, articu-
latory approach was chosen because of the nature of our information about
the phonology of older forms of languages. For diachronic studies,
philological rules are superior to transformational rules because philo-
logical rules take into account the incompleteness of our knowledge about
older forms of language.

Rules have been used to state sound changes since the days of
Grimm, and features were dealt with even by linguists of the nineteenth century, but the identification of linguistic phenomena with rules and the interpretation of linguistic changes as rule changes is an innovation introduced by transformational grammar. Philological rules (expressed in phonemes) and transformational rules (expressed in distinctive features) are equivalent if both meet the requirements of observational adequacy and descriptive adequacy. 12

If linguists using distinctive feature analysis simply rewrite rules that have already been formulated by philologists, they provide no new insights into the linguistic phenomena. Rules, or formulas, are factually correct only if they are based on objective, documentable reality. Inadequacies in rules result from our lack of information about phonetic aspects (the allophones) of the phonemes of older forms of language. 13 Our knowledge of the sound system of earlier forms of language is incomplete because it is based on information that was transmitted in writing, which gives us limited access to the actual sounds of the spoken language.

Any orthography is at best an inadequate means of representing the spoken language. A written document is like an informant from whom only limited information can be gained. Determining what sounds are represented by orthographic symbols is a crucial problem in historical linguistics, since the only attestations we have concerning the earlier forms of languages all consist of written records.
From the documented reality of these written records, linguists attempt to reconstruct the spoken language. In studying the historical development of a language, the spoken form of the language is primary and the written form is a reflection of it. The finer points of the auditory portion of the older forms of language elude us, since there are no informants for them. Much information is irretrievably lost. Distinctive feature analysis, a generative approach, makes assumptions that can only be supported by information from informants. Since linguists do not have those informants, it is not valid to make those assumptions.

Linguists can derive much information from inscriptions, borrowings into other languages, the opinions of grammarians who lived at the time in question, etc. These sources, however, do not give complete information. Through internal reconstruction and comparative analysis, we can reconstruct reliably at the phonemic level, but reconstruction on the phonetic level, involving more specific information, is often open to question. Our information regarding historical phonology, therefore, is phonemic, not phonetic.

The cardinal fact is that every language is a system which is constantly changing in a systematic way. Whether one is producing, or encoding, speech (an articulatory process), or whether one is receiving, or decoding (an auditory process), knowledge of the interacting and inter-dependent patterns constituting the entire system is essential.
Speech decoding is based on pattern recognition. A listener is able, on the basis of a very brief sampling, to infer an entire frame of reference for dealing with an individual's speech (regardless of whether the speaker is male or female, young or old, of the same or of a different social class, etc.) provided, of course, that the speech is in a language that the listener has learned.

While acoustic analysis is a necessary preliminary to determining the cues, it cannot by itself show what the cues are or how they combine when the listener makes his decisions. In order to do this, we have to isolate the cue dimensions, to study the effect of variation in a given dimension on the listeners' judgments and to combine cues in a controlled and systematic way.14

Thus, since there are no informants for the older forms of languages to tell us what auditory cues (i.e., which features of the phonemic bundles) are distinctive in their judgment, the implications of auditory analysis by itself are of limited value in historical investigations. As a result, transformational rules using distinctive feature analysis—which was developed through the study of living languages for which linguists have informants—produces speculative and hypothetically ordered rules when applied to historical studies.

For these reasons, an articulatory, phonemic description is more appropriate for this study.

0.4.2. Nature of information needed to specify consonants.

Second, an historical, articulatory approach was chosen due to the nature of the information needed to specify the sounds involved in
medial consonant combinations.

The point of articulation (mainly a question of the position of the tongue in the mouth), the manner of articulation (mainly determined by the amount of closure), and the opposition voiced vs. voiceless (based on the action of the vocal cords) give information that adequately defines consonants. It is true that a description of vowels in such terms leaves something to be desired. Vowels can be more accurately identified through distinctive feature analysis, in which auditory as well as articulatory criteria are employed. Articulatory criteria, however, are sufficient and appropriate for this study, since it deals with the resolution of consonant clusters. The articulatory features above, plus the oppositions nasal vs. oral and long vs. short, are therefore used in the description of phonemes involved in each resolution.

Rather than a speculative or theoretical study, this dissertation is principally an observation of physical reality, i.e., the movements of the articulatory organs involved in documentable sound changes. Castilian, like the other Romance Languages, has as its parent language Latin, which is attested over a span of more than a thousand years. There is written evidence of Castilian itself, also covering roughly a thousand years.  

0.4.3. **Nature of sound changes.** Third, this approach was selected because of the concatenated nature of sound changes.
Distinctive feature analysis was developed from the study of living languages, i.e., from the study of one synchronic stage. Articulatory analysis developed through the diachronic studies of the Neogrammarians. As de Saussure envisioned linguistics, a diachronic study presupposed synchronic studies. If, in accordance with de Saussure's view, we consider the history of a language to be a series of hypothetical synchronic stages and then compare the changes which occur from one stage to another in order to obtain a diachronic view, we might be able to use distinctive feature analysis to hypothecate what sounds were distinctive at each of the synchronic stages. The result would probably be a series of transformational grammars (one for each synchronic stage) interrelated by various rules imposing an ordering of the rules. No such complete diachronic study has been written.

Anderson, in *A Structural Account of the Evolution of Intervocalic Consonant Clusters in Spanish*, gives charts summarizing initial and final consonants and also summarizing consonant combinations for, in his terms, Vulgar Latin, Hispano Roman, Old Spanish, and Modern Spanish. He uses a structural--not a transformational--approach, but is obviously in agreement with de Saussure's view of synchronic and diachronic linguistics: diachronic studies consist of comparing and contrasting the various synchronic stages.

In an effort to reflect the concatenated nature of sound changes, a similar, but more flexible, approach has been adopted for this study.
Attested forms in Vulgar Latin, Old Castilian, and Modern Castilian are given for the combinations, but no charts representing hypothetical synchronic stages are given. Rather, the development of each combination is followed from Latin to Modern Castilian, then the various resolutions of medial consonant combinations are summarized. This approach has been adopted because language is in a constant state of flux. It is not in reality a series of static states. Although we may compartmentalize language into various stages for convenience of study, such stages are hypothetical constructs.19

In contrast to this approach, Burstynsky, using distinctive feature analysis, places emphasis on those features relevant to Modern Spanish and sets up theoretical distinctive features for the evolution of single sounds from Latin to Spanish. We do not, however, have to reconstruct Latin. Considerable documentation of it already exists. Also, sound shifts naturally occur in one direction (from the past to the present); and the process, once set in motion, is irreversible. Although analogy may level some forms that undergo sound changes, overall the changes occur like chain reactions.

According to Arlotto, sound change, when considered within a generative framework, results from the addition, deletion, or re-ordering of rules in the phonological component of the grammar. One further possibility which should be taken into account, however, is the restructuring of a base form.20
In such a restructuring, a rule is added to the phonology (Grimm's Law, for example, in the Germanic Languages), then the forms affected by this rule are changed by it. Sound shifts gradually grow in importance or dominance, change the environments that they govern, then wane or become inoperative at different times and to varying degrees in the continuum of language development. Sound changes seem to occur at varying rates, and not all changes affect all words. Thus there is a valuable residue of older forms which aids in reconstructing earlier stages of the language. Finally, the rule itself is deleted from the phonology because there are no longer any forms to which it applies. After the rule is deleted, other environments like those to which it applied can develop from other sources.

In this articulartory, philological approach, the restructuring of the base form is illustrated in the examples accompanying each rule. By watching the restructuring of the base form, we are constantly observing the sound's changing environment, which continually influences the cumulative sound shifts.

0.4.4. Nature of an articulatory study. Fourth, an historical, articulatory approach has been chosen so that the sounds being examined can be studied in the phonetic environments in which they occur.

The environment of a sound determines how it will be realized. In distinctive feature analysis, the sound is examined in its synchronic environment, and then the sound and its context are expressed in a rule.
The sound is extracted from its environment when it is written into the rule. Thus distinctive feature analysis does not allow one to observe continuously the changing environment which influences the sound's development. On the other hand, a philological approach does allow one to watch the influence of the changing environment, in that it treats sound shifts by category and position in the word, i.e., by the environment. Traditionally in philology sound changes for consonants are discussed in order by their position in the word, by point of articulation, by whether they are primary, secondary, or tertiary, etc. As a result of their occurring at different points in the time continuum, for example, primary and secondary combinations develop differently, since the environments in which they occur change with the passage of time. Because they do develop differently, a careful distinction is drawn between primary and secondary combinations in this study. Secondary combinations often are in different environments and are governed by different sound changes than similar primary combinations.

0.5.0. **Summary.** In conclusion, the principal objective of this dissertation is to present the articulatory resolutions of medial consonant combinations according to specific categories, to use diagrams to illustrate them, and then to summarize the general trends. To investigate these resolutions, an articulatory, historical approach has been chosen because it allows us to describe them in features that
are factually documentable and to observe the restructuring of a base form as we watch the changing environment of the evolving sounds.
CHAPTER 1

EXPLANATORY MATERIAL

1.1.0. Introduction. This chapter consists of four parts. First, the format used in the chapters on consonant combinations (Chapters 3 through 6) is discussed. Second, the symbols and abbreviations in those chapters are explained and the reason for the choice of these distinctive features is given. Third, charts showing the distinctive features and articulatory features of the sounds of Latin and Castilian are presented. Finally, the rationale behind the four major classes of consonant combinations is explained.

1.2.0. Format. In Chapters 3 through 6, each consists of the following:

1. a conspectus of the types of consonant combinations belonging to the class;

2. a detailed discussion of the combinations dealt with in the chapter;

3. illustrations of representative consonant combinations.

In this format, the formulas, word examples, syllabic structure, and mouth diagrams are presented together and accompany each commentary. This arrangement allows the reader to see at a glance all
the basic information concerning the developments discussed. The illustrations are representative of the various types of change that can be listed under each major class. For each illustration the format outlined and explained below has been followed.

1.2.1. **Formulas.** Each section begins with a formula that summarizes the development of the combination and gives transcriptions for the sounds involved.

1.2.2. **Word examples.** The development of each resolution is illustrated by a set of word examples containing the sound in context, as it appeared in the various stages of the language. Each word in the word examples is given in phonetic transcription.

In each word, the symbols representing the sounds under scrutiny are underlined to focus attention on them. For instance in 3.2.2. [\textipa{\textipa{\textipa{\textipa{am-plum}}} \rightarrow \textipa{\textipa{\textipa{\textipa{am-plu}}}} \rightarrow \textipa{\textipa{\textipa{\textipa{an-t\textipa{o}}}}}] . The underlining aids in following which sounds are involved in the resolution as the word evolves from one synchronic stage to another.

1.2.3. **Syllabic structure and symbols.** The syllabic structure of the examples in each synchronic stage is given. In specifying this structure, the symbols, C, R, S, and V ("consonant," "resonant" ([r] or [l]), "semiconsonant" ([j] or [w]), and "vowel" respectively) are used to clarify the changes occurring in the syllabic make-up of the
word. It is important to be aware of the functional role played in syllables by these elements. Consonants may be onsets or codas, \(^2\) which are the marginal elements in syllables. Resonants and semiconsonants can both be subsumed under the consonants, since they are also marginal elements and enter into combinations with consonants. Vowels are syllabic nuclei.

Syllabic division is indicated by hyphens, as in CV-CV-CVC, the representation of [kom-pu-tum]. Stress is indicated by an acute accent.

1.2.4. **Mouth diagrams.** Diagrams of the mouth illustrate the movements for articulating each sound involved in the resolution of the medial consonant combination. Vibration of the vocal cords is indicated by the addition of two dark lines in the throat on the diagram. Lip rounding is indicated by "o" in front of the lips. Lateral escape is indicated by a line between the lips and extending across the diagram.

The series of mouth diagrams used in this format may lead one, at first glance, to think of the articulations as a series of static poses in which the articulators are set to produce a sound and then move to another fixed position to articulate the following sound. The articulations, on the contrary, form a continuous flow of movements. \(^3\) A film or working model might more realistically portray this flow of movements, but the format selected for this dissertation has the
advantage of allowing us to highlight the individual changes, with clarity and without becoming too involved in speculation concerning the specific phonetic components of the sounds in the older stages of the language.

1.2.5. Commentaries. Each commentary is a discussion of the development of the sounds in the combination. First, a paragraph summarizing the development is given, to aid the reader in understanding the discussion which follows. Then the changes in distinctive features and in articulatory movements are discussed in detail. Finally, the commentary concludes with a brief statement of the economy of effort introduced by the changes.

1.3.0. Phonetic symbols. Most of the symbols and abbreviations in this work are commonly used and require no explanation. The statements in this section and the following section explain symbols and abbreviations that are not in frequent use or that may be used differently.

The symbols used in transcriptions are those of the International Phonetic Alphabet. In general usage, brackets [ ] enclose phonetic transcriptions, while slanted lines / / indicate phonemic transcriptions. In this study, however, the use of brackets [ ] has been preferred for both narrow (phonetic) and broad (phonemic) transcriptions. Such a use of brackets allows the flexibility of transcription required in a diachronic study. Underlining (_) focuses attention on those consonants involved in
resolutions. The colon (:) is equivalent to the macron (¯) and indicates lengthening for vowels (for example, [o:] is equal to [o]). For consonants, the colon also indicates length, or gemination (for example, [s:] equals [ss]). If a vowel is not marked as long, then it is short. Stress can be determined from the nature of the penultimate syllable in the Latin word, but for the reader's convenience it is marked by an acute accent.

1.4.0. Distinctive features and their abbreviations. The distinctive features used in this study are all based on articulatory criteria. Some terms usually employed in distinctive feature analysis are based on auditory and acoustic criteria. Where the terms differ from those usually employed in distinctive feature analysis, the distinctive feature analysis terms are given in footnotes.

The features used in this study are always listed for each sound in the order in which the flow of air is modified as the sound is produced:

A. Voicing (voiced vs. voiceless). The breath first passes through the vocal cords, where the sound is accompanied by a periodic vibration of the vocal cords, or is not accompanied by such vibration. Voicing is indicated by +VCD if the sound is voiced and by -VCD if it is voiceless.

B. Nasality (oral vs. nasal). Next the sound resonates in the mouth, or the velum is opened and the sound is allowed to resonate in
both the nasal cavity and the oral cavity (the mouth). Nasality is indicated by +NSL if the sound is nasal and by -NSL if the sound is oral (i.e., non-nasal).

C. Point of articulation. The flow of air is modified at a specific place in the mouth. Features for the point of articulation are determined by the position of the tongue, i.e., the primary cavities of articulation are those produced by the tongue.\(^4\)

The abbreviations for the points of articulation are explained in this list:

- (BILAB) bilabial
- (LABDEN) labiodental
- (DEN) dental
- (INTERDEN) interdental
- (PAL) palatal
- (ALV) alveolar
- (VEL) velar
- (GLOT) glottal

D. Manner of articulation. The flow of air is allowed to pass through the mouth in a specific way. The essential criterion for determining the manner in which a sound is articulated is closure, i.e., how closed or how open the mouth is while the sound is being produced.

The manner of articulation is designated by one of the following terms:

- (VIB) vibrant
- (LAT) lateral
- (SCN) semiconsonant
- (VWL) vowel
- (CNT) continuant
For vowels, the terms HIGH, MID, and LOW indicate features based on the height of the tongue (the degree of opening for the mouth). The terms "front" and "back" are replaced in this study by the terms "palatal" (PAL) and "velar" (VEL), respectively, in order to bring out more clearly the relationships between the vowels and the consonants that have a corresponding point of articulation. These articulatory terms are determined by the location of the vowel in the mouth (i.e., the position of the lips and tongue). The articulatory term CENTRAL in this study refers to the position of [a] between the palatal and velar points of articulation.

E. Length. A sound may be prolonged or it may not. Length is indicated by +LONG if the sound is prolonged (doubled or long) and by -LONG if the sound is not prolonged (single or short).

The five distinctive features discussed above—voicing, nasality, point of articulation, manner of articulation, and length—have been chosen specifically because they are the most significant in the changes from Latin to Modern Castilian. Some features may be more important than others at certain synchronic stages (e.g., length is a significant factor influencing developments from Classical Latin to Vulgar Latin) and less important at other stages (e.g., length is distinctive only for [r:] and [r] in Modern Castilian), but the use of this core of five features throughout the study adds clarity and unity to the exposition. They correspond to those listed by Alarcos Llorach as distinctive for Modern
This correspondence is to be expected, since Modern Castilian is the result, the outgrowth, of the various changes which have shaped the evolution of the language.

It is very important to notice that when changes take place, they usually involve modification of one or more distinctive features of a phoneme. In accounts of changes, we accordingly identify the distinctive features of phonemes and allophones, for through their modification sound changes take place.

This study concentrates on consonantal changes, which are reflected in the five distinctive features, as described below.

A. Changes in voicing. A change may occur in glottal articulation: voiced sounds may be devoiced, voiceless sounds may become voiced.

B. Changes in nasality. A change may take place in the position of the velum: nasal sounds may become denasalized, non-nasals may become nasals.

C. Changes in point of articulation. Various changes, such as palatalization, may occur.

D. Changes in manner of articulation. Various changes, such as fricativization of stops, may occur.

E. Changes in length. Shortening or lengthening may occur.

Certain other changes, such as loss, may occur.

Changes also take place in the characteristic features of vowels. Changes relating to vowels in this study involve 1) manner of articulation:
the degree of vowel opening may change, and thus open vowels may become more closed or closed vowels more open; 2) length: some of the vowels in the word examples undergo shortening.

Loss also occurs in syncope and in some forms of the elimination of hiatus.

In dealing with the changes in both consonants and vowels, the same distinctive features are used in order to bring out the relationships between the changing sounds as clearly as possible. Our ability to follow the articulatory movements is sometimes hindered by the descriptive terminology usually employed, as is shown by the fact that [i], traditionally described as a high front oral vowel, and [j], traditionally described as a voiced palatal slit fricative, have much more in common than the terms seem to indicate. As described in this investigation, their relationship can be seen more clearly, for [i] is specified as +VCD, -NSL, +HIGH PAL, +VWL, and -LONG, while [j] is described as +VCD, -NSL, +HIGH PAL, +SCN, and -LONG. Redundant features (e.g., voicing in vowels, resonants, and nasals) are allowed to remain in the descriptions, in order to facilitate the comparison of various sounds and to make it easy for the reader to follow the evolution of sounds in the consonant combinations as the combination develops. All features used in these descriptions are distinctive, i.e., phonemic.

1.5.0 Charts. 1.5.1 List of distinctive features. The five distinctive features discussed in the preceding section are listed below for the Latin and Castilian sounds in this study.
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<td>+VCD</td>
<td>-NSL</td>
<td>MID VEL</td>
<td>VWL</td>
<td>-LONG</td>
</tr>
<tr>
<td>u</td>
<td>+VCD</td>
<td>-NSL</td>
<td>HIGH VEL</td>
<td>VWL</td>
<td>-LONG</td>
</tr>
<tr>
<td>u:</td>
<td>+VCD</td>
<td>-NSL</td>
<td>HIGH VEL</td>
<td>VWL</td>
<td>+LONG</td>
</tr>
</tbody>
</table>
1.5.2. **Articulatory chart.** The arrangement of the articulatory chart below allows all the sounds in Latin and Castilian to be categorized in much the same way as they were described by using the distinctive articulatory features in the preceding section.

On the left-hand side of the chart, the sounds are divided into the general categories "continuants" and "obstruents" (interrupted sounds). The obstruents are the stops and the affricates. All the other sounds are continuants.

On the left-hand side of the chart, the sounds are further divided into vowels, semiconsonants, resonants, and consonants.

In each cell on the chart, the voiceless sound is on the left, and the voiced sound is on the right.

The binary opposition nasal vs. non-nasal is included under the manner of articulation, under the heading "nasals."

Across the top of the chart, the points of articulation are shown. The sounds are listed from left to right in the order of their production from the front of the mouth to the back of the mouth, to show their point of production in relation to one another.

Down the left-hand side of the chart, the manners of articulation are listed. The categories (stops, affricates, etc.) are listed on the chart so that, going from the top of the chart to the bottom, they range from the sounds for which the mouth is most closed (the stops) to the sounds for which the mouth is most open (the vowels). By saying "for
<table>
<thead>
<tr>
<th>Obstruents</th>
<th>Consonants</th>
<th>Bilabial</th>
<th>Labiodental</th>
<th>Interdental</th>
<th>Dental</th>
<th>Premaxillary</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td></td>
<td>$p, b$</td>
<td>$t$</td>
<td>$d$</td>
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<td></td>
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<tr>
<td>Affricates</td>
<td></td>
<td>$\phi$</td>
<td>$\beta$</td>
<td>$\theta$</td>
<td>$\gamma$</td>
<td>$s$, $\phi$</td>
<td>$\zeta$</td>
<td>$\eta$</td>
<td>$\eta$</td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td></td>
<td>$\phi$</td>
<td>$\beta$</td>
<td>$\theta$</td>
<td>$\gamma$</td>
<td>$s$, $\phi$</td>
<td>$\zeta$</td>
<td>$\eta$</td>
<td>$\eta$</td>
<td></td>
</tr>
<tr>
<td>Nasals</td>
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<td>$m$</td>
<td>$n$</td>
<td>$\eta$</td>
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<td></td>
<td></td>
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<tr>
<td>Laterals</td>
<td></td>
<td>$l$</td>
<td>$l$</td>
<td>$\lambda$</td>
<td>$\lambda$</td>
<td>$\lambda$</td>
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<tr>
<td>Vibrants</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>$r$</td>
</tr>
<tr>
<td>Resonants</td>
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<tr>
<td>Consonants</td>
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<tr>
<td>Semiconsonants</td>
<td></td>
<td>(w)</td>
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<tr>
<td>Vowels</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$a$</td>
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<tr>
<td>High (Close)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$u$</td>
</tr>
<tr>
<td>(Close)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$e$</td>
</tr>
<tr>
<td>Mid (Open)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$\xi$</td>
</tr>
<tr>
<td>Low (Open)</td>
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<td></td>
</tr>
</tbody>
</table>
which the mouth is most closed, "we mean "for which there is complete
closure at some point in the vocal tract." By saying "for which the
mouth is most open," we mean "for which the air passes completely
unimpeded through the vocal tract."

With the exception of the long variants, all sounds involved in
this work are listed on the chart. For those sounds having phonemically
long and short variants, see the list of distinctive features in 1.5.1.

Because this is an articulatory study concerning mainly conso-
nants, a chart based principally on place of articulation, manner of
articulation, and the opposition voiced/voiceless is adequate. An
articulatory chart is more suitable for this study than a distinctive fea-
ture matrix because:

A. It conforms to the physical reality of the production of the
sounds by showing the point and manner of articulation.
(The chart has been arranged as described above so that the
sounds are portrayed in approximately the position in which
they are actually produced in the mouth.)

B. It allows both vowels and consonants to be displayed on the
same chart and reflects the use of the same criteria and
terminology for both vowels and consonants.

C. It is flexible enough to allow all the sounds involved in the
history of Castilian to be shown on the same chart.

An articulatory chart has been chosen not only because this is an
articulatory study, but also because in a distinctive feature matrix the sounds do not appear in the positions in which they are produced in the mouth.\textsuperscript{10}

1.6.0. **Four major classes of consonant combinations.**
Depending on whether sounds have consonantal or vocalic qualities, they can be divided into four major sets: consonants, semiconsonants, resonants, and vowels.\textsuperscript{11} The following list helps to clarify the basis for these four major sets. (+ in the list means "having the quality"; - indicates "not having the quality."\textsuperscript{12})

<table>
<thead>
<tr>
<th></th>
<th>vocalic</th>
<th>consonantal</th>
</tr>
</thead>
<tbody>
<tr>
<td>consonants</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>semiconsonants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>resonants</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>vowels</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

The four major sets correspond to the amount of closure (the degree of consonantal quality), varying from those for which the mouth is most closed (consonants) to those for which the mouth is most open (vowels).\textsuperscript{13} The organization of the articulatory chart (1.5.2.) reflects this phenomenon.

As pointed out in 1.2.3., resonants and semiconsonants enter into combinations with consonants and may be considered as types of consonants. This study focuses on consonantal developments. If the set "vowels" is deleted from the list above, three major sets remain. The
members of those three sets function as onsets and as codas, and they combine to form interludes, or medial consonant combinations.

The combinations examined in this study fall into four classes, which are based on the three remaining major sets:

1. Class 1: combinations ending in a resonant
2. Class 2: combinations ending in a semiconsonant
3. Class 3: combinations beginning with [l], [r], [m], [n], or [s], and not ending with a resonant or semiconsonant
4. Class 4: combinations not belonging to any of the preceding classes.

The codas and interludes in the combinations in Classes 3 and 4 almost all belong to the major set "consonants." (These codas and interludes are not vowels, a few are resonants, none are semiconsonants, and most are consonants.)

In this dissertation the combinations are placed into one of the four classes above according to what sound ends the combination in Latin.
CHAPTER 2

THE FORMATION AND RESOLUTION OF UNACCEPTABLE MEDIAL CONSONANT COMBINATIONS

2.1.0. Introduction. Many medial consonant combinations, both primary and secondary, are compatible to the phonological system of the language and remain without change. Such combinations are acceptable and stable. Other combinations, however, do not conform to the phonological system and are unacceptable. They are unstable and will change or simplify to conform to the sound patterns of the language.

Each of the following four chapters deals with one of the classes of combinations. Combinations that remain unchanged are mentioned, but this study focuses on the discussion and illustration of medial combinations that change. This chapter serves as a preface for the following chapters by specifying the processes by which unacceptable combinations arise and by discussing the factors involved in their resolution.

2.2.0. Syncope and the elimination of hiatus. The four classes consist of combinations that are primary consonant groups or that arise through one of two major processes: 1) the elimination of unstressed vowels (syncope); 2) the elimination of hiatus. Unacceptable
combinations in Classes 1, 3, and 4 result from syncope. Those in Class 2 are due to the elimination of hiatus.

2.2.1. **Definition of syncope.** Syncope is the loss of an unstressed interconsonantal vowel and results in the juxtaposition of the consonants that formerly preceded and followed the vowel. Whether or not syncope occurs seems to depend on several factors, which have not yet been clarified. Since syncope juxtaposes consonants, it frequently gives rise to an unacceptable combination that is then resolved. Through the resolution, the combination often conforms to the major syllabic pattern: \( CV-CV \). Syncope involves the loss of a syllabic nucleus. The elimination of hiatus involves a related change: the conversion of a syllabic nucleus to a semiconsonant. In both cases a vowel, and thus a syllable, is eliminated.

2.2.2. **Definition of hiatus.** Hiatus is the immediate succession of two vowels, each of which is in a separate syllable. In the transition from Latin to Vulgar Latin, when hiatus is eliminated, in most cases the first of two successive vowels is changed from a syllabic nucleus to a syllabic margin (i.e., to a semiconsonant). The elimination of hiatus results in the juxtaposition of a semiconsonant and a consonant, and consequently gives rise to an unacceptable combination that is then resolved. Through the resolution, this kind of combination also conforms to the major pattern of \( CV-CV \).
The elimination of hiatus is a process which recurs in the course of the development of Latin from Old Latin to Late Vulgar Latin. The same may be said of syncope, which gains momentum in Late Vulgar Latin and extends, in a greater or lesser degree, to all regions of the Roman Empire.

2.3.0. **Syllabic patterns and economy.** After unacceptable combinations arise through syncope or through the elimination of hiatus, they are resolved so as to become compatible with the phonological system.

The compatibility or incompatibility of a combination depends on the nature of the phonological system, which changes from one stage of the language to another. When the system changes, what is compatible with its patterns also changes. Whether or not a medial combination is compatible depends to a certain extent on what consonants are allowed as onsets and codas in the syllabic structure at that synchronic stage of the language.

2.3.1. **Definition of resolution.** Medial consonant combinations have this syllabic structure: coda(s) + onset(s), i.e., syllable-final consonant(s) followed by syllable-initial consonant(s), as in [kons-trwír]. To "resolve" a medial consonant combination usually means to analyze the combination into recurrent onsets and codas. By extension, the term "resolve" herein means to change the combination in such a way
as to cause its onset and coda to conform to the recurrent combinations of onsets and codas of the phonological system. To "resolve," therefore, also means to make compatible.

A "resolution," for our purposes, is a change that is brought about by processes such as epenthesis, metathesis, or palatalization, to facilitate the pronunciation of a combination. In a resolution, the articulatory movements of a combination are altered to make them more compatible with the pronunciation habits of the speakers. Two factors are involved: 1) syllabic structure and 2) economy.

Conformity to a prevalent syllabic structure is an important aspect of compatibility. Although there are numerous types of syllabic structure in Classical Latin, the most frequently occurring types are 1) V-; 2) CV-; and 3) CC(C)V-. Various types of syllabic structure are also permissible in the development of Castilian, but the general trend is for more and more syllables to conform to the pattern of CV'-CV, which becomes dominant. Throughout its history, Castilian has reduced the occurrence of combinations resulting from syncope and hiatus. Due to the resolution of such combinations, Castilian does not have syllables in which the nucleus (the vowel) is followed by more than two consonants in the same syllable. Syllables having two consonants after the nucleus occur only in medial position, e.g., [konstrwír]. In Castilian bisyllabic and trisyllabic paroxytones are especially predominant. Proparoxytones are found, but are mostly learned words.
In general, in the next four chapters the same processes which are used to resolve the medial combinations, e.g., assimilation and metathesis, will recur in various chapters; however, all processes are not used in the resolution of every type of combination (for example, epenthesis occurs only in Class 2). Each class differs in nature from the others; consequently, the processes used to resolve each class also vary somewhat. Due to these differences, the resolutions for each class will be discussed in the conspectus for the chapter devoted to that class, then the resolutions will be re-examined as a whole in the concluding chapter to ascertain general trends.

2.3.2. **Definition of economy.** Some attention has been given to conformity to syllabic structure, because it is essential for the definition of resolution and is important for an understanding of economy. To bring about economy, resolutions must lead to patterns which are acceptable to the phonological system. When a resolution occurs, the general trend is towards economy of effort. In this context, "economy" is the tendency of the changes in a language to follow the law of least effort, commensurate with the clarity of pronunciation needed for accurate communication. 13

The major emphasis, hereafter, is on economy. After the syllabic structure is illustrated in each section dealing with a combination, the mouth diagrams and the commentaries serve to corroborate the
statement of economy which concludes the section. The findings on economy are re-examined as a whole in the concluding chapter.
CHAPTER 3

CLASS ONE: COMBINATIONS ENDING IN A RESONANT IN LATIN

3.1.0. **Conspectus.** Medial consonant combinations ending in a resonant in Latin can be divided into two major groups: combinations ending in [r] and those ending in [l].

The first is subdivided into stop + [r] combinations and continuant + [r] combinations. Stop + [r] combinations develop in two ways: through assimilation of the stop or through vocalization. Assimilation of the stop is the more usual development. Occasionally, if the combination consists of a voiced stop + [r], the voiced stop vocalizes. Although a few continuant + [r] combinations remain unchanged, most such combinations are usually secondary combinations that are resolved through epenthesis.

The second major group is, similarly, subdivided into stop + [l] combinations and continuant + [l] combinations. The former are resolved through assimilation of the stop, through palatalization, or through metathesis. There is only one continuant + [l] combination, [ml]. It is resolved through metathesis, palatalization, or epenthesis.
By reviewing the preceding paragraphs, one can see that consonant + resonant combinations are of several kinds and are resolved through various processes: assimilation of the stop, vocalization, palatalization, metathesis, and epenthesis. All but the last two of these are types of assimilation. Sections 3.1.1. and 3.1.2. are detailed discussions of the two major groups outlined above.

[r] and [l] are +vocalic and +consonantal. For their articulations the mouth is more open than it is for any other consonants, except for yod and wau. In the articulations of [r] and [l], the airstream is modified as it passes through the mouth: for [r] it is released with vibration of the tip of the tongue; for [l] it is released along the sides of the tongue. The degree of opening is less than it is for vowels, but for both resonants and vowels the shape that the tongue assumes will determine which sound is produced.

In similar environments, combinations ending in [r] and those ending in [l] often develop in the same way, because [r] and [l] are resonants and share many features. Combinations ending in [r] and those ending in [l] change in the same way in combinations that develop through the assimilation of a stop, through epenthesis, and through metathesis. Although assimilation of the stop can occur when a stop is followed by either [r] or [l], one alternate development, vocalization, occurs only when a voiced stop is followed by [r], and palatalization occurs only when a stop (which may be voiced or voiceless) is followed
by [l]. These last two sets of combinations develop in different ways because of the differences in the articulations of [r] and [l], as explained at the end of 3.1.1.A.2. and at the end of 3.1.2.A.2.

3.1.1.A. Resolutions for stop + [r] combinations. 1. Assimilation of the stop. All medial stop + [r] combinations occur in this sequence: -V-stop (voiced or voiceless)+[r]+V-. The stop is between a vowel and a resonant, and the stop develops as if it were intervocalic: if the stop is voiceless, it becomes voiced; when the stop is voiced, it changes manner of articulation and becomes a fricative. \(^2\) The [r] remains unchanged.

Since resonants are +vocalic and +consonantal, [r] is to a certain extent vocalic in nature. As shown in 1.5.2. and 1.6.0., the mouth is most open for the articulation of vowels and is more widely open for [r] than it is for any of the other consonants except yod and wau. Both vowels and resonants are voiced. Since vowels and resonants are similar in degree of opening and voicing, a stop preceded by a vowel and followed by a resonant is in much the same environment as a stop preceded by a vowel and followed by a vowel. The development of the stop is the same in both instances.

The stop preceded by a vowel and followed by a resonant is not very tense and tends to assimilate to the sounds around it by becoming more lax, that is, by voicing (when the stop is voiceless) and by the mouth opening more (when the stop is voiced), which results in
fricativization. The [r] is these combinations remains unchanged.

Examples of assimilation of the stop are (with a voiceless stop) [pá-trem] > [pá-dre] > [pá-³re] and (with a voiced stop) quadrum [kwá-drum] > cuadro [kwá- œro]. The development of [pá-trem] is representative of this category and is illustrated in 3.2.1.

3.1.1.A.2. **Vocalization.** Occasionally, in the sequence above, a voiced stop undergoes vocalization—a development not found in inter-vocalic position—and is then lost through complete assimilation.

In assimilation of the stop (3.1.1.A.1.), the stop + [r] combination remains syllable-initial throughout the development; but in vocalization (this section), the stop becomes a syllable-final semiconsonant, and the [r] begins the syllable following the semiconsonant. The change for vocalization is from: -V-voiced stop+[r]+V- to: -V+semiconsonant-[r]+V-.

The stop preceded by a vowel and followed by a resonant tends to assimilate to the sounds around it by becoming more lax. Because the mouth is widely open for the vowel preceding the voiced stop and is almost as widely open for the [r] following the voiced stop as it is for a semiconsonant, in this environment the mouth tends to open more than it usually does in the articulation of the voiced stop. A semiconsonant results and is realized as a glide after the first vowel in this sequence. The [r] remains unchanged.

An example of vocalization is cathedra [ka-te³-dra] > cadeira [ka-dej-ra] > cadera [ka- giáo-ra].
3.1.1.B. **Resolution of continuant + [r] combinations.** A few medial secondary continuant + [r] combinations remain unchanged, but almost all are resolved through the intrusion of an epenthetic glide or through simple metathesis. For example, epenthesis occurs with secondary [lr], as in [sa-lir hē-be-o] > [sa-līr hē] > [sal-rē] > [sal-drē], and with secondary [nr], as in [in-ge-ne-rā'-re] > [in-gen-rār] > engendrar [en-xen-drār]. Metathesis occurs within the same combinations: with secondary [lr], as in [ko-lo-rā'-re] > [kol-rār] > [kor-lār], and with secondary [nr], as in [ge-ne-rum] > [jēn-ro] > yerno [jēr-no].

Although such alternate developments occur in the same environments, continuant + [r] combinations usually undergo either epenthesis or metathesis, but not both. The characteristics of those undergoing metathesis are discussed in 3.1.1.B.2.

All the combinations in this section involve a continuant + a resonant (in other words, a continuant + a continuant), but one must be careful to distinguish them from other continuant + continuant combinations in which the second continuant is not a resonant. The other combinations undergo a different development: instead of epenthesis, they undergo either dissimilation or dissimilation followed by epenthesis. Such combinations are examined in 5.1.1.B.3.

3.1.1.B.1. **Epenthesis.** Most secondary combinations consisting of a continuant followed by [r] are resolved through epenthesis. Such
combinations occur in this sequence: -V+continuant-[r]+V-. When the continuant is [l], [m], or [n] and is followed by a syllable-initial [r], the combination generally develops a glide. Such a glide is always a voiced stop. For example, [hú-me-rum] > [hó-m-ro] > hombro [óm-bro]. The development of [hú-me-rum] is representative of this category and is illustrated in 3.2.3.

3.1.1.B.2 Metathesis. A few secondary continuant + [r] combinations are resolved through metathesis, notably [nr]. Like those in 3.1.1.B.1., they occur in the sequence: -V+continuant-[r]+V-. For example, [gé-ne-rum] > [jén-ro] > yerno [jér-no]. The development of [gé-ne-rum] is illustrated in 3.2.4.

Since more than one resolution is sometimes possible for the same secondary continuant + [r] combinations, even secondary [nr] may undergo either metathesis or epenthesis. For example, [te-ne-re há-be-o] develops into [te-nér hé] and later changes into [ten-ré], then the combination [nr] is resolved through two alternate developments. Through metathesis, [ten-ré] becomes [ter-ne]; through epenthesis, [ten-ré] gives [ten-dré].

3.1.2.A. Resolutions for stop + [l] combinations. A few stop + [l] combinations undergo no change. Primary and secondary [pl], for instance, remain in a few words which may be semi-learned, such as complexum [kom-plék-sum] > complejo [kom-plé-xo]. Other stop + [l]
combinations change as discussed in the following sections.

3.1.2. A. 1. Assimilation of the stop. Stop + [l] combinations which are resolved through assimilation of the stop occur in this environment: -V+stop-[l]+V-. The stop is between a vowel and a resonant, and the stop develops as if it were intervocalic. The [l] remains unchanged.

Since resonants are +vocalic and +consonantal, [l] is to a certain extent vocalic in nature. In articulating [l], the mouth is more open than it is for any other consonants except [r], yod and wau, as can be seen from the chart in 1.5.2. Both vowels and resonants are voiced. Since vowels and resonants are similar in degree of opening and voicing, the stop preceded by a vowel and followed by a resonant is in much the same environment as a stop preceded by a vowel and followed by a vowel. The development of the stop is the same in both instances. The environment is similar to that in 3.1.1.A. 1. (viz., -V-stop+[r]+V-) and the development is the same: the stop assimilates to the sounds preceding and following it.

Examples of this resolution are [pl] » bl [β1] as in [du-plaː-re] » [do-βlaːr], which occurs with both primary and secondary [pl] and in which voicing and fricativization take place; and [bl] » bl [β1], generally, as in [fa-bu-läː-re] » [fa-blåːr] » hablar [a-β1aːr], which occurs with both primary and secondary [bl] and in which fricativization takes place.

The development in which secondary [tl] occasionally changes to
[dl] and then to [ld] is similar to the development above in that the stop voices; however, a further development, metathesis, takes place. For example, [spá-tu-lam] > [es-pád-la] > [es-pál-da].

3.1.2. A. 2. Palatalization. Most stop + [l] combinations are resolved through palatalization, but stop + [r] combinations never are. It is not the environments for stop + [l] combinations and stop + [r] combinations, but rather the differences in their articulations that determine whether or not palatalization takes place.

While [l] is dorso-alveolar, [r] is apico-alveolar. Also, [l] is produced with lateral escape of the airstream, but [r] is a vibrant. By comparing the distinctive features of [l], [r], and [λ], we can see how they are similar and how they are different:

\[
\begin{array}{ccc}
+VCD & +VCD & +VCD \\
-NSL & -NSL & -NSL \\
+(DORSO) & ALV & +(APICO) & ALV & +PAL \\
+LAT & +VIB & +LAT \\
-LONG & -LONG & -LONG \\
\end{array}
\]

It is much easier for the dorsum of the tongue to come into contact with the palate than it is for the tip of the tongue to reach back to make contact with the palate. Since [l] is dorso-alveolar, it is easier for it to become palatalized than it is for [r], which is apico-alveolar. An apico-palatal is not likely to develop.

Palatalization of combinations consisting of a stop followed by an
occurs in the following environments:

a) -C-stop+[l]+V-
b) -V-[k'] or [g']+[l]+V-
c) -V+stop-[l]+V-

Each of these is discussed in the following paragraphs.

Many of the combinations which palatalize are found in the first environment above, for example [ám-plum] and [trún-ku-lum] > [trón-k'lu]. A syllable-initial voiceless stop + [l] combination, in the middle of a word and preceded by another consonant, is similar to a syllable-initial stop + [l] combination at the beginning of a word, in that the stop in both combinations is very tense. Such a combination, therefore, is likely to palatalize just as a word-initial stop + [l] combination does. A syllable-initial voiceless stop + [l] combination at the beginning of a word frequently palatalizes in several of the Romance Languages and dialects. In Latin the [l] was apparently a tense dorso-alveolar sound. The tenseness may have led to a prolongation of the [l], which retracted slightly and became more palatal in nature and then developed into [ʎ]. The syllable-initial voiceless stop + [l] combination in the middle of a word may have developed to [tʃ] in the same way. The stop in both the word-initial and the word-medial combination assimilates to the [l] and palatalizes.

For instance, in [trún-ku-lum] > [trón-k'lu] > [trón-tʃo] the [k'], preceded by a consonant, is very tense. Because of this
tenseness and because the point of articulation of the [k'] is palatal, it readily palatalizes when it comes into contact with the [l] as a result of syncope.

Some combinations of a stop + [l] which palatalize occur in the second environment listed above, for example [ˈ-ku-λum] > [ˈ-klu]. The point of articulation of the stop ([k'] or [g']) is palatal, and the [l] readily palatalizes in contact with it, as in [ˈ-ku-λum] > [ˈ-klu] > ojo [ˈ-dʒo] or [ˈ-ʒo] > ojo [ˈʒo].

A few combinations which palatalize are found in the third environment listed above. Metathesis is an alternate development in this same environment.

This environment is similar to that in 3.1.2.A.1. (viz., -V -voiced or voiceless stop+[l]+V-) and that in 3.1.1.A.1. (viz., -V -voiced or voiceless stop+[r]+V-) and also that in 3.1.1.A.2. (viz., -V-voiced stop +[r]+V-) but the development here is different. The first two involve assimilation of the stop, the third involves vocalization, and this development involves palatalization. The [l] in syllable-initial position is very strong, or tense. Here, in the sequence -V+stop-[l]+V-, the stop assimilates to the [l], becomes more tense, and palatalizes, as in [tri-bu-λáː-re] > [trib-λáːr] > [tri-Λáːr].

All the instances in which palatalization occurs in medial combinations ending in a resonant in Latin can be summarized as follows: the stop must be followed by [l], and, although it may occur in any one
of the three environments listed towards the beginning of this section, the same change occurs in all three: the stop assimilates to the [l] and becomes palatal due to the nature of the articulation of [l].

The development of [ám-plum] illustrates the palatalization occurring in the first environment in this section and is representative of this category. See 3.2.2.

3.1.2.A.3. Metathesis. Some secondary stop + [l] combinations are resolved by simple metathesis. They occur in the environment -V+stop-[l]+V-. Palatalization is an alternate development in this same environment as discussed at the end of the preceding section. This environment is similar to that in 3.1.1.B.2. (viz., -V+continuant-[r]+V-; both are -V+C-R+V-) and the development is the same: the resonant and the consonant preceding it metathesize.

Examples of this development are [bl] in [si-bi-lá'-re] > [sib-lár] > [sil-bár], [tl] in [spá-tu-lam] > [spá-t-la] > [es-pá-d-la] > [es-pál-da], and [dl] in [mó-du-lem] > [mód-le] > [mól-de].

The development of [gé-ne-rum], illustrated in 3.2.4., is representative of metathesis in both 3.1.1.B.2. and this section.

At times, metathesis may occur and then be followed by another process, as in the resolution of secondary [tl] in [mu-ti-lá'-re] > [mul-tár] > mochar [mo-tʃár], in which metathesis is followed by palatalization.

The only combination consisting of a continuant followed by [l] that is resolved through epenthesis is secondary [ml]. It occurs in the environment -V+[m]-[l]+V-, which is similar to that in 3.1.1.B.1. (viz., -V+[l], [m], or [n]-[r]+V-; both are -V+continuant-R+V-) and the development is the same: a glide, which is always a voiced stop, develops between the continuant and the resonant.

For example, [tre-mu-lá:-re] > [trem-lár] > [tem-blár].

The development of [hú-me-rum], illustrated in 3.2.3., is representative of the epenthesis in both 3.1.1.B.1. and this section.

3.1.2. B.2. Palatalization. Combinations consisting of two primary continuants followed by [l] are resolved through palatalization.

The environment is: primary continuant-[f]+[l]+V-. This environment is like the first one discussed in 3.1.2.A.2. (-C-stop+[l]+V-; both environments are -C-voiceless C+[l]+V-) and the development is similar; palatalization of the voiceless consonant and the [l] takes place (in 3.1.2.A.2. the consonant preceding the stop + [l] remains unchanged, but here the consonant preceding the [f] + [l] is lost).


The development of [am-plum], illustrated in 3.2.2., is representative of the palatalizations occurring in 3.1.2.A.2. and is also
3.2.1. Primary and secondary [tr] → [dr] → [ðr], generally.

[pá-trem] → [pá-dre] → padre [pá-ðre]

C>V-CRVC  C>V-CRV  C>V-CRV
representative of the palatalization in this section.

3.2.0. Illustrations and commentaries.

3.2.1. The development of the medial [tr] in [pa'-trem] > [pa'-dre] > [pa'-dre] is representative of the development of stop + [r] combinations.

In this development, first the voiceless stop [t] voices, then the resultant voiced stop [d] becomes the voiced fricative [ʒ]. The [r] remains unchanged.

The stop [t] is between a vowel and a resonant. It undergoes the development usual for an intervocalic stop, in that when the stop is voiceless, it becomes voiced; when the stop is voiced, it becomes a fricative.

The usual development of a single intervocalic stop can be seen in [me'-tum] > miedo [mjé'-ʒo]. The intervocalic [t] undergoes this change: [t] > [d] > [ʒ]. In distinctive features, the change is as follows:

\[
\begin{array}{cccccccc}
\text{[e]} & - & \text{[t]} & \text{[u]} & \text{[e]} & - & \text{[d]} & \text{[o]} \\
+VCD & -VCD & +VCD & +VCD & +VCD & +VCD \\
-NSL & -NSL & -NSL & -NSL & -NSL & -NSL \\
+OPEN & +PAL & +HIGH & +OPEN & +DEN & +CLOSE \\
MID & VEL & MID & VEL & MID & VEL \\
PAL & & PAL & & & \\
+VWL & +STP & +VWL & +VWL & +STP & +VWL \\
-LONG & -LONG & -LONG & -LONG & -LONG & -LONG
\end{array}
\]
The same change occurs in [pá-rem] > [pá-dre] > [pá-ðre], as can be seen in distinctive features below:

<table>
<thead>
<tr>
<th></th>
<th>[a]</th>
<th>-</th>
<th>[t]</th>
<th>[r]</th>
<th>[a]</th>
<th>-</th>
<th>[d]</th>
<th>[r]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>-VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+LOW</td>
<td>+DEN</td>
<td>+ALV</td>
<td>+LOW</td>
<td>+DEN</td>
<td>+ALV</td>
<td>+LOW</td>
<td>+DEN</td>
<td>+ALV</td>
</tr>
<tr>
<td></td>
<td>CENTRAL</td>
<td></td>
<td></td>
<td>CENTRAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+STP</td>
<td>+VIB</td>
<td>+VWL</td>
<td>+STP</td>
<td>+VIB</td>
<td>+VWL</td>
<td>+STP</td>
<td>+VIB</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

In articulatory terms, the changes occur as described in the following paragraphs.

Throughout the development of this word, the velum remains closed in the sequence discussed. In the sequence [á-tr] of [pá-rem], the tongue begins low in the mouth and the vocal cords vibrate for the production of the [a]. Then the vocal cords cease vibrating, the tip of the tongue moves forward to make complete closure behind the upper
teeth in the front of the mouth, and [t] is produced. For the articulation of the [r], the vocal cords vibrate and the tongue tip quickly strikes the alveolar ridge once as the airstream passes through. The vocal cords vibrate for the [a], cease to vibrate while the [t] is articulated, then vibrate again for the [r].

In the sequence [a-dr] in [pa-dre], the tongue begins low in the mouth and the vocal cords vibrate to produce the [a]. The vocal cords continue vibrating, and the tip of the tongue moves forward to make complete closure behind the upper teeth in the front of the mouth, thus producing [d], the voiced counterpart of [t]. Then the tongue tip quickly strikes the alveolar ridge as the airstream passes through, to articulate the [r]. The vocal cords vibrate for the [a], continue vibrating while [d] is articulated, and continue vibrating for the [r]. Because of its environment (its position between the two voiced sounds, [a] and [r]) the [t] in [pa-trem] assimilates to the sounds by voicing to [d] in [pa-dre].

In the sequence [a-mighty] of [pa-mighty], the tongue begins low in the mouth and the vocal cords vibrate to produce [a]. For the articulation of the [mighty], the tip of the tongue moves forward and is placed lightly against the back or edges of the upper front teeth while the vocal cords continue vibrating. The airstream passes through the slit formed by the tongue and the teeth. The [mighty] may be interdental, because the tongue can touch both the upper and lower teeth at the same time. Finally,
to produce the [r], the tongue tip moves back and quickly strikes the alveolar ridge as the airstream passes through and as the vocal cords continue to vibrate.

In summary of the changes involved in [pá'-trem] > [pá'-dre] > [pá'-ðre], the sequence begins with [a], the (voiced) vowel for which the mouth is most widely open. The voiceless stop [t] assimilates to the vowel preceding it and the (voiced) resonant [r] following it, voicing to [d]. The voiced stop [d] assimilates further to the sounds preceding and following it, sounds for which the mouth is widely open, by becoming the fricative [ð], a sound for which the mouth is more open (more relaxed) than it is for a stop. The sequence ends with [r], which has remained unchanged.

Economy of effort can be seen in the movements of the mouth and in the action of the vocal cords in these changes. In the movements of the mouth, in the sequence [á'-tr], the mouth begins very wide open for the [a], closes completely for the stop, then open widely for the [r], but in the sequence [á'-ðr], the movements have changed so that the mouth begins very wide open for the [a], relaxes and closes partially to produce a fricative, then opens widely for the [r].

By saying that the mouth opens widely for [r], we mean to convey that the vocal tract is not completely blocked in the production of the [r]. The tongue touches the alveolar ridge and moves away quickly. By saying that it closes for the stop, we mean that there is occlusion
(or closure) at a certain point in the vocal tract. When we say that the mouth closes partially to produce a fricative, we mean that the passage of the air through the vocal tract is impeded due to the partial closure at some point in the vocal tract. Cf. 1.5.2. and 1.6.0. In the action of the vocal cords, in [a'-tr] the vocal cords vibrate for the vowel [a], cease to vibrate for the voiceless stop [t], then vibrate again for the resonant [r], but in [a'-θr] the vocal cords vibrate continuously.


In this development, the medial [pl] palatalizes to [tʃ] when preceded by a consonant; then the [m] preceding the [pl] assimilates to the [tʃ] in point of articulation and becomes [ŋ].

Palatalization, the usual development of a syllable-initial voiceless stop + [l] at the beginning of a word, can be seen in [plo-rá:-re] llorar [λo-rá'r]. In distinctive features, the change is as follows:

\[
\begin{array}{cccccc}
\text{[p]} & \text{[l]} & \text{[o]} & \text{[λ]} & \text{[o]} \\
-VCD & +VCD & +VCD & +VCD & +VCD \\
-NSL & -NSL & -NSL & -NSL & -NSL \\
+BI LAB & +ALV & +MID VEL & +PAL & +MID VEL \\
+STP & +LAT & +VWL & +LAT & +VWL \\
-LONG & -LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

Palatalization also occurs in syllable-initial [pl] in the middle of a word, as in [ám-plum] > ancho [a'θ-tʃo]. In distinctive features
3.2.2. Primary and secondary [pl] > Castilian ch [tʃ] when preceded by a consonant.

[ˈam-plum] > [ˈam-plu] > ancho [ˈan-tʃo]

VC-CRVC  VC-CRV  VC-CV
the change is as follows:

\[
\begin{array}{cccc}
+VCD & -VCD & +VCD & +VCD \\
+NSL & -NSL & -NSL & -NSL \\
+BILAB & +BILAB & +ALV & +HIGH VEL \\
+CNT & +STP & +LAT & +VWL \\
-LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

\[
\begin{array}{cccc}
[p] & [\text{o}] \\
+VCD & -VCD & +VCD \\
+NSL & +NSL & -NSL \\
+PAL & +PAL & +MID VEL \\
+CNT & +AFR & +VWL \\
-LONG & -LONG & -LONG \\
\end{array}
\]

Although word-initial [pl] results in [λ] and word-medial [pl] preceded by a consonant results in [tʃ], palatalization occurs in both instances.

In articulatory movements, the change involving [pl] in [ˈam-plum] ancho [ˈaʃəntʃo] occurs as described in the following paragraphs.

Beginning the sequence [m-plu] of [ˈam-plum], the lips are closed, the velum opens and the airstream passes through to resonate in the nasal cavity as well as the oral cavity while the vocal cords vibrate, thus producing [m]. For the articulation of [pl], the lips remain closed, the vocal cords cease to vibrate, and the velum is closed. The airstream passing into the oral cavity is held back by the closed lips and is then released abruptly without aspiration. Next, in the production of [l], the vocal cords vibrate, the airstream escapes down one or both sides of the tongue, and the tip of the tongue moves up so that it touches
the lower front teeth. Finally, as the [u] is articulated, the vocal cords continue to vibrate, the lips round, and the dorsum is in close proximity to the velum. In this sequence the vocal cords vibrate continuously, except for the articulation of the voiceless stop [p]; the [m] and the [p] have the same point of articulation; and the velum is closed for the production of all the sounds in the sequence, except for the nasal continuant [m].

In the sequence [n-tʃ o], the [n] is produced by opening the velum so that the airstream passes through to resonate in the nasal cavity as well as in the oral cavity, while the vocal cords vibrate and the back of the tongue rises and presses against the palate, making extensive contact with it. In the articulation of [tʃ], the vocal cords cease to vibrate, and the blade and tip of the tongue rise and touch the alveolar ridge and the front part of the palate. The sides of the dorsum touch the sides of the palate and the upper back teeth, leaving an opening in the middle. The airstream is momentarily interrupted, as it is for a stop, by the blade of the tongue contacting the front palate. The blade of the tongue then quickly releases the contact, forming a round opening between itself and the front palate. The airstream passes through this groove, as it does in a fricative. The sound [tʃ] is a combination of a stop and a fricative, pronounced almost simultaneously. Finally, as [o] is produced, the vocal cords vibrate, the lips round, and the dorsum is raised (but it is not raised as high as it was for [u]).
sequence, the vocal cords vibrate continuously, except for the production of [tʃ]; the [ŋ] and the [tʃ] have the same point of articulation; and the velum is closed for the production of all sounds in the sequence, except for the nasal continuant [ŋ].

In the transition from [əm-plum] to [ən-tʃo], [m-pl] changes to [n-tʃ]. The intermediate steps were probably those discussed below:

First, a nasal usually assimilates to the consonant following it: [m] and [p] have the same point of articulation in [m-pl], while [ŋ] and [tʃ] have the same point of articulation in [ŋ-tʃ]. Second, [pl], a stop + a continuant, is replaced by [tʃ], an affricate (a combination of a stop + a fricative pronounced almost simultaneously). [pl] and [tʃ] share some distinctive features as can be seen in this comparison:

<table>
<thead>
<tr>
<th></th>
<th>[p]</th>
<th>[l]</th>
<th>[tʃ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-VCD</td>
<td>+VCD</td>
<td>-VCD</td>
<td></td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td></td>
</tr>
<tr>
<td>+BILAB</td>
<td>+ALV</td>
<td>+PAL</td>
<td></td>
</tr>
<tr>
<td>+STP</td>
<td>+CNT</td>
<td>+AFR</td>
<td></td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td></td>
</tr>
</tbody>
</table>

The resemblance between [pl] and [tʃ] becomes even clearer if one compares [p] and [l] with [t] and [ʃ].

<table>
<thead>
<tr>
<th>[p]</th>
<th>[l]</th>
<th>[t]</th>
<th>[ʃ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-VCD</td>
<td>+VCD</td>
<td>-VCD</td>
<td>-VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+BILAB</td>
<td>+ALV</td>
<td>+DEN</td>
<td>+PAL</td>
</tr>
<tr>
<td>+STP</td>
<td>+CNT</td>
<td>+STP</td>
<td>+FRIC</td>
</tr>
</tbody>
</table>
| -LONG | -LONG | -LONG | -LONG | (continuant)
In summary of the changes involved in \[\text{\`am-plum} \Rightarrow \text{\`an-t} \text{\`f} \text{o}\],
the medial combination, consisting of a voiceless consonant + [l] and
preceded by a consonant, palatalizes. Since the preceding consonant
here is a nasal, it assimilates to the palatal point of articulation.

Economy of effort is introduced through these changes since the
simplification of \[m-pl\] to \[n-tf\] reduces the number of movements the
articulatory organs must make from three in \[m-pl\] to two in \[n-tf\].
Both [m] and [n] are nasals and require the same number of movements.
In \[p + l\] the voiceless bilabial stop is articulated and then the voiced
alveolar lateral continuant is produced. \[tf\], on the other hand, is a
single articulation, a voiceless palatal affricate. \[tf\] is a compromise,
an almost simultaneous movement which replaces \[p + l\], two con-
secutive movements. The two sequences are equivalent in other
respects, with no further economy or increase in effort. The vocal
cords vibrate continuously, except for the production of one sound, the
voiceless stop \[p\] in \[m-plu\] or the voiceless affricate \[tf\] in \[n-tf o\];
the voiceless sound occurs in the same place in both sound sequences.
In both sequences the nasal has the point of articulation of the conso-
nant following it: [m] and [p] are both bilabial in \[m-plu\]; [n] and [tf]
are both palatal in \[n-tf o\]. Finally, in both combinations the velum
is closed for the production of all sounds, except for the nasal con-
tinuant: [m] in \[m-plu\] or [n] in \[n-tf o\].
3.2.3. Secondary continuant + resonant changes to continuant + glide + resonant.

\[ \text{[hú-me-rum]} \rightarrow \text{[hó-m-ro]} \rightarrow \text{hombro [óm-bro]} \]

\[ CV^-CV-RVC \quad CV^C-RV \quad CV^C-CRV \]
3.2.3. The development of the combination [mr] in [hu-me-rum] 
> [hom-ro] > hombro [om-bro] is representative of the development 
of a continuant + [r] combination which is resolved through epenthesis.

An epenthetic glide develops as follows: first, syncope occurs; 
then, as result of syncope, two continuants--the second of which is 
a resonant--are juxtaposed; finally a homorganic bridge consonant arises between the two continuants.

In the secondary combination [mr] the vocal cords vibrate, both 
lips close, and the velum opens so that the flow of air from the lungs 
resonates in the nasal cavity as well as the oral cavity to produce [m].
For the articulation of [r], the vocal cords continue to vibrate, the 
velum closes, and the tip of the tongue quickly strikes the alveolar 
ridge as the airflow passes through.

In moving from [m] to [r], the velum has to be closed to prevent 
nasal resonance and the lips must be opened to permit the articulation 
of the alveolar vibrant [r]. If these movements do not occur simulta-
neously, a moment of complete bilabial closure without resonance--
which produces the bilabial stop [b]--will result. Thus, [mr] is said 
to develop the glide or bridge consonant [b].

In distinctive features, the change occurs as follows:
<table>
<thead>
<tr>
<th></th>
<th>[m]</th>
<th>[r]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>-</td>
<td>+VCD</td>
</tr>
<tr>
<td>+NSL</td>
<td></td>
<td>-NSL</td>
</tr>
<tr>
<td>+BILAB</td>
<td></td>
<td>+ALV</td>
</tr>
<tr>
<td>+CNT</td>
<td></td>
<td>+VIB</td>
</tr>
<tr>
<td>-LONG</td>
<td></td>
<td>-LONG</td>
</tr>
</tbody>
</table>

The stop is always between two voiced continuants and therefore is always voiced. The vocal cords vibrate continuously in both the sequence [m-r] and [m-br].

The changes involved in the development of an epenthetic glide may be summarized as follows: the articulation of two continuants juxtaposed through syncope is simplified by the intrusion of a voiced stop which acts as a bridge between the two continuants. The introduction of the glide adds no articulatory movements, but rather is the result of simultaneous movements being replaced by sequential movements. The glide facilitates the transition from one continuant to another.

3.2.4. Instead of developing an epenthetic glide some medial continuant + resonant combinations metathesize, if an acceptable combination will result from metathesis.

The secondary combination [nr] in [ge-ne-rum] -> [jeń-ro] ->
3.2.4. Secondary [nr] \(\Rightarrow\) Castilian [rn], occasionally.

\([\text{gé-ne-rum}] \Rightarrow [\text{jén-ro}] \Rightarrow \text{yerno} [\text{jér-no}]\)

\(\text{CV-CV-RVC} \quad \text{SVC-RV} \quad \text{SVR-CV}\)
yerno [je'r-no] is representative of continuant + resonant combinations that may simplify through metathesis.

The resolution takes place as follows: Syncope occurs and as a result the continuants [n] and [r] are juxtaposed; then [nr] undergoes simple metathesis to [rn].

In distinctive features, [nr] metathesizes to [rn] as follows:

\[
\begin{array}{c|c|c|c|c}
+VCD & +VCD & +VCD & +VCD \\
+NSL & -NSL & -NSL & +NSL \\
+ALV & +ALV & +ALV & +ALV \\
+CNT & +VIB & +VIB & +CNT \\
-LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

The same change, in articulatory movements, is described in the following paragraphs.

In the secondary combination [nr], the vocal cords vibrate, the velum opens, and the tip of the tongue touches against the alveolar ridge to produce [n]. For the articulation of [r], the vocal cords continue to vibrate, the velum closes, and the tip of the tongue quickly strikes the alveolar ridge as the airstream passes through.

In the sequence [rn], the articulatory movements described above are reversed. The vocal cords vibrate, the velum remains closed as it was in the articulations preceding the [r], and the tip of the tongue strikes the alveolar ridge, thus producing [r]. For the articulation of [n], the vocal cords continue to vibrate, the velum opens, and the tip
of the tongue is placed against the alveolar ridge.

The nature of the vowels preceding and following the continuant + resonant combination has no apparent effect on whether or not such a combination metathesizes, and therefore the vowels are not included in this illustration.

In summary, secondary medial [nr] changes to [rn] through simple metathesis. Metathesis introduces no additional effort, but it does introduce economy of effort because the [r] in [rn] is not trilled as heavily as the [r] in [nr]. If [nr] did not metathesize, it would tend to develop an epenthetic glide.
CHAPTER 4

CLASS TWO: MEDIAL COMBINATIONS ENDING IN A SEMICONSONANT IN LATIN

4.1.0. Conspectus. Medial consonant combinations ending in a semiconsonant in Latin can be divided into two major groups according to the sounds involved: those combinations ending in yod and those ending in wau. This chapter deals with primary yod and primary wau combinations. Secondary yod and secondary wau combinations are discussed in the next two chapters. 1

The first major group is subdivided into four categories that undergo differing developments which depend on the development of the yod and the extent of its influence on the sounds preceding and following it. After these four categories are presented, the changes occurring in primary yod combinations are studied under two broader headings: consonant + primary yod combinations that do not metathesize, and consonant + primary yod combinations that do metathesize. The effect of the yod can be seen more clearly when the changes are considered under these broader headings.

The second major group is subdivided into three categories that undergo differing developments that depend on the development of the
wau. Then changes occurring in primary wau combinations are studied under two headings: words with medial [kw], other than the wau-perfects, in which the consonant + primary wau combinations do not metathesize; and the wau-perfects, in which the consonant + primary wau combinations do metathesize.

Most consonant + primary yod combinations are resolved through assimilation or through palatalization. Metathesis may or may not precede the resolution. Some are resolved through metathesis and loss of the yod by assimilation of the yod to a preceding vowel.

Consonant + primary wau combinations are resolved through assimilation of the consonant, which is always a stop. The stop develops as if it were intervocalic. Metathesis may or may not precede the resolution.

By reviewing the preceding paragraphs, one can see that primary consonant + semiconsonant combinations are of several kinds and are resolved through various processes: assimilation, palatalization, metathesis followed by loss of yod, or the assimilation of a stop. All of these processes are types of assimilation. Sections 4.1.1. and 4.1.2. are detailed discussions of the two major groups outlined above.

Yod and wau are glide sounds that are -vocalic and -consonantal. In the articulation of yod and wau, the mouth is more open (i.e., the vocal tract is less obstructed) than it is for any other consonant sounds. The articulation of yod is very similar to that of [i], and the articulation
of wau is very similar to that of [u], but yod and wau differ from [i] and [u] in three ways. First, their articulations are of shorter duration than those of [i] and [u]. Second, for yod and wau the tongue always is in the process of going up from a lower vowel or going down to one. Third, the tongue position for yod and wau is like that for [i] and [u], but for yod and wau the tongue moves slightly higher and thus comes so close to the palate for yod or to the velum for wau that the airstream escapes with friction.

In all the combinations illustrated in this chapter, the yod arises from an [i] in hiatus, and the wau arises from a [u] in hiatus, when two vowel articulations in separate syllables in Standard Latin are reduced to a diphthong in Vulgar Latin (e.g., [ra-ti-o'-nem] \(\rightarrow\) [ra-tj'o'-ne] in 4.2.1. and [po'-tu-i:] \(\rightarrow\) [po'-twi] in 4.2.6.). This reduction introduces economy of effort, since yod and wau are shorter in duration than [i] and [u], and since the tongue forms them in gliding from one sound to another rather than forming them as separate articulations. Such a reduction, however, involves a change in vowels rather than a change in medial consonants and will, therefore, not be elaborated on in the commentaries. The development of the consonant + yod or the consonant + wau combination resulting from this reduction, on the other hand, involves changes in medial consonant combinations ending in a semi-consonant, and, is therefore discussed at length in the commentaries.
4.1.1. Yod combinations. A. Possible resolutions. With respect to the development of the yod and the extent of its influence on the sounds surrounding it, combinations involving yod may be divided into the following four categories:

1) Developments in which [tj] and [kj] palatalize and assimilate.
   For example, a) [ra-ti-o:-nem] > [ra-tjö-ne] > [ra-tsjö-ne] > [ra-tʃon] > [ra-θon]; b) [a-ki-a:-ri-um] > [a-kjä-rjo] > [a-tʃaj-jo] > [a-θe-ro]. The [k] merges with [tj]. The development of [ra-ti-o:-nem] is representative of this category and is illustrated in 4.2.1.

2) Developments in which these palatalizations occur: [lj] and [k'lj] both palatalize to [dʒ] and then velarize to [x]; [ni] and [gn] both palatalize to [ɲ]. For example,
   a) [lj] : [pá-le-am] > [pá-lja] > [pá-dʒa] > paja [pá-xa]
   b) [k'lj] : [o'-ku-lum] > [o'-klu] > [o'-d o] > ojo [o'-xo]
      (A secondary yod is involved in this development.)
   c) [nj] : [wi:-ne-a] > [wi-nja] > [bi'-na]
   d) [gn] : [lig-num] > [lɛ-po] (A secondary yod is involved.)
   The development of [wi:-ne-a] is representative of this category and is illustrated in 4.2.2.

3) Developments in which the yod remains and does not palatalize the neighboring consonant: [dj] and [gj] change to [j]; [bj] and [mj] remain. For example,
a) [dj] : [wí-de-o] > [bé-jo] > veo [bé-o]  
b) [gj] : [fú-gi-o] > [fú-jo] > huyo [ú-yo]  
c) [bj] : [rá-bi-am] > [rá-bja]  
d) [mj] : [práj-mi-um] > [pré-mjo]

The developments of [wí-de-o], [fú-gi-o], and [práj-mi-um], are representative and are illustrated in 4.2.3.A., 4.2.3.B., and 4.2.4., respectively. In developments like [wí-de-o] and [fú-gi-o], after a front vowel the yod is absorbed, but between back vowels the yod remains.

4) Developments in which [kt] palatalizes to [tʃ]; and in which [ks] palatalizes to [ʃ] and later velarizes to [x]; and in which [rj], [sj], and [pj] metathesize and then become [r], [s], and [p], respectively. For example,

a) [kt] ; [nó-k-tem] > [nó-jte] > [nó-tʃe] (A secondary yod is involved in this development.)  
b) [ks] : [dί:k-si:] > [dί-ʃe] > [dί-xe] (A secondary yod is involved.)  
c) [rj] : [rí-pá:-ri-am] > [rí-páj-ra] > [rí-ʃe-ra]  
d) [sj] : [bá-si-um] > [báj-so] > [bé-so]  
e) [pj] : [sá-pi-am] > [sáj-pa] > [sé-pa]

The development of [rí-pá:-ri-am] is representative of this category and is illustrated in 4.2.5.  

To present a complete view of yod combinations, the list above
includes both primary and secondary yod combinations. Secondary combinations are marked as such and are discussed in the next two chapters.

To show more clearly the effect of the yod, we can regroup the primary yod combinations under two broader headings: those combinations that do not metathesize, and those that do metathesize. The primary combinations in the first three categories above do not metathesize; those in the fourth category do.

4.1.1. B. Effect of yods on neighboring consonants and vowels. Generally, the yod affects the sounds preceding it in the sound sequence (a form of regressive assimilation). Sometimes the yod affects the sounds following it (a form of progressive assimilation).

Semiconsonants are -vocalic and -consonantal. In articulating the yod or wau, the mouth is more open than it is for any other consonant and is almost as open as it is for vowels, as can be seen from the chart in 1.5.2. Both vowels and semiconsonants are voiced. Because vowels and semiconsonants are similar in degree of opening and in voicing, the consonant preceded by a vowel and followed by a semiconsonant is in an environment that is similar to that of a consonant preceded by a vowel and followed by a vowel.

The consonant preceded by a vowel and followed by a semiconsonant is not very tense and tends to assimilate to the sounds around it by
becoming more lax by voicing (if the consonant is voiceless) and by the mouth opening more. Cf. 3.1.1.A.1., 3.1.1.A.2, and 3.1.2.A.1.

4.1.1.B.1. In primary yod combinations that do not metathesize. All primary yod combinations begin by having this sequence: -V-C+[j] +V-. In primary combinations that do not metathesize, the sequence remains unchanged. The consonant precedes the yod, and the yod may or may not affect it: if the consonant is labial, the yod does not affect it; if the consonant is dental or velar, it usually assimilates or palatalizes.

The yod has a degree of closure (i.e., a manner of articulation) which is less than that of a stop (for which the mouth is completely closed at some point so that the airflow is obstructed). Its degree of closure is also slightly less than that of a continuant (for which the mouth is slightly open so that the airflow is channeled). The yod may attract a stop to its manner of articulation (medium closure). The mouth, in anticipation of the closure for the yod, opens more in the articulation of the stop, and thus the stop becomes assimilated. The yod causes a preceding stop to become more open. A continuant is not appreciably affected by a yod, in regard to manner of articulation. The yod may also attract a consonant to its point of articulation, and the consonant (whether a stop as in [tj]; or a continuant, as in [lj]) becomes palatalized.

4.1.1.B.2. In primary yod combinations that do metathesize. In
consonant + yod combinations that do metathesize, the sequence changes from: \(-V-C+[j]+V-\) to: \(-V+[j]-C+V-\) or \(-V-[j]+C+V-\). The preceding vowel now comes immediately before the yod, and the yod may or may not affect it. Not all yods affect all vowels. 7

The yod has a degree of closure which is more than that of a vowel (for which the mouth is so open that the airflow is unobstructed). The yod may attract a vowel to its manner of articulation (medium closure). The mouth, in anticipation of the closure for the yod, closes more in the articulation of the vowel. In general, the yod causes the preceding vowel to become more closed. The yod, however, does not affect the vowel in regard to point of articulation.

In these combinations, the consonant follows the yod as a result of metathesis, but the yod has the same effect on the consonant as it did in 4.1.1.B.1.: if the consonant is labial, the yod does not affect it; if the consonant is dental or velar, it usually assimilates or palatalizes. 8

4.1.2. Wau combinations. A. Possible resolutions. With respect to the development of the wau and its influence on the sounds around it, combinations involving wau may be divided into the following categories:

1) Developments in which stop + wau combinations do not metathesize, and then the stop is assimilated. These occur in words, other than wau-perfects, with medial [kw]. For
example, aequa:lem [aj-kwá:-lem] > igual [i-γwál] and *sequi:re [se-kwá:-re] > seguir [se-γr].

2) Developments in which stop + wau combinations metathesize, and then the stop is assimilated. These occur in the wau-perfects. For example, [pó-tu-i:] > [pó-ti] > [ pó-de] > [pó-ðe] > [pó-ðe]. The development of [pó-tu-i:] is representative of these first two categories and is illustrated in 4.2.6.

3) Developments in which a consonant vocalizes to wau. This vocalization may be followed by the loss of the wau through its assimilation to a vowel. For example, [dé-bi-tam] > [deβ-ða] > deuda [dew-ða] (a secondary wau is involved) and [ál-te-rum] > [ál-tru] > [áw-tro] > [ó-tro] (a secondary wau is involved).

To present a complete view of wau combinations, the list above includes both primary and secondary wau combinations. Secondary wau combinations are marked as such and are discussed in the next two chapters.

Combinations ending in wau occur less frequently than combinations ending in yod, and they do not affect the development of Castilian as much as those ending in yod.

To show more clearly the effect of the wau, we can group primary wau combinations under two headings: those combinations that do not
metathesize, and those that do. Wau combinations in the first category above do not metathesize; those in the second category do.

4.1.2.B. Effect of waus on neighboring consonants and vowels.

Generally, the wau affects a sound preceding it in the sound sequence (a form of regressive assimilation). Occasionally, the wau affects a sound following it (a form of progressive assimilation).

4.1.2.B.1. In primary wau combinations that do not metathesize.

All primary wau combinations begin by having this sequence: 
-V-C+[w]+V-. In primary combinations that do not metathesize, the sequence remains unchanged. The consonant, which is always the stop [k] in primary wau combinations that do not metathesize, precedes the wau and is affected by it: the stop is between a vowel and a semi-consonant and usually develops as if it were intervocalic. Cf. 3.1.1.A.1., 3.1.2.A.1., and 3.2.1., in which a stop between a vowel and a resonant develops as if it were intervocalic.

The wau has a degree of closure which is less than that of the stop preceding it. The wau attracts the stop to its manner of articulation (medium closure). The mouth, in anticipation of the closure for the wau, opens more in the articulation of the stop, and the stop becomes a fricative. The wau causes the preceding stop to become more open. Since the stop is always [k] in wau combinations that do not metathesize, the wau and the stop have the same point of articulation. Thus the wau
does not attract the stop to its point of articulation.

Usually the wau has no effect on a preceding vowel. The wau, however, may close a preceding initial vowel through assimilation (e.g., *aequa:lem* [aj-kwá:-lem] > *igual* [i-γwál]).

The wau and the vowel are affected in this way: the following vowel and the wau, a labiovelar glide, assimilate and the great degree of lip-rounding characteristic of the wau is usually lost when the following vowel is [e], [i], or [o]; the lip-rounding for the wau is retained when the following vowel is [a].

### 4.1.2. B.2. In primary wau combinations that do metathesize

In consonant + wau combinations that do metathesize, the sequence changes from: -V-C+[w]+V- to: -V+[w]-C+V-. The preceding vowel now comes immediately before the wau and the wau may or may not affect it. 13

The wau has a degree of closure which is more than that of a vowel. It may attract a vowel to its manner of articulation (medium closure). The mouth, in anticipation of the closure for the wau, closes more in the articulation of the vowel. In general, the wau causes the preceding vowel to become more closed. The wau, however, does not affect the vowel in regard to point of articulation.

In these combinations, the consonant follows the wau as a result of metathesis, but the wau has the same effect on the consonant as it
did in 4.1.2.B.1.: the consonant, which is always a stop in wau combinations that do metathesize, develops as if it were intervocalic (except in the combination [pw] as in [sá'-pu-i:] > [sá'-pwi], in which [p] does not change after [pw] metathesizes to [wp]).

4.2.1. The word [ra-ti-o-nem] > [ra-tjp-ne] > [ra-tsó:n] or [ra-dzó:n] > [ra-00n] contains the combination [tj], the development of which is representative of the development of the type of yod combinations in 4.1.1.A.1.\(^\text{14}\)

[tj] and [k'j] merged in Vulgar Latin and apparently developed together to either [dz] or [ts]. The distinction between [dz] and [ts] was lost very early in Castilian. It was lost during the Old Spanish period in the other dialects.\(^\text{15}\)

In the development of [tj], the dental stop [t] was attracted to the point of articulation of the yod, which was simultaneously attracted towards the [t]. They assimilated, becoming the pre-alveolar affricate [ts] (or its voiced counterpart [dz]) which was developed further to become [0] in modern Castilian.

In distinctive features, the changes are as follows:

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<th>[t]</th>
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<td>-NSL</td>
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<td>+DEN</td>
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<td>-LONG</td>
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4.2.1. [te], [ti] and [k'e], [k'i] in hiatus

[tj], [kj] > [ts], [dz] > [θ].

[ra-ti-o'-nem] > [ra-tjó-ne] > [ra-tson] or [ra-dzon] > [ra-θón]

RV-CV-Vː-CVC RV-CSV-CVC RV-CCVC or

RV-CCVC RV-CVC
In terms of articulatory movements, the changes occur as described in the following paragraphs.

In the articulation of the sequence [tj] in [ra-tj'en], the vocal cords do not vibrate, the tongue tip presses against the back of the upper front teeth to stop the airstream, which is then released abruptly without aspiration to articulate the [t]. To produce the [jj], the vocal cords vibrate, the tongue rests against the lower front teeth, the dorsum of the tongue arches and almost touches the palate, and the airstream continues to pass through the slit formed by the tongue and the palate. The velum remains closed during the sequence.

In the articulation of [ts] in [ra-tson], the tongue touches almost the back of the upper front teeth (i.e., it is in a pre-alveolar position) and a groove is formed in the tongue tip and the airstream is released as it is for [s]. The velum remains closed, and the vocal cords do not vibrate. (If [dz] is produced, the articulation is the same as for [ts], but the vocal cords vibrate.)

To articulate [θ] in [ra-θon], the vocal cords do not vibrate, the tip of the tongue is placed between the upper and lower front teeth (or sometimes is placed lightly against the back of the upper teeth) and the airstream is released through the slit formed by the tongue and teeth.

In summary of the changes involved in the development of [tj] to [θ], rather than closing completely for the dental stop, the mouth opens in anticipation of the yod. The result is assimilation, which is a type
of assimilation.

Economy is introduced here in the movements of the mouth, since two articulations [t] and [j], have been replaced by one, [θ]. In the sequence [tj], the mouth (the vocal tract) begins by being completely closed, then opens enough so that the air passes through with friction. For the articulation of [θ], on the other hand, the mouth does not have to close and then open, but remains partially open while the air is channeled through a slit formed by the teeth and tongue so that it escapes with friction.

4.2.2. The word [wiː-ne-a] > [wiː-nja] > [bi:-ja] contains the combination [nj], whose development is representative of developments involving yods in 4.1.1.A.2.

In the development of [nj], the alveolar nasal [n] is attracted towards the point of articulation of the following yod. The [n] and the yod assimilate, producing the palatal nasal [ŋ].

In distinctive features, the change is as follows:

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In articulatory movements, the change occurs as follows:

In the sequence [nj] in [wiː-nja], the vocal cords vibrate for both
4.2.2. [ne], [ni] in hiatus $\Rightarrow$ [nj] $\Rightarrow$ n [n].

[wuː-ne-a] $\Rightarrow$ [wuː-nja] $\Rightarrow$ [biː-na]

SVː-CV-V  SVː-CSV  CVː-CV
[n] and [j]. To produce [n] the velum is open so that the airstream passes through and resonates in the nasal cavity as well as in the oral cavity, and the tip of the tongue is placed against the alveolar ridge. To produce [j], the velum closes. Then the tip of the tongue moves to rest against the lower front teeth, the dorsum arches and almost touches the palate, and the airstream continues to pass through the slit formed by the tongue and the palate.

To articulate [n] in [bi-na], the vocal cords vibrate, the velum opens, and the tongue dorsum arches and makes extensive contact with the palate by pressing against it.

[nj] develops to [n] through palatalization, a form of assimilation.

This change does not introduce economy in the movement of the velum or in the action of the vocal cords, but it does introduce economy by reducing the number of articulatory movements required of the tongue. Rather than articulating [n] and then articulating [j], the tongue makes a compromise articulation, [ŋ]. Two movements are consequently reduced to one.

4.2.3. The developments illustrated in this and the following sections are representative of developments in which the yod remains and does not palatalize the preceding consonant. See 4.1.1.A. The preceding consonant may be lost through complete assimilation (as in this section) or may remain unchanged (as in the next section).
4.2.3.A. [de], [di] in hiatus > [j], is lost (absorbed)

in Castilian when preceded by a front vowel.

[wí-de-o] > [wí-djo] > [bê-jo] > [bê-o]

SV'-CV-V CV'-CSV CV'-SV CV'-V
Two developments are illustrated in this section: [dj] or [gj] preceded by a front vowel, in 4.2.3.A.; and [dj] and [gj] preceded by a back vowel, in 4.2.3.B.

4.2.3.A. In the word [wi-de-o] ⇒ [wi-djo] ⇒ [be-jo] ⇒ [be-o], the [d] becomes completely assimilated and is lost. The yod is then absorbed by (completely assimilated to) the preceding vowel, but does not otherwise affect the preceding vowel.

In distinctive features, the changes are as follows:

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<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

In articulatory terms, the changes occur as described in the
following paragraphs.

Throughout this word, the vocal cords vibrate continuously and the velum remains closed.

The only change in this word in the transition from Standard Latin to Vulgar Latin is the development of the yod: \[\text{[wi\text{-de-o}] > [wi\text{-djo}]}.\] For a discussion of this development, see the last paragraph of 4.1.0.

In the sequence \[\text{[i\text{-djo]}\] in the Vulgar Latin form of this word, to articulate \[\text{[i]}\] the tip of the tongue rests against the lower front teeth and the highest part of the dorsum is in the front of the mouth. To articulate \[\text{[d]}\], the tip of the tongue rises up to press against the back of the upper front teeth, interrupting the airstream, which is then released with a slight explosion. Then the tongue tip moves down to rest against the lower front teeth, the dorsum arches and almost contacts the palate, and the airstream flows through the slit between the tongue and the palate, to produce \[\text{[j]}\]. As can be seen in the mouth diagrams accompanying this section, for the \[\text{[o]}\] (which follows the \[\text{[j]}\]), the lips round, the dorsum is in a mid-velar position and, consequently, the tip of the tongue is low in the front of the mouth.

In the transition from \[\text{[i\text{-djo]}\] to \[\text{[e\text{-jo}]}\], the change from \[\text{[i]}\] to \[\text{[e]}\] is a regular vocalic development. The dorsum relaxes slightly and is not as high for \[\text{[e]}\] as it was for \[\text{[i]}\]. The \[\text{[d]}\] assimilates to the \[\text{[e]}\] and the \[\text{[j]}\]. The \[\text{[d]}\] is in a voiced environment in the Standard Latin word, \[\text{[wi\text{-de-o}]}\], where it is intervocalic. It is still in a voiced environment
in the Vulgar Latin word, \([\text{w}i\text{-djo}]\), where it is between a vowel and a semiconsonant. The \([d]\) changes manner of articulation from stop, \([d]\), to fricative, \([\partial]\), then assimilates completely by further weakening (further opening of the mouth) and is lost. This is the same development that \([d]\) undergoes when it is intervocalic. See 3.2.1.

In the sequence \([e\text{-jo}]\) the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, to articulate \([e]\). The lips remain spread, the tongue tip continues to rest against the lower front teeth, the dorsum arches and almost touches the palate, and the air continues to flow through the slit formed by the tongue and palate, to produce \([j]\).

In the articulation of the \([o]\) following the \([j]\), the lips round and the highest part of the dorsum is in the back of the mouth, and consequently, the tip of the tongue stays low in the front of the mouth.

In the change from \([e\text{-jo}]\) to \([e\text{-o}]\), the yod is completely assimilated to the vowel preceding it. The tongue tip stays low in the mouth after the articulation of the \([e]\). The dorsum does not arch as high, but rather is lower and further back in the mouth, in the position to articulate \([o]\).

This series of changes does not introduce economy in the movement of the velum or in the action of the vocal cords, but it does introduce economy by reducing the number of articulatory movements required of the mouth, tongue, and lips.
Economy in the movement of the mouth results from the assimilation of \([d]\) to \([e]\) and \([j]\), because an articulation, \([d]\), is eliminated. Rather than the mouth opening for the first vowel, closing for \([d]\), then opening for the second vowel, this occurs: the mouth opens for the first vowel and then remains open for the articulation of the second vowel. Also, economy in tongue movements results from the elimination of \([d]\). In the change from \([\text{'djo}]\) to \([\text{'jo}]\), instead of the tip of the tongue moving up to stop the flow of air at the upper front teeth to produce \([d]\), after the articulation of the \([i]\) it stays low in the mouth; consequently, the highest part of the dorsum can stay in the front of the mouth and then easily move slightly higher to articulate the \([j]\).

Economy in tongue movements results from the assimilation of \([j]\) to \([e]\), since an articulation, \([j]\), is eliminated. In the change from \([\text{'jo}]\) to \([\text{'o}]\), instead of the dorsum arching up and moving forward to come closer to the palate and articulate \([j]\), after being high in the mouth for \([e]\) the dorsum moves rather low and back to articulate the following \([o]\). Also, slight economy in lip movements is brought about by the elimination of \([j]\). Rather than being spread for \([e]\) and remaining spread for \([j]\), they are spread for a shorter length of time (just for \([e]\)) before rounding to form \([o]\).

4.2.3.B. In the word \([\text{fu-gi-o}] \rightarrow [\text{fu-jo}] \rightarrow \text{huyo [u-jo]}\), the \([g]\) becomes completely assimilated and is lost. The yod remains and
4.2.3.B. [ge], [gi] in hiatus [j] > [y] when preceded by a back vowel

[fʊ̞-gi-o] > [fʊ̞-jo] > huyo [ʊ̞-jo]

CV-CV-V CV-SV V-SV
does not assimilate to or affect the preceding vowel.

In distinctive features, the changes are as follows:

\[
\begin{array}{cccc}
[u] & [g] & [i] & [o] \\
+VCD & +VCD & +VCD & +VCD \\
-NSL & -NSL & -NSL & -NSL \\
+HIGH & +VEL & +HIGH & +MID \\
VEL & PAL & VEL & \\
+VWL & +STP & +VWL & +VWL \\
-LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

\[
\begin{array}{cccc}
[u] & [j] & [o] \\
+VCD & +VCD & +VCD \\
-NSL & -NSL & -NSL \\
+HIGH & +HIGH & +MID \\
VEL & PAL & VEL \\
+VWL & +SCN & +VWL \\
-LONG & -LONG & -LONG \\
\end{array}
\]

In articulatory terms, the changes occur as described in the following paragraphs.

Throughout the development of this word, the vocal cords vibrate continuously and the velum remains closed from the articulation of [u] to the end of the sequence.

In the sequence [u-gi-o], the lips are very rounded and the highest part of the dorsum is in the back of the mouth very close to the velum, for [u]. Next, the dorsum presses against the velum interrupting the airstream, which is then released with a slight explosion, for [g]. The lips spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth very close to the hard palate, for [i]. Finally, the lips round, and the highest
part of the dorsum is in the back of the mouth, for [o].

In the sequence [u'-jo], the lips are very rounded, and the highest part of the dorsum is in the back of the mouth very close to the velum, for [u]. Then the lips spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth very close to the hard palate, for [j]. Finally, the lips round, and the highest part of the dorsum is in the back of the mouth, for [o].

In the transition from [u'-gi-o] to [u'-jo], the yod develops when the highest part of the dorsum moves higher in the mouth and then glides from the position for [j] to the position for [o], instead of moving directly from [i] to [o]. See the last paragraph of 4.1.0. In [u'-gi-o], the [g] is intervocalic. It changes in manner of articulation from stop, [g], to fricative, [ɣ], then assimilates completely by further weakening and is lost. This is the usual development for an intervocalic stop.

These changes do not introduce economy in the movement of the velum or in the action of the vocal cords, but they do introduce economy by reducing the number of movements required of the mouth and tongue. Economy in the movement of the mouth results from the assimilation of [g] to [u] and [i], because one articulation, [g], is eliminated. Rather than the mouth opening for the first vowel, closing for [g], and then opening for the second vowel, the mouth opens for the first vowel and then remains open for the articulation of the second vowel. Economy in tongue movements also results from the elimination of [g]. In the
change from [u'-gi-o] to [u'-jo], instead of the highest part of the dorsum moving up to stop the flow of air at the velum to produce [g] after the articulation of [u], it moves so that it is in the front of the mouth very close to the hard palate and ready to articulate [j].

4.2.4. The development illustrated in this section, like those in the preceding section, is representative of the developments in which the yod remained and did not palatize the neighboring consonant. See 4.1.1.A.3.

The combination [mj], as in [práj-mi-um] > [pré'-mju] > [pré'-mjo], develops as follows: the [m] remains unchanged while the yod may affect the preceding vowel.

In distinctive features, the changes are as shown below:

<table>
<thead>
<tr>
<th></th>
<th>[a]</th>
<th>[j]</th>
<th></th>
<th>[m]</th>
<th>[j]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td></td>
</tr>
<tr>
<td>-NSL</td>
<td>NSL</td>
<td>-NSL</td>
<td>+NSL</td>
<td>-NSL</td>
<td></td>
</tr>
<tr>
<td>+LOW</td>
<td>HIGH</td>
<td>+BILAB</td>
<td>+HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CENTRAL</td>
<td>PAL</td>
<td></td>
<td>PAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>SCN</td>
<td>+CNT</td>
<td>+SCN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-LONG</td>
<td>LONG</td>
<td>-LONG</td>
<td>LONG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>[e]</th>
<th></th>
<th>[m]</th>
<th>[j]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>VCD</td>
<td></td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>NSL</td>
<td></td>
<td>+NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+OPEN</td>
<td>+BILAB</td>
<td></td>
<td>+HIGH</td>
<td>PAL</td>
</tr>
<tr>
<td>MID PAL</td>
<td></td>
<td></td>
<td>+CNT</td>
<td>+SCN</td>
</tr>
<tr>
<td>+VWL</td>
<td></td>
<td></td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>
4.2.4 [mj] remains unchanged.

[práj-mi-um] > [pre'-mju] > [pre'-mjo]

CSVŚ-CV-VC CRVŚ-CSV CSVŚ-CSV
In articulatory movements, the changes are as follows:

In the combination [mj], the vocal cords vibrate continuously. The velum opens, and the lips press together, to articulate [m]. Then, to produce [j] the vocal cords continue to vibrate, the velum closes, the lips open, and the tip of the tongue rests against the lower front teeth; the dorsum of the tongue arches and almost touches the palate, and the airstream continues to pass through the slit formed by the tongue and the palate.

In the production of labials, such as [m] in [mj], the most important feature is that the lips are closed. In the articulation of labials, the tongue takes up the position of whatever sound follows them. Thus, when labials are followed by a yod, the tongue takes up the position of the following sound (the yod) and the labials are unaffected by the following yod.

Since there is no consonantal change, no economy is introduced in regard to the consonant combination. There are, however, regular vocalic changes which introduce economy in this word. In [præ̆j-mi-um] > [pré̆-mju], the number of articulatory movements is reduced from
4.2.5. \([re], [ri]\) in hiatus \(\Rightarrow [rj] \Rightarrow [jr] \Rightarrow [r]\). 

\([ri:-pá:-ri-am] \Rightarrow [ri-pá-ra] \Rightarrow [ri-páj-ra] \Rightarrow [ri-báj-ra] \Rightarrow [ri-βé-ra]\)

\(RV:-CV:-RV-VC\)  \(RV-ČV-RLS\)  \(RV-ČVS-RV\)  \(RV-ČV-Š-RV\)  \(RV-ČV-ČV-RV\)
two in [a j] to one in [e]. Also, in [prāj-mi-um] → [prē-miu], two separate vowel articulations are reduced to a glide followed by a vowel.

See the last paragraph of 4.1.0.

4.2.5. The word [ri-pā-ri-am] → [ri-pā-rija] → [ri-pāj-ra] > [ri-bāj-ra] > [ri-pē-ra] contains the combinations [rj], the development of which is representative of developments involving yod in 4.1.1.A.4.

The [rj] develops as follows: [rj] metathesizes to [jr]. The [r] is not otherwise affected. The [j], coming into contact with the preceding vowel as a result of metathesis, may affect the preceding vowel.

In distinctive features the changes are as follows:

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</thead>
<tbody>
<tr>
<td>[a]</td>
<td>-</td>
<td>[r]</td>
<td>[j]</td>
</tr>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+LOW</td>
<td>+ALV</td>
<td>+HIGH</td>
<td>+LOW</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>PAL</td>
<td>CENTRAL</td>
<td>CENTRAL</td>
</tr>
<tr>
<td>+VWL</td>
<td>+VIB</td>
<td>+SCN</td>
<td>+VWL</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[a]</td>
<td>[j]</td>
<td>-</td>
<td>[r]</td>
</tr>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+LOW</td>
<td>+HIGH</td>
<td>+ALV</td>
<td>+LOW</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>PAL</td>
<td>CENTRAL</td>
<td>CENTRAL</td>
</tr>
<tr>
<td>+VWL</td>
<td>+SCN</td>
<td>+VIB</td>
<td>+VWL</td>
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<tr>
<td>-LONG</td>
<td>-LONG</td>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[e]</td>
<td>-</td>
<td>[r]</td>
<td>[a]</td>
</tr>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+CLOSE</td>
<td>+ALV</td>
<td>+LOW</td>
<td>CENTRAL</td>
</tr>
<tr>
<td>MID</td>
<td>PAL</td>
<td>MID</td>
<td>PAL</td>
</tr>
<tr>
<td>+VWL</td>
<td>+VIB</td>
<td>+VWL</td>
<td>+VWL</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>
In articulatory terms, the changes occur as described in the following paragraphs.

In [ri-pá'-rja], for the combination [rj] the vocal cords vibrate continuously, and the velum remains closed. To produce [r], the tongue tip quickly strikes the alveolar ridge as the airstream passes through. To produce [j], the tip of the tongue moves until it rests against the lower front teeth, the dorsum arches and almost touches the palate, and the airstream is directed through the slit formed by the teeth and the palate.

In [ri-páj-ra], the [rj] has metathesized to [jr]. In other words, the order of the articulations has become reversed. The yod, now in contact with the [a], assimilates to it completely and raises (closes) the [a] to [e]. Rather than moving from the low central position for [a] all the way to the high palatal position for [j], the tongue assumes a mid palatal position, which is a compromise between [a] and [j] and which results in the production of [e].

The [p] undergoes the development normal for an intervocalic stop: [p] > [b] > [β].

Other than metathesis, there is no change in the consonant combination. Although the number of articulatory movements is not reduced through metathesis per se, the change it brings about in the sequence of the movements allows the yod to come into contact with the [a] and then to assimilate to the [a] and raise it to [e]. This assimilation
introduces economy, since two articulations, [a] and [j], are reduced to one, [e].

4.2.6. The development of [pó-tu-i:] is representative of the development of primary wau combinations. It shows all the changes that may occur in them. See 4.1.2.A.

In [pó-tu-i:] > [pó-twi] > [pów-ti] > [pó-de] > [pú-g̃e] after the wau develops, the changes are as follows: [tw] metathesizes to [wt] and [o] > [q], then the wau and [q] mutually assimilate to [o]. The [q] changes to [u], and the [t] undergoes the usual development for an intervocalic stop.

In distinctive features the changes are as follows:

\[
\begin{array}{cccc}
\text{[o]} & \text{[t]} & \text{[u]} & \text{[i;]} \\
+\text{VCD} & -\text{VCD} & +\text{VCD} & +\text{VCD} \\
-\text{NSL} & -\text{NSL} & -\text{NSL} & -\text{NSL} \\
+\text{MID} & +\text{DEN} & +\text{HIGH} & +\text{HIGH} \\
\text{VEL} & \text{VE} & \text{PAL} \\
+\text{VWL} & +\text{STP} & +\text{VWL} & +\text{VWL} \\
-\text{LONG} & -\text{LONG} & +\text{LONG} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{[o]} & \text{[w]} & \text{[t]} & \text{[i]} \\
+\text{VCD} & -\text{VCD} & +\text{VCD} & +\text{VCD} \\
-\text{NSL} & -\text{NSL} & -\text{NSL} & -\text{NSL} \\
+\text{MID} & +\text{DEN} & +\text{BILAB} & +\text{HIGH} \\
\text{VEL} & \text{HIGH} & \text{PAL} \\
+\text{VWL} & +\text{STP} & +\text{SCN} & +\text{VWL} \\
-\text{LONG} & -\text{LONG} & -\text{LONG} & -\text{LONG} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{[o]} & \text{[w]} & \text{[t]} & \text{[i]} \\
+\text{VCD} & +\text{VCD} & -\text{VCD} & +\text{VCD} \\
-\text{NSL} & -\text{NSL} & -\text{NSL} & -\text{NSL} \\
+\text{OPEN} & +\text{BILAB} & +\text{DEN} & +\text{HIGH} \\
\text{MID} & \text{HIGH} & \text{PAL} \\
\text{VEL} & \text{VEL} \\
+\text{VWL} & +\text{SCN} & +\text{STP} & +\text{VWL} \\
-\text{LONG} & -\text{LONG} & -\text{LONG} & -\text{LONG} \\
\end{array}
\]
4.2.6. Standard Latin [tu] in hiatus ➞ Vulgar Latin

[tw] ➞ [wt] ➞ [wə] ➞ Castilian [ʒ].
[pó-tu-iː] ➞ [pó-twI] ➞ [pów-ti] ➞ [pó-ti] ➞ [pó-de] ➞ [pó-ʒe]
[pú-ʒe]

\[CV-CV-V: CV-C-SV. CVS-CV CV-CV CV-CV CV-CV\]
4.2.6. (Continued)
In terms of articulatory movements, the changes occur as described in the following paragraphs.

Throughout the development of this word, the velum remains closed during the entire sequence.

In the transition from [ɔ-tu-i:] to [ɔ-twɪ], the wau develops when the highest part of the dorsum glides from the position for [w] to the position for [ɪ], instead of moving from the position for [u] to that for [ɪ]. See the last paragraph of 4.1.0. The change from a vowel to a semiconsonant eliminates a syllable.
In [ɔ'-twi], to articulate [o] the vocal cords vibrate, the lips round, and the highest part of the dorsum is in the back of the mouth. For [t], the vocal cords cease vibrating and the tip of the tongue moves forward to make complete closure behind the upper teeth. To articulate [w], the vocal cords vibrate, the lips round very much, and the highest part of the dorsum is in the back of the mouth so close to the velum that the airstream escapes with friction. To produce [i], the vocal cords continue vibrating, the lips spread, and the tip of the tongue rests against the lower front teeth. The highest part of the dorsum is very close to the hard palate.

The articulations of [t] and [w] are reversed through metathesis, and the sequence [ɔ'w-ti] results. After the articulation of the [o], the vocal cords continue to vibrate, the lips round even more, and the highest part of the dorsum moves higher, coming so close to the velum that the airstream escapes with friction, to produce [w]. Then the vocal cords cease vibrating, and the tip of the tongue moves forward to make complete closure behind the upper teeth, for [t]. Finally, the lips spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth very close to the hard palate.

In the change from [ɔ'w-ti] to [ɔ'-ti], [ɔ] and [w] mutually assimilate to [ɔ]. As explained in 4.1.2.B.2., the wau causes the preceding vowel to become more closed. A compromise between the articulations
for [o] and [w] results in [o]. Due to the compromise, rather than moving to a position as high (and subsequently as close to the velum) as that for wau, the tongue moves to a position almost as high as that assumed for the articulation of [u], and thus articulates [o].

In the transition from [o-ti] to [o-de], then to [o-ȝe], and finally to [u-ȝe], three changes take place concurrently: [o] develops to [u], [t] develops to [ʒ], and [i] develops to [e]. In the change from [o] to [u], the vocal cords vibrate for both sounds, but the mouth closes more and the dorsum moves higher in the back of the mouth for [u] than it does for [o]. 20 In the change from [t] to [ʒ], the [t] undergoes the usual development for an intervocalic stop: it assimilates to the vowel preceding it and to the vowel following it by weakening from a voiceless stop, [t], to a voiced stop, [d], and then to a fricative, [ʒ]. The change from final [i] to [e] is a regular vocalic development.

This series of changes does not introduce economy in the movement of the velum, but it does introduce economy in several other ways described below.

The development of wau introduces economy as explained in 4.1.0.

The metathesis of [tw] to [wt] does not introduce economy per se, but the change it brings about in the sequence of movements and syllabic division allows the wau to come into contact with [o] and then to assimilate to it.

The assimilation of [o] and [w] to [o] introduces economy, since
two articulations are reduced to one. Through this compromise, the

tongue moves to a higher position than it did for [o], but not to as high
a position as it assumed for [w]; also, the lips round, as they did for
[o], but they do not round as much as they did for [w].

(The change from [o] to [u] does not appreciably affect the effort
required.)

The change from [t] to [ʒ] introduces economy since there is less
change in the action of the vocal cords: for [o'-ti] the vocal cords vibrate,
stop vibrating, then vibrate again; for [o'-de] and [o'-ʒe] the vocal cords
vibrate continuously throughout the sequence. The change from [t] to
[ʒ] also introduces economy since there is less opening and closing
movement of the mouth: for [o'-ti] and for [o'-de] the mouth opens rather
widely for the first vowel, closes completely for [t] and opens rather
widely for the second vowel; but for [o'-ʒe] the mouth opens rather
widely for the first vowel, closely slightly for [ʒ], then opens rather
widely for the second vowel.

(The change from final [i] to [e] does not appreciably affect the
effort required.)
CHAPTER 5

CLASS THREE: MEDIAL COMBINATIONS BEGINNING WITH [l], [r], [m], [n] OR [s], AND NOT ENDING WITH A RESONANT OR A SEMICONSONANT IN LATIN

5.1.0. Conspectus. Medial consonant combinations beginning with [l], [r], [m], [n], or [s] and not ending with a resonant or a semi-consonant in Latin are divided into two groups in this chapter: two-consonant combinations and three-consonant combinations. Due to the variety of consonants in these combinations, they are divided into groups according to the number of sounds rather than the types of sounds involved.

The first group is subdivided into combinations that are resolved by assimilation of the stop, by vocalization, by vocalization followed by palatalization, by the assimilation of two continuants, and by the interchange of [l], [r], and [n] (which is further subdivided into those resolved through dissimilation and those resolved through dissimilation followed by epenthesis). All these processes, except those involving the interchange of [l], [r], and [n], are types of assimilation.

The second group is subdivided into those combinations involving the loss of the first consonant and those involving the loss of the second
consonant (which may be followed by the assimilation of the first and last consonants). Only those undergoing the loss of the second consonant may involve assimilation.

Sections 5.1.1. and 5.1.2. are detailed discussions of the two groups outlined above.

The consonants [l], [r], [m], [n], and [s] are all continuants: [l] is a lateral continuant, [r] is a trill (repetitive continuant) or a fricative continuant, [m] and [n] are nasal continuants, and [s] is a fricative continuant. All, except [s], are voiced. They are also all alveolar, except for [m], which is bilabial.

In similar environments, combinations beginning with these consonants often develop in similar ways, since they share many distinctive features.

5.1.1. Two-consonant combinations. In general, if the first consonant was [l], [r], [m], [n], or [s], and if the second consonant was not [l], [r], [j], or [w], then the combination usually underwent little if any change. There are numerous examples of primary Class 3 combinations \(^1\) that remained unchanged, such as [ál-tum] > [ál-to], [fál-sum] > [fál-so], [úl-mum] > [úl-mo], [tém-pum] > [tjém-po], [mún-dum] > [mún-do], [ář-kum] > [ář-kö], [tor-náː-re] > [tor-nár], [trún-kum] > [trún-kö], [pór-tam] > [pwér-ta]. Since these combinations do not change, they are not discussed or illustrated.
5.1.1.A. **Assimilation of the stop.** Some primary Class 3 combinations, however, do change: in those with a voiced stop, the stop assimilates to the sounds around it and becomes a fricative, as in

\[ [\text{ál-} \text{bam}] > [\text{ál-ϕa}], [\text{ál-} \text{gam}] > [\text{á} \text{λ-a}], [\text{bár-} \text{bam}] > [\text{bár-ϕa}], [\text{kór-} \text{dam}] > [\text{kwérf-ϕa}]. \]

If the Class 3 combination is secondary and the second consonant is a voiceless stop, the stop generally voices and then becomes a fricative, as in \[ [\text{de-li-ká-tum}] > [\text{de-le-} \text{gá-do}] > [\text{del-} \text{γá-} \text{do}]. \]

Since the change of a stop to a fricative is discussed in 3.1.1.A.1. and 3.1.2.A.1., and is illustrated in 3.2.2., it is not illustrated again in this chapter.

The Class 3 combinations that change through assimilation of the stop occur either in the environment -V+ Class 3 continuant - primary voiced stop + V- or in the environment -V + Class 3 continuant - secondary voiceless stop + V-. Both change to: -V + Class continuant - voiced fricative continuant + V-.\(^2\) The syllable division falls between the two consonants in these combinations. In the combinations that remain the same, the first consonant is an acceptable coda, and the second is an acceptable onset. In those combinations that change, after the change the first consonant is an acceptable coda, and the second is an acceptable onset.

5.1.1.B. **Vocalization.** In some primary combinations consisting
of [l] followed by [t], the [l] vocalizes to become a secondary wau if it is in the environment -[a]+[l]-[t]+V-. The secondary wau in the same syllable as [a] and the preceding [a] assimilate to [o]. The syllable-initial [t] combines with the following [r] in the same syllable as [t] to form an onset.

An example of vocalization in this environment is [al-te-rum] > [al-tro] > [aw-tro] > [o-tro]. The development of [al-te-rum] is representative of this type of vocalization and is illustrated in 5.2.3.

In some primary combinations consisting of [l] followed by [tr], the [l] vocalizes to become a secondary yod if it is in the environment -[u]+[l]-[t]+[r]+V-. A semiconsonant results and is realized as a glide, a secondary yod, after the [u]. The syllable-initial [t] combines with [r] in the same syllable as [t] to form an onset. The secondary yod combines with the preceding [u] in the same syllable as the yod to form a diphthong. (Under these circumstances, the yod does not combine with the [t] and palatalize it.)

An example of this development is [wul-tu-rem] > [wul-trem] > [bwI-tre].

5.1.1. C. Vocalization followed by palatalization. In some primary combinations consisting of [l] followed by [t], the [l] vocalizes to yod if it is in the environment -[u]+[l]-[t]+V-. A semiconsonant results and is realized as a glide, a secondary yod, after the [u]. The [t],
syllable-initial and tense, readily palatalizes when it comes into contact with the yod resulting from vocalization.

For example, [mul-tum] > [mui-to] > [mu-tʃo]. The development of [mul-tum] is representative of this type of vocalization and is illustrated in 5.2.4.

5.1.1.D. Assimilation of two continuants. Four Standard Latin combinations, [ns], [rs], [mb], and [mn], undergo assimilation. The Vulgar Latin long consonant resulting from the assimilation of [ns], [rs], and [mb] simplifies by shortening of duration to a single consonant in Castilian, but the Vulgar Latin long consonant resulting from the assimilation of [mn] simplifies by palatalization to a single consonant. In all these combinations the syllable division falls between the two continuants making up the combination. The first continuant, which is syllable-final and lax, assimilates to the second continuant, which is syllable-initial and tense.

The combinations [ns] and [rs] both assimilate to [s:], which simplifies to [s]. Examples of this development are [men-sem] > [mes-se] > [mes] and [ur-sum] > [oʃ-so] > [oʃ-so] > [ʃ-so]. The development of [ur-sum] is representative of this simplification and is illustrated in 5.2.5.

The combinations [mb] and [mn] also both undergo assimilation, with slightly different results. Standard Latin [mb] assimilates to
Vulgar Latin [m:] and simplifies to Castilian [m]. For example
[pa-lúm-bam] > [pa-lóm-ma] > [pa-ló-ma]. Standard Latin [mn]
assimilates to [n:] early and palatalizes to [n] as in [dá-m-num] >
[dán-no] > [da'-no]. The development of [dám-num] is illustrated in
5.2.6.

[mb] may also undergo dissimilation followed by epenthesis, as
discussed in 5.1.1.E.2.

5.1.1.E. Interchange of [l], [r], and [n]. The sounds [l], [r],
and [n] are subject to frequent confusion and interchange. The rea-
son for this interchange is that these sounds share several distinctive
features, as can be seen below:

<table>
<thead>
<tr>
<th></th>
<th>[l]</th>
<th>[r]</th>
<th>[n]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>-NSL</td>
<td>+ALV</td>
<td>+VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>+ALV</td>
<td>+CNT</td>
<td>+NSL</td>
</tr>
<tr>
<td>+LAT</td>
<td>+VIB</td>
<td>-LONG</td>
<td>+CNT</td>
</tr>
<tr>
<td>-LONG</td>
<td></td>
<td></td>
<td>-LONG</td>
</tr>
</tbody>
</table>

All three are voiced, alveolar, and short (-LONG). All are also con-
tinuants, but of varying types: [l] is a lateral continuant, [n] is a nasal
continuant, and [r] may either be a trill (a repetitivive continuant) or a
fricative continuant (if [r] is a tap, it may be readily lengthened into a
trill). Since all these sounds are similar in articulation, they are
readily substituted for one another.

A few combinations consisting of a continuant followed by a con-
tinuant, in which the second continuant is not a resonant in Latin, develop
through dissimilation or through dissimilation followed by epenthesis. Such combinations involve the interchange of [l], [r], and [n].

5.1.1.E.1. **Dissimilation.** The secondary combination [nm] in Vulgar Latin is unacceptable to the Castilian phonological pattern. The [n] dissimilates to either [r] or [l]; both [rm] and [lm] (which occur in the environment -V+continuant (resonant)-continuant+V-) are acceptable in Castilian and remain unchanged. For example, *[mi-ni-má:-re] > *[men-már] > [mer-már] and [á-ni-ma] > [án-ma] > [ál-ma]. These two developments are representative of this category and are illustrated in 5.2.1.A. and 5.2.1.B.

5.1.1.E.2. **Dissimilation followed by epenthesis.** The secondary combination [mn] in Vulgar Latin is unacceptable in Castilian. The [n] dissimilates to [r], and the resultant combination, [mr] develops the epenthetic glide [b] and becomes [mbr], which is acceptable to the Castilian phonological pattern and which remains unchanged. The change is from the environment: -V+continuant (nasal)-continuant (nasal)+V-, to: -V+continuant (nasal)-continuant (resonant)+V-, and then to: -V+continuant (nasal)-stop+continuant (resonant)+V-. Examples of this development are *[fé-mi-nam] > *[fém-na] > [fém-ra] > hembra [émb-ra] and *[no-mi-nem] > *[nóm-ne] > [nóm-re] > [nóm-bre]. The dissimilation is similar to that in 5.1.1.E.1.
5.1.2. **Three-consonant combinations. A. Loss of the first consonant.** A three-consonant combination resulting from syncope and having [s] as the second consonant usually simplifies through the loss of the first consonant. Combinations of this nature consist of a continuant followed by [s] and then followed by a stop in Vulgar Latin. The combination simplifies. The change is from the environment: -V+continuant+[s](continuant)-stop+V- to the environment: -V+[s](continuant)-stop+V-.

The development of [kôn-su-tu-ra] > [kôn-su-tu-ra] > [kôn-tu-ra] is representative of this type of resolution and is illustrated in 5.2.2.A.

5.1.2. B. **Loss of the second consonant.** Other three-consonant combinations resulting from syncope may simplify through the loss of the second consonant. The first of the two remaining consonants may assimilate to the last consonant. Almost all combinations of this nature consist of a continuant followed by a stop and then followed by another stop in Vulgar Latin. Such a sequence is unacceptable in Castilian, and the combination simplifies to a sequence which is acceptable to Castilian. The change is from the environment: -V+continuant+stop-stop+V- to the environment: -V+continuant-stop+V-.

The development of [kôn-pu-tum] > [kôn-pu-tum] > [kôn-tu] > cuento [kweñ-to] is representative of this type of resolution and is illustrated in 5.2.2.B.
5.2.0. Illustrations and commentaries.

5.2.1. Two developments are illustrated and discussed in this section. Together they are representative of the resolution of a secondary combination through interchange of \([l]\), \([r]\), or \([n]\). In part A., \([n]\) and \([r]\) interchange. In part B., \([n]\) and \([l]\) interchange.

5.2.1.A. Through syncope, \([n]\) and \([m]\) are juxtaposed in

\[*[mi-\text{n}\text{-}\text{ma}':-\text{re}] > *[men-már]*\]. The \([n]\) and the \([m]\) dissimilate and \([n]\) becomes \([r]\) in \[*[men-már] > [mer-már]*\]. The dissimilation is shown in distinctive features below:

\[
\begin{array}{llllll}
[n] & [-] & [m] & [-] & [r] & [-] \\
+VCD & +VCD & +VCD & +VCD & +VCD & +VCD \\
+NSL & +NSL & +VIB & +CNT & +CNT \\
+ALV & +BILAB & -VIB & -VIB & -VIB & -VIB \\
-LONG & -LONG & -LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

+VIB under \([r]\) indicates that \([r]\) is a specific type of continuant. It, like both \([n]\) and \([m]\), is +CNT. \([n]\) and \([m]\) differ in point of articulation. \([n]\) changes to \([r]\), from which it differs in nasality. \([n]\) has thus dissimilated from \([m]\); \([r]\) and \([m]\) differ both in point of articulation and nasality.

As well as dissimilating from the following nasal, the \([n]\) may be assimilating to the preceding vowel. The \([n]\) is +NSL, but both \([r]\) and the preceding vowel are oral (-NSL). Also, since \([n]\) is a consonant, it is -VOCALIC +CONSONANTAL; since \([r]\) is a resonant, it is +VOCALIC +CONSONANTAL; and since the preceding \([e]\) is a vowel, it

* [mi-ni-má-re] > * [men-má-re] > [mer-már]

*CV-CV-CV'-RV  *CVC-CV'-RV  CVR-CVR
is +VOCALIC -CONSONANTAL. By changing from [n] to [r], the sound has become more similar to the preceding vowel: both [r] and the vowel are +VOCALIC and are -NSL.

The transition from [nm] to [rm] is described in articulatory movements in the following paragraphs.

In [n-m], the vocal cords vibrate continuously. After the articulation of the preceding vowel, the velum opens, the lips remain open, the tip of the tongue touches the alveolar ridge, and the air is released through the nose to produce [n]. Then, to articulate [m], the velum remains open, the lips close, and the tongue assumes the position of the sound following the [m] (in *[men-már] the tongue is low in the center of the mouth for [a]), and the airstream is released through the nose.

In [r-m], the vocal cords vibrate continuously. After the articulation of the preceding vowel, the velum remains closed, the lips remain open, the tongue tip quickly strikes the alveolar ridge as the airstream passes through, and the airstream is released through the mouth, to produce [r]. Then, to articulate [m], the velum opens, the lips close, the tongue assumes the position for the following sound (in [mer-már] the tongue is low in the center of the mouth for [a]), and the airstream is released through the nose.

When [nm] changes to [rm], instead of the tongue touching the alveolar ridge and remaining there while the airstream is released through the nose for [n], the tongue quickly strikes the alveolar ridge
and moves away from it while the airstream is released through the mouth for [r]. Also, when [nm] changes to [rm], instead of the velum opening for [n] then remaining open while the lips close for [m], the opening of the velum is delayed until the lips close for [m]. Consecutive movements of the velum and lips have become simultaneous movements: the velum opens at the same time that the lips close. The velum is consequently held open for a shorter period of time: rather than being open for two sounds, [n] and [m], it is open for one sound, [m].

Economy is introduced in the changes from [nm] to [m] in the movement of the tongue, because the tip of the tongue is not held in place at the alveolar ridge as long for [r] in [rm] as it is for [n] in [nm]. Economy is also introduced because the movements of the velum and lips do not have to be co-ordinated so that the closing of the lips follows the opening of the velum, and because the velum is not held open as long for [rm] as it is for [nm].

5.2.1.B. Through syncope, [n] and [m] are juxtaposed in [á-ni-ma] > [án-ma]. The [n] and the [m] dissimilate, and the [n] becomes [l] in [á-n-ma] > [ál-ma]. The dissimilation is shown in distinctive features below:

[án-ma] > [án-ma] > [ál-ma]

\[\dot{V}-CV-CV \quad \dot{V}C-CV \quad \dot{V}R-CV\]

The developments are the same as for 5.1.1.A., except for the last stage, which is as follows:
+LAT under [l] indicates that [l] is a specific type of continuant. It, like both [n] and [m], is +CNT. [n] and [m] differ in point of articulation. [n] changes to [l], from which it differs in nasality. [n] has thus dissimilated from [m]; [l] and [m] differ in both point of articulation and nasality.

As well as dissimilating from the following nasal, the [n] may also be assimilating to the preceding vowel. The [n] is +NSL, but both [l] and the preceding vowel are oral (-NSL). Also, since [n] is a consonant, it is -VOCALIC +CONSONANTAL; since [l] is a resonant, it is +VOCALIC +CONSONANTAL; and since the preceding [a] is a vowel, it is +VOCALIC -CONSONANTAL. By changing from [n] to [l], the sound has become more similar to the preceding vowel: both [l] and the vowel are +VOCALIC and are -NSL.

The transition from [nm] to [lm] is described in articulatory movements in the following paragraphs.

For [n-m], the description is the same as that for [n-m] in 5.2.1.A. above.

In [l-m], the vocal cords vibrate continuously. After the articulation of the preceding vowel, the velum remains closed, the lips remain
open, and the tip of the tongue presses against the alveolar ridge while
the airstream escapes laterally through the mouth, to produce [l].

To articulate [m], the velum opens, the lips close, the tongue assumes
the position for the following sound (in [ál-ma] the tongue is low in the
center of the mouth for [a]), and the airstream is released through
the nose.

When [nm] changes to [lm], instead of the tip of the tongue touching
the alveolar ridge and remaining there while the airstream is released
through the nose for [n], the tip of the tongue touches the alveolar ridge
and remains there while the airstream escapes laterally through the
mouth for [l]. Also, when [nm] changes to [lm], instead of the velum
opening for [n], then remaining open when the lips close for [m], the
opening of the velum is delayed until the lips close for [m]. Consecu-
tive movements of the velum and lips have become simultaneous: the
velum opens at the same time that the lips close. The velum is conse-
quently held open for a shorter period of time: rather than being open
for two sounds, [n] and [m], it is open for one sound, [m].

The length of time that the tip of the tongue is held in place at the
alveolar ridge is the same for both [n] and [l], so no economy results
in the movement of the tongue, unlike the economy introduced in the
movement of the tongue by the change from [n] to [r] in 5.2.1.A. Economy
is introduced, however, because the movements of the velum and lips do
not have to be co-ordinated so that the closing of the lips follows the
opening of the velum, and because the velum is not held open as long for
[1m] as it is for [nm].

5.2.2. Two developments are discussed in this section. A three-
consonant combination may simplify by the loss of the first consonant or
by the loss of the second consonant. Each of these developments is dis-
cussed separately below.

5.2.2.A. As a result of syncope, the combination [nst] occurs in
[kon-su-tu'-ra] > [kons-tu'-ra]. This combination simplifies by the loss
of the first consonant, [n], through complete assimilation of the [n] to
the following [s], and [kons-tu'-ra] becomes [kos-tu'-ra].

In [ns-t], to articulate [n], the vocal cords vibrate, the velum opens,
the lips are open, and the tip of the tongue is placed against the alveolar
ridge while the airstream escapes through the nose. To articulate [s]
(i.e., to make the transition from [n] to [s]), the vocal cords cease to
vibrate, the velum closes, the lips remain open, and the tongue still
rests against the alveolar ridge but a groove through which the airstream
passes is formed in the tongue and the airstream escapes through the
mouth. To articulate [t] (i.e., to make the transition from [s] to [t]),
the vocal cords still do not vibrate, the velum remains closed, the lips
are still open, and the tongue tip moves up to make complete closure
against the back of the upper front teeth to stop the airstream, which is
then released abruptly.
5.2.2.A. An unacceptable three-consonant combination may simplify by the loss of the first consonant if the second consonant is [s].

[kon-su-tú-ra] > [kons-tú-ra] > [kos-tú-ra]

CVC-CV-C\'RV  CVCC-C\'RV  CVC-C\'RV
The [n] in [ns-t] is lost through complete assimilation to the [s].
Instead of the vocal cords vibrating, the velum opening, the lips being open, and the tongue tip resting against the alveolar ridge while the airstream escapes through the nose, and then the vocal cords ceasing to vibrate, the velum closing, the lips staying open, and the tongue tip resting against the alveolar ridge while the airstream passes through a groove in the tongue (i.e., instead of the transition from [n] to [s]), the following happens: the vocal cords cease to vibrate earlier than before, the velum does not open, the lips are open, and the tongue tip rests against the alveolar ridge while the airstream passes through a groove in the tongue. Thus the [n] has completely assimilated to the [s]. When the [n] is lost, some movements (the change from vibrating to not vibrating for the vocal cords; the opening and then closing of the velum) are eliminated (the vocal cords cease to vibrate early; the velum does not open). Other movements (the lips remaining open; the tongue tip resting on the alveolar ridge and then the tongue tip continuing to rest on the alveolar ridge while the airstream passes through a groove in the tongue) become simultaneous (the lips do not remain open as long; they are open only for one sound, [n], rather than for two sounds, [n] and [s]; the tongue rests on the alveolar ridge and a groove is formed in the tongue at the same time).

In distinctive features, the loss of [n] occurs as follows:
After the loss of [n] in [ns-t], the combination [s-t] remains without change. The transition from [s] to [t] is the same as described above in [ns-t].

Economy of effort is introduced through the loss of [n]. Through the elimination of some movements, the vocal cords do not vibrate as long as they did before the loss of [n] (they do not have to vibrate for an [n]) and there is a saving of one opening and closing of the velum. Through other movements becoming simultaneous, the lips are not open as long as they were before (they do not have to remain open for an [n]) and the tongue is not held in place as long at the alveolar ridge.

5.2.2.B. As a result of syncope, the combination [mpt] occurs in [kóm-pu-tum] > [kómp-tu]. This combination undergoes two changes: it simplifies by the loss of the second consonant, [p], then the first of the two remaining consonants, [m], assimilates to the last consonant, [t]. Through these changes [kómp-tu] becomes [kónto]. The remaining change from [kónto] to [kwénto] involves a vocalic development, the diphthongization of [o] to [we] in a stressed syllable.

For [mp-t], to articulate [m], the vocal cords vibrate, the velum
5.2.2.B. An unacceptable three-consonant combination may simplify by the loss of the second consonant. The first of the two remaining consonants may assimilate to the last.

\[
\text{[kom-pu-tum]} \rightarrow \text{[komp-tu]} \rightarrow \text{[kon-to]} \rightarrow \text{[kwénto]}
\]

CVC-CV-CVC CVC-CVC-CV CV-CV CSVC-CV
opens, the tongue moves towards the upper front teeth, the lips close and the airstream is released through the nose. To articulate [p] (to make the transition from [m] to [p]), the vocal cords stop vibrating, the velum closes, the tongue remains near the upper front teeth, the lips close and the airstream is stopped. To articulate [t] (to make the transition from [p] to [t]), the vocal cords still do not vibrate, the velum stays closed, the tongue moves up to make complete closure behind the upper front teeth, then the airstream is released through the mouth.

The [p] in [mp-t] is lost through assimilation to the [t]. Instead of the vocal cords ceasing to vibrate, the velum closing, the tongue moving toward the upper front teeth, and the lips closing to stop the airstream (i.e., the transition from [m] to [p]) and then the action of the vocal cords, velum, and lips remaining the same while the tongue makes complete closure behind the upper front teeth (i.e., the transition from [p] to [t]), and then the airstream being released, the following happens: the vocal cords cease to vibrate, the velum closes, and the lips open and at the same time the tongue moves up to make closure behind the upper front teeth. Rather than the airstream being stopped at the lips (for [p]) and then being released at the teeth (for [t]), the airstream is stopped and released only at the teeth. When the [p] is lost, consecutive movements (the transition from [m] to [p], followed by the transition from [p] to [t]) become simultaneous movements
(the transition is only from \([m]\) to \([t]\)).

In distinctive features, the loss of \([p]\) occurs as shown below:

\[
\begin{array}{cccccccc}
[m] & [p] & \rightarrow & [t] & [m] & ([t]) & \rightarrow & [t] \\
+VCD & -VCD & -VCD & +VCD & -VCD & -VCD & +VCD & -VCD & -VCD \\
+NSL & -NSL & -NSL & +NSL & -NSL & -NSL & +NSL & -NSL & -NSL \\
+BILAB & +BILAB & +DEN & \rightarrow & +BILAB & +DEN & +DEN & +DEN & +DEN \\
+CNT & +STP & +STP & +CNT & +STP & +STP & +CNT & +STP & +STP \\
\end{array}
\]

Not only does the \([p]\) assimilate to the \([t]\) by changing from bilabial to dental, but the \([m]\) also assimilates to the \([t]\) by changing from bilabial to dental. The assimilation of the nasal to the point of articulation of the following stop facilitates the transition from \([m]\) to \([t]\), and \([m-t]\) becomes \([n-t]\).\(^{20}\)

In \([m-t]\), to articulate \([m]\), the vocal cords vibrate, the velum opens, the lips close, the tongue moves toward the upper front teeth, and the airstream is released through the nose. To articulate \([t]\), the vocal cords stop vibrating, the velum closes, the lips open, the tongue makes closure behind the upper front teeth and the airstream is released through the mouth. In \([n-t]\), to articulate \([n]\), the vocal cords vibrate, the velum opens, the lips are open, the tongue moves towards the upper front teeth, and the airstream is released through the nose. Then \([t]\) is articulated.

The only change from \([m-t]\) to \([n-t]\) is that the lips do not close. As a result, a dental nasal rather than a bilabial nasal precedes the dental stop.
In distinctive features, the assimilation occurs as follows:

<table>
<thead>
<tr>
<th>Feature</th>
<th>[m]</th>
<th>[t]</th>
<th>[n]</th>
<th>[t]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCD</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>NSL</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>BILAB</td>
<td>+</td>
<td>DEN</td>
<td>+</td>
<td>DEN</td>
</tr>
<tr>
<td>CNT</td>
<td>+</td>
<td>STP</td>
<td>+</td>
<td>STP</td>
</tr>
<tr>
<td>LONG</td>
<td>-</td>
<td>LONG</td>
<td>-LONG</td>
<td>LONG</td>
</tr>
</tbody>
</table>

Through these changes [komp-tu] has become [kon-to]. Through diphthongization [kon-to] becomes [kwēn-to].

Economy is brought about through the loss of [p] in [mp-t] when consecutive movements become simultaneous movements, because the lips are not held closed as long (they are closed only for [m], rather than for both [m] and [p]), and the tongue is not held as long in the position it assumes to articulate [t] (it is in that position for [m] and [t], rather than for [m], [p], and [t]). 21 Economy is also brought about through the assimilation of [m-t] to [n-t], because the lips do not have to close and then open (for [m-t]) but rather remain open (for [n-t]).

5.2.3. In [ā1-te-rum] > [āt-tru] > [āw-tro] > [o'-tro], the [l] vocalizes to a secondary wau, which then assimilates completely to the [a] and raises the [a] to [ɔ].

In [ā1-t], the velum is closed throughout the sequence. To articulate [a], the vocal cords vibrate, the mouth is widely open, the lips are not spread nor rounded but are in an intermediate position, and the tip of the tongue rests near the lower front teeth while the tongue itself
5.2.3. \([\tilde{t}n] > [\tilde{t}l] > [wt] > [t]\), sometimes, when preceded by \([a]\).

\([\tilde{a}l-te-rum] > [\tilde{a}l-tro] > [aw-tro] > [o-tro]\)

\(\check{V}R-CV-RVC \check{V}R-CRV \check{V}S-CRV \check{V}-CRV\)
lies low and level in the mouth. To produce [l], the vocal cords vibrate, the tip of the tongue presses against the back of the upper front teeth to make closure, and the airstream escapes on one or both sides of the tongue. To articulate [t], the vocal cords stop vibrating, and the tip of the tongue continues to press against the back of the upper front teeth to stop the airstream, which is then released abruptly.

In the changes from [al-te-rum] to [al-tru], then to [aw-tro], the [l] vocalizes through its velar allophone [t], to become a secondary wa, as described in the following paragraphs.

In the articulation of [l], the passage of air through the mouth is blocked centrally but not laterally. The tongue tip (which usually forms a closure at the alveolar ridge or in the pre-alveolar region for [l]) forms a closure at the back of the upper front teeth (due to the fact that this is a dental variety of [l] preceding a dental stop), but the sides of the tongue do not touch the palate. Air is allowed to pass along the sides of the tongue (laterally), but not along the center.

In the articulation of [t], the back of the tongue is raised towards the velum (velarization) and simultaneously there is alveolar blockage of the airstream by the tip of the tongue. A co-articulation exists: the velar articulation is secondary to the alveolar articulation, and the sound is a velarized alveolar lateral. In the vocalization of [l], it first becomes velarized to [t], then the velarization becomes primary rather than secondary, and the alveolar and lateral qualities are lost. The air
escapes centrally rather than laterally; the alveolar blockage is lost. A labial element is introduced by an accompanying rounding of the lips. The result of these changes is [w].

In the changes in which [n] vocalizes to [w], rather than the tip of the tongue moving from its position low in the mouth for [a] to make complete closure against the back of the upper front teeth, the airstream escaping along the sides of tongue for [n], and then the tip continuing to press against the back of the upper front teeth to maintain closure for [t], the following occurs: the dorsum glides from its position low in the mouth to high in the back of the mouth so that the highest part of the dorsum almost touches the velum for [w], then the tip of the tongue presses against the alveolar ridge to make closure for [t]. When the dorsum moves up and back for [w], as a natural consequence the tip of the tongue is pulled down; then, when the tip moves up and forward for [t], the dorsum is pulled down, as can be seen in the mouth diagrams for [aw-t]. Rather than the tip touching the back of the upper front teeth and then continuing to press against the back of the upper front teeth, the tongue movements flow naturally front back to front. These changes have facilitated the movement of the tongue.

The vocalization of [n] to [w] can be summarized in distinctive features as follows:
In the final change, from [aw-tro] to [o-tro], after the [l] has vocalized to wau, the wau—which is realized as a glide following [a] and which forms a diphtong with it—assimilates completely to the [a] and raises it to [o], as described below.

In the combination [aw], the velum remains closed and the vocal cords vibrate throughout the sequence. For [a], the lips are not spread nor rounded but are in an intermediate position, and the tip of the tongue rests near the lower front teeth while the tongue itself lies low and level in the mouth. For [w], the lips are very rounded, and the highest part
of the dorsum is in the back of the mouth so close to the velum that the
airstream escapes with friction.

When [a] and [w] assimilate, some consecutive movements (the
velum remaining closed and the vocal cords continuing to vibrate) become
simultaneous (i.e., the velum does not remain open as long: it is open just
for one sound, [o], rather than for two, [aw], and the vocal cords do not
vibrate as long: they vibrate for [o] rather than for [aw]). Other conse-
cutive movements (the lips being in an intermediate position and then
being very rounded; the tongue lying low and level in the mouth and then
the dorsum moving so close to the velum that the airstream escapes with
friction) are eliminated (i.e., the lips are only rounded; the tongue assumes
a compromise mid velar position).

In distinctive features this assimilation occurs as follows:

<table>
<thead>
<tr>
<th></th>
<th>[a]</th>
<th>[w]</th>
<th>[o]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td></td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td></td>
</tr>
<tr>
<td>+LOW</td>
<td>+HIGH</td>
<td>+MID</td>
<td></td>
</tr>
<tr>
<td>CENTRAL</td>
<td>VEL</td>
<td>VEL</td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+SCN</td>
<td>+VWL</td>
<td></td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td></td>
</tr>
</tbody>
</table>

Through vocalization and then assimilation, [a]-te-rum] changes to
[ə-tru], then to [əw-tro], and then to [ɔ-tro]. Through syncope the
syllable-initial [t] comes to be followed by [r], and forms an acceptable
onset with the [r]. The combination [tr] remains unchanged.

Economy of effort is introduced by the vocalization of [l] to [w]:
the movements of the tongue are facilitated. Economy is also introduced by the assimilation of [a] and [w]: through the elimination of some consecutive movements, the velum is not held open as long as before the assimilation, and the vocal cords do not vibrate as long; through other consecutive movements becoming simultaneous, the lips and the tongue move less than they did before the assimilation.

5.2.4. In [mút-tum] > [múj-tu] > mucho [mú-tʃo], the [l] vocalizes to become a secondary yod, then the following [t] assimilates to the yod and palatalizes to become [tʃ].

The vocalization of [l] to [j] can be summarized in distinctive features as follows:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[u]</td>
<td>[l]</td>
<td>[t]</td>
</tr>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>-VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+HIGH</td>
<td>+DEN</td>
<td>+DEN</td>
</tr>
<tr>
<td>VEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+LAT</td>
<td>+STP</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[u]</td>
<td>[j]</td>
<td>[t]</td>
</tr>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>-VCD</td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>+HIGH</td>
<td>+HIGH</td>
<td>+DEN</td>
</tr>
<tr>
<td>VEL</td>
<td>PAL</td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+SCN</td>
<td>+STP</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

The [l] in [ul-t] retains a front point of articulation and does not velarize to [t] (Cf. 5.2.3.). The front articulation, strengthened by dissimilation from the preceding [u], causes [l] to vocalize to a yod.
5.2.4. \([\text{j}t] > [\text{jt}] > [t\text{f}]\), generally, when preceded by \([u]\) in Latin.

\([\text{mu}^\text{u}]-\text{tum} > [\text{mu}^\text{u}]-\text{to} > [\text{mu}^\text{u}]-\text{to}\]

\(\text{CVR-CVC CVS-CV CV-CV}

\(\text{u} \quad \text{j} \quad \text{t}\)

\(\text{u} \quad \text{j} \quad \text{t}\)

\(\text{u} \quad \text{t}\)
rather than a wau.

In [u₁-t], the velum is closed during the entire sequence. To articulate [u], the vocal cords vibrate, the lips are very rounded, the highest part of the dorsum is in the back of the mouth and close to the velum. To articulate [l], the vocal cords continue to vibrate, the tip of the tongue presses against the back of the upper front teeth to stop the airstream. The airstream is released laterally through the mouth.

For [t], the vocal cords stop vibrating, the sides of the tongue rise so that the airstream cannot escape along the sides of the tongue, and the tongue continues to press against the back of the upper front teeth to stop the airstream, which is then released abruptly.

In the transition from [u₁ⁿ-t], to [u₁j-t], rather than the sides of the tongue being up for [u], dropping for [l], and then rising up for [t], this happens: the sides of the tongue remain up for the entire sequence. Thus the sides of the tongue move less. Also, rather than the tongue tip being down (near the lower teeth) for [u], moving up to press against the upper teeth for [l], and remaining up to press against the upper teeth for [t], this happens: the tongue tip is down (near the lower teeth) for [u], stays down for [j], and then moves up to press against the upper teeth for [t]. Instead of the tongue tip being held up and made to press against the teeth for two sounds, [l] and [t], it is held up and presses against the teeth for one sound, [t]. Thus the tongue tip is held up for a shorter length of time after the change from [u₁ⁿ-t] to [u₁j-t].
In the change from [új-t], to [ú-tʃ], the [t] assimilates to the point of articulation of the yod and palatalizes to [tʃ].

The palatalization of [t] can be summarized in distinctive features as shown below:

\[
\begin{array}{cccccc}
+VCD & +VCD & -VCD & +VCD & -VCD \\
-NSL & -NSL & -NSL & -NSL & -NSL \\
+HIGH & +HIGH & +DEN & +HIGH & +PAL \\
VEL & PAL & VEL & VEL & VEL \\
+VWL & +SCN & +STP & +VWL & +AFR \\
-LONG & -LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

In [új-t], the velum is closed throughout the sequence. To articulate [u], the vocal cords vibrate, the lips are very rounded, the highest part of the dorsum is in the back of the mouth and close to the velum. To articulate [j], the vocal cords continue to vibrate, the tongue tip moves forward to rest against the lower front teeth, the dorsum arches so that the dorsum is in the front of the mouth almost touching the palate, and the airstream passes with friction through the slit formed by the tongue and the palate. For [t], the vocal cords stop vibrating and the tip of the tongue moves to press against the back of the upper front teeth to stop the airstream which is then released abruptly.

In [ú-tʃ], the velum is closed during the entire sequence. For [u], the vocal cords vibrate, the lips are very rounded, and the highest part of the dorsum is in the back of the mouth and close to the velum. For [tʃ], the vocal cords stop vibrating; the blade and tip of the tongue
rise up and touch the alveolar ridge and the front part of the palate; then the sides of the dorsum touch the sides of the palate and the upper back teeth, leaving and opening in the middle. [tʃ] is an affricate: the airstream for [tʃ] is momentarily interrupted, as it is for a stop, by the blade of the tongue momentarily contacting the front palate; then the blade of the tongue quickly releases the contact, forming a round opening between itself and the front palate, and the airstream passes through this groove, as it does for a fricative.

In the transition from [u̯]-t to [u-tʃ], rather than the vocal cords vibrating for [u], continuing to vibrate for [j], and then ceasing to vibrate for [t], they vibrate for [u], then cease vibrating for [tʃ]. Instead of vibrating for two sounds, [u] and [j], the vocal cords vibrate for one sound, [u]. Thus the vocal cords do not vibrate as long after the assimilation of [j] and [t] to [tʃ] as they did before the assimilation. Also, rather than the tongue tip resting against the lower front teeth for [u] while the dorsum is in the back of the mouth near the velum for [u], the tip staying against the lower teeth while the dorsum moves forward to almost touch the palate for [j], and then the tip moving forward to touch the back of the upper front teeth for [t], this occurs; after articulating [u], the blade and tip of the tongue touch the alveolar ridge and front part of the palate while the sides of the dorsum touch the sides of the palate and the upper back teeth. Instead of articulating two sounds, [j] and [t], the tongue compromises and articulates only one sound, [tʃ].
Thus, the tongue does not move as much after the assimilation of [j] and [t] as it did before the assimilation.

Economy is introduced in the change from [ḍ̪̊-t] to [ḍ̪̊-ʃ] because the sides of the tongue move less and the tip of the tongue is held up for a shorter length of time. Further economy is introduced in the change from [ḍ̪̊-ʃ] to [ṭ-ʃ] because after the assimilation of [j] and [t] the vocal cords do not vibrate as long as they did before the assimilation and the tongue does not move as much as it did before the assimilation.

5.2.5. In [úr-sum] > [úr-su] > [ós-so] > [ós-so], the [r] assimilates to the [s], and the resultant [s:] shortens to [s].

In distinctive features, the changes are as follows:

- [r] +VCD -NSL +VIB -LONG
- [s] -VCD -NSL +ALV -LONG
- [s] -VCD -NSL +ALV -LONG
- [s] -VCD -NSL +ALV -LONG

In the assimilation of [r] to [s], the voiced alveolar fricative vibrant [r], changes in such a way that its features become the same as that of the voiceless alveolar fricative continuant, [s].
5.2.5. Standard Latin [rs] changes to Vulgar Latin [s:] and develops into [s] in Castilian.

[úr-sum] > [úr-su] > [ós-so] > [ó-so]

\[ V_R\cdot C_V \quad V_R\cdot C_V \quad V_C\cdot C_V \quad V\cdot C_V \]
The long sonsonant [s:] results from syllable-final [s] followed by syllable-initial [s] in [ɹs-so]. It simplifies to a single consonant, perhaps through a complete assimilation of the syllable-final [s]. The [s:], pronounced with decreased duration, becomes [s] in [ɹ-so].

In articulatory terms, the changes occur as follows:

In the sequence [ɹr-su], the velum remains closed during the entire sequence. The vocal cords vibrate for [u] and for [r], stop vibrating for [s] and vibrate again for [u]. To produce [r], the tongue tip quickly strikes the alveolar ridge as the airstream passes through. To articulate [s:], the tongue is also in alveolar position, but it rests against the alveolar ridge and a groove through which the airstream passes is formed in the tongue.

In the sequence [ɹs-so], the velum remains closed during the entire sequence. The vocal cords vibrate for the preceding vowel, cease vibrating for [s:], and vibrate again for the following vowel. The tongue movement for [s] is the same as described in the preceding paragraph.

When [r] and [s] assimilate to [s-s], two consecutive movements are eliminated. Rather than the vocal cords vibrating for the preceding vowel, continuing to vibrate for [r], ceasing to vibrate for [s], and then vibrating again for the following vowel, this occurs: the vocal cords cease to vibrate early. They vibrate for the preceding vowel, stop vibrating for [s], and vibrate for the following vowel. The vocal cords
do not vibrate as long: they vibrate for three sounds in [úr-su] but for two sounds in [ós-so]. Also, rather than the tongue striking the alveolar ridge and moving away for [r], and then the tongue resting against the alveolar ridge and a groove through which the airstream passes being formed in the tongue for [s], this occurs: the tongue moves to the alveolar ridge, a groove is formed in it, and it rests at the alveolar ridge while the airstream passes through the groove for twice as long as it does for [s]. The tongue makes one less movement for [ós-so] than it did for [úr-su]; in [úr-su] the tongue made four movements, but for [ós-so] it makes three.

For the change from [ós-so], to [ó-so], the tongue is held half as long at the alveolar ridge for [s] as it was for [s:]; consequently, only half as much air is released through the groove in the tongue.

Through the assimilation of [rs] to [s:], there is economy of effort in the action of the vocal cords and in the movement of the tongue. The vocal cords do not vibrate as long after the assimilation as they did before the assimilation, and the tongue makes one less movement than it did before the assimilation.

Through the shortening of duration of [s:] to [s], economy is introduced because the tongue is not held at the alveolar ridge as long and less air is required for the production of [s] than is required for [s:].

5.2.6. In [dám-num] > [dán-no] > [dá-po], the [m] assimilates

[dám-num] > [dán-no] > [dá-po]

CVC-CVC  CVC-CV  CV-CV
to the following [n], producing [n:], which palatalizes to [n].

In distinctive features, the change from [mn] to [n:] occurs as follows:

<table>
<thead>
<tr>
<th>[m]</th>
<th>[n]</th>
<th>[n]</th>
<th>[n]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>+NSL</td>
<td>+NSL</td>
<td>+NSL</td>
<td>+NSL</td>
</tr>
<tr>
<td>+BILAB</td>
<td>+ALV</td>
<td>+ALV</td>
<td>+ALV</td>
</tr>
<tr>
<td>+CNT</td>
<td>+CNT</td>
<td>+CNT</td>
<td>+CNT</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>

In the change from [m] to [n], the bilabial nasal [m] assimilates to the alveolar nasal [n] in point of articulation, resulting in a syllable-final [n]. This syllable-final [n] followed by a syllable-initial [n] is equivalent to [n:].

The [n:] does not simplify to its short counterpart [n] but rather palatalizes. The [n:], with increased duration--and consequently increased tenseness--retracts from an alveolar to a palatal point of articulation. The change in distinctive features is as follows:

<table>
<thead>
<tr>
<th>[n:]</th>
<th>[n]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>+VCD</td>
</tr>
<tr>
<td>+NSL</td>
<td>+NSL</td>
</tr>
<tr>
<td>+ALV</td>
<td>+PAL</td>
</tr>
<tr>
<td>+CNT</td>
<td>+CNT</td>
</tr>
<tr>
<td>+LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>
In articulatory terms, the changes occur as described below:

For [m-n] the vocal cords vibrate continuously. The velum opens for the articulation of [m] and stays open until after the articulation of [n]. To articulate [m], the lips press together and the tongue assumes the position required for the following sound, so the tip of the tongue is placed against the alveolar ridge for the production of the following [n], and the airstream is released through the nose. To articulate [n], the lips open, the tongue stays against the alveolar ridge, and the airstream is released through the nose.

For [n-n], the vocal cords vibrate continuously. The velum opens for the articulation of the first [n] and stays open until after the articulation of the second [n]. The tongue is placed against the alveolar ridge and held there while the airstream is released through the nose twice as long as it is for [n].

When [m-n] assimilates to [n:], one movement is eliminated. Rather than the lips closing for [m] and then opening for [n], this happens: the lips do not close. The other movements remain unchanged: for the same length of time for both [m-n] and [n-n], the vocal cords vibrate, the velum is open, and the airstream is released through the nose.

For [n] in [da:no], the vocal cords vibrate, the velum opens, the tongue dorsum arches and makes extensive contact with the palate, the lips remain open, and the airstream escapes through the nose.

In the change from [n:] to [n], the vocal cords vibrate only half as
long for [n] as for [n:], and the velum is held open only half as long.

Rather than the tongue tip pressing against the alveolar ridge and being held there as for [n:], in the articulation of [n] the dorsum makes contact with the palate for a period of time that is only half as long as the time that the tongue tip presses against the alveolar ridge, and the airstream is released through the nose only half as long.

Economy results from the change from [m-n] to [n:]. There is a saving of one closing and opening of the lips. Economy also results from the change from [n:] to [ŋ]: the vocal cords do not vibrate as long, the velum is not held open as long, the tongue is not held in place as long, and less breath is required for [ŋ] than for [n:].
CLASS FOUR: MEDIAL COMBINATIONS NOT BELONGING TO ANY OF THE PRECEDING CLASSES

6.1.1. Conspectus. The medial consonant combinations discussed in this chapter are those that do not belong to any of the preceding classes. Many of these developments are problematic and are not clearly understood. They are diverse in nature, but can be divided into three major groups according to the sounds involved: those that consist of a labial stop + a dental stop; those that consist of a dental stop + a velar stop, or of a velar stop + a dental stop; and other combinations.

The first major group is subdivided into two categories that undergo differing developments depending on the time of the development of the combination: those developing early are resolved through the assimilation of the first stop to the second, and those developing late (late primary as well as secondary combinations) are resolved through the vocalization of the first of the two stops.

The second major group is subdivided into three categories of secondary combinations based on the sounds involved: [tk], [dk], and
[kt]. All of these combinations are resolved through assimilation.

The third major group is also subdivided into three categories based on the sounds involved: [ng], and [gn], [kt], and [ks]. In all these combinations, one consonant vocalizes to become a secondary yod, then the combinations are resolved through palatalization.

By reviewing the preceding paragraphs, one can see that the diverse combinations in this chapter are resolved through the assimilation of the first stop to the second, the vocalization of the first of two stops, assibilation, or palatalization. All these processes are types of assimilation. Sections 6.1.1., 6.1.2., and 6.1.3. are detailed discussions of the three major groups outlined above.

These combinations all consist of two consecutive stops, except for the combinations [ng] and [gn]. In all these combinations, the syllable division falls between the two consonants. Usually, the first consonant, which is syllable-final and lax, changes, and this changed element affects the second consonant, which is syllable-initial and tense. The two consonants simplify to become one sound which, in most instances, is a fricative.

6.1.1. Labial stop + dental stop combinations. A. Assimilation of two stops in combinations that develop early. In an early-developing primary combination, the first consonant (the labial) generally assimilates to the second (the dental), then the resultant long consonant
simplifies. Such combinations occur in the environment -V+labial stop
-dental stop+V-, which changes to -V+dental stop-dental stop+V-, and
then changes to -V-dental stop+V-. Examples of assimilation in this
environment are [rúp-tum] > [rót-to] > [ró-to] and [súb-tum] >
[sót-to] > [só-to]. The development of [rúp-tum] is representative of
this change and is illustrated in 6.2.1.

B. Vocalization of the first stop in combinations that develop
later. In late-developing primary combinations, as well as in secondary
combinations, the labial stop tends to vocalize (rather than to assimilate
to the dental stop). The result is a combination consisting of a secondary
wau followed by a dental stop or followed by a fricative that develops
from the dental stop. The environment is -V+labial stop-dental stop
+V-, which changes to -V+[w]-dental stop+V-, then to -V+[w]-dental
stop (or dental fricative)+V-. Examples of this development are
[kap-tí:-wum] > [kaφ-tí-wu] > cautivo [kaφ-tí-φo] (a late developing
primary combination) and [dé-bí-tam] > [dé-φí-a] > deuda [déw-φa]
(a secondary combination). The development of [kap-tí:-wum] is
illustrated in 6.2.2.

6.1.2. Dental stop + velar stop, or velar stop + dental stop com-
binations. A. Assimilation of secondary [tk]. [tk] changes to [φγ] and
[ts-j] and then becomes [θγ], as in portasticum [por-tá:-ti-kum] >
[por-tád-gu] > [por-táφ-γo] and portazgo [por-táts-γο] > [por-táθ-γo].
The sequence of developments for this combination is not clearly understood. This may be a semi-learned development, since most of the words in which it occurs are legal or governmental terms, e.g., mayora:ticum [ma-jo-rá:-ti-kum] > mayorazgo [ma-jo-raθ-yo].

B. Assimilation of secondary [dk]. [dk] changes to [θγ] and then becomes [θγ], as in [ju-di-ká:-re] > [juθ-γár] > [juθ-γár]. This development is very similar to that of [por-tá:-ti-kum] in the preceding paragraph. The sequence of developments is not clearly understood.

[dk'] followed by a front vowel undergoes a slightly different assimilation: [dk'] > [dts] or [ddz] > [ts] or [dz] > [θ], as in tredecim [tré-de-kim] > [tréθ-k'im] > [tréθ-tse] or [tréθ-dze] > [tréθ-tse] or [tréθ-dze] > trece [tréθ-se]. This combination occurs in the environment -voiced dental stop+V-voiceless velar stop+front V-, which changes to -voiced dental stop-voiceless palatal stop+front V-, then to -voiced dental stop-voiceless (or voiced) prealveolar affricate+front V-, then to voiceless (or voiced) prealveolar affricate+front V-, and then to -voiceless interdental continuant+front V-. The development of [tréθ-de-kim] is representative of these assimilations and is illustrated in 6.2.3.

C. Assimilation of secondary [k't]. [k't] changes to [ts-θ] or [dz-θ] > [θ], as in placitum [plá-te-kim] > plazo, plazdo [pláts-θo] or [pládz-θo] > plazo [pláθ-o]. The combination occurs in the
environment -voiceless velar stop+V-voiceless dental stop+V-, which changes to -voiceless dental continuant-voiced dental fricative+V-, or -voiced dental continuant-voiced dental fricative+V-, and then to -voiceless interdental fricative+V-. In [pla'-ki-tum], the unstressed front vowel following [k'1] remains long enough for [k'1] to develop to [ts] or to [dz]. The [t] voices and becomes fricative before the unstressed vowel is lost through syncope, and the resultant [p] is either absorbed by [ts] (or [dz]) or is lost through dissimilation.

6.1.3. Other combinations. A. Vocalization followed by palatalization in primary [ng] and primary [gn]. Both these combinations develop into [ɲ].

[ng] may develop as follows: [ng] > [nj] > [ɲ], as in [lon-ge:] [lon-je] > luene [lwe-je]. The [g] vocalizes to a secondary yod which palatalizes the [n], changing it to [ɲ]. This combination occurs in the environment -V+alveolar nasal-voiced velar stop+V-, which changes to -V+alveolar nasal-[j]+V-, then to -V+palatal nasal+V-.

Similarly, [gn] may develop as follows: [gn] > [jn] > [ɲ], as in [lig-num] > [lej-no] > [le-ɲo]. This combination occurs in the environment -V+voiced velar stop-alveolar nasal+V-, which changes to -V+[j]-alveolar nasal+V-, then to -V-palatal nasal+V-. The development of [lig-num] is representative of these palatalizations of [n] and is illustrated in 6.2.4.
B. **Vocalization followed by palatalization in [kt].** 1. **Primary [kt].** After all vowels except [i:], [kt] generally develops into [tʃ], as in noctem [nók-tem] > [nók'-tem] > [nój-te] > [nój-tʃe] > noche [nó-tʃe] and dictum [dík-tum] > [díj-tu] > dicho [dí-tʃo]. The [kt] vocalizes to a secondary yod which palatalizes the [t], changing it to [tʃ]. The yod closes the preceding vowel and assimilates completely to it. The combination occurs in this environment: -V+voiceless velar stop-voiceless dental stop+V-. The environment changes to -V+[j]-voiceless dental stop+V- and then to -V-voiceless palatal affricate +V-. The development of [nók-tem] is representative of this development of [kt] and is illustrated in 6.2.4.

After [i:], primary [kt] develops into [jt], then into [t], as in fricatum [frí:k-tum] > [fríj-to] > [frí-to]. [k] vocalizes to a secondary yod which completely assimilates to the [i:] before the secondary yod can palatalize the [t]. This combination occurs in the environment -V+voiceless velar stop-voiceless dental stop+V-, which changes to -V+[j]-voiceless dental stop+V-, then to -V+voiceless dental stop+V-.

2. **Secondary [kt] + consonant.** As a result of syncope, [kt] is often followed by a consonant and subsequently simplifies to secondary yod + consonant. For instance, pectinem [pék-ti-nem] > [pékt-ne] > [pék-ne] > peine [péj-ne]. The [t], which is the second consonant in a three-consonant combination ([kt-n]), is lost. The [k] then vocalizes to a secondary yod, but no further change occurs (i.e., the yod does not
palatalize the consonant following it). The environment is -V+voiceless velar stop-voiceless dental stop+V-alveolar nasal+V-, which becomes -V+voiceless velar stop-voiceless dental stop-alveolar nasal +V-, and changes to -V+voiceless velar stop-alveolar nasal+V-, then to -V+[j]-alveolar nasal+V.

C. Vocalization followed by palatalization then velarization in primary [ks]. [ks]+ a vowel develops into [x], as in di:xi: [dí:k-si:] > dixe [dí-ʃe] > dixe [dí-xe]. The [k] vocalizes to a secondary yod which palatizes the [s], changing it to [ʃ]. The yod is absorbed by the preceding vowel. The [ʃ] later velarizes to become [x]. This combination occurs in the environment -V:+voiceless velar stop-voiceless alveolar fricative+V:-, which becomes -V-voiceless palatal fricative+V-, and then becomes -V-voiceless velar fricative+V-. The development of [dí:k-si:] is illustrated in 6.2.6.

[ks] + a consonant, however, develops into [js] + consonant, then simplifies to [s] + consonant. For instance, fraxinum [frá:k-si-num] [fráks-nu] > [fráːjs-no] > [fréis-no]. The [k], which is the first consonant in a three-consonant combination ([ks-n]) having [s] as the second consonant, vocalizes to a secondary yod, is subsequently lost, and no further change occurs (i.e., before the yod is lost, it does not palatalize the consonant following it). This combination occurs in the environment -V+voiceless velar stop-voiceless alveolar fricative+V-alveolar nasal +V-, which changes to -V+voiceless alveolar stop+voiceless alveolar
fricative-alveolar nasal+V-, then to -V+[j]+voiceless alveolar fricative-alveolar nasal+V-, and then to -V+voiceless alveolar fricative-alveolar nasal+V-.

6.2.0. Illustrations and commentaries.

6.2.1. In [rup-tum] > [rot-to] > [ro7-to], the [p] assimilates to the [t]. The resultant [t:] shortens to [t].

In distinctive features, the change occurs as follows:

\[
\begin{array}{cccc}
-VCD & -VCD & -VCD & -VCD \\
-NSL & -NSL & -NSL & -NSL \\
+BILAB & +DEN & +DEN & +DEN \\
+STP & +STP & +STP & +STP \\
-LONG & -LONG & -LONG & -LONG \\
\end{array}
\]

\[
\begin{array}{cccc}
[t:] & [t] \\
-VCD & -VCD \\
-NSL & -NSL \\
+DEN & +DEN \\
+STP & +STP \\
+LONG & -LONG \\
\end{array}
\]

In the change from [p] to [t], the bilabial stop [p] assimilates to the dental stop [t] in point of articulation, resulting in a syllable-final [t]. This [t], and the following syllable-initial [t] in [ro7-to] are equivalent to [t:]. The [t:] simplifies to a single consonant, perhaps through the loss of the syllable-final [t].

In articulatory terms, the changes occur as follows:

For [p-t], the vocal cords do not vibrate, and the velum remains closed throughout the sequence. To articulate [p], the lips press

[ ráp-tum] > [rot-to] > [ró-to]

RVC-CVC  RVC-CV  RV-CV
together to stop the airstream.\(^{11}\) To articulate [t], the tip of the tongue presses against the back of the upper front teeth to stop the airstream, which is then released abruptly.

For [t⊥t], the vocal cords do not vibrate, and the velum is closed. The tongue movement for [t] is the same as described in the preceding paragraph.

When [p⊥t] assimilates to [t⊥t], one movement is eliminated. Rather than the lips closing for [p] and then opening for [t], the lips remain open. The other movements remain unchanged: the vocal cords do not vibrate, the velum is closed, and the airstream is released abruptly. Thus, rather than the airstream being stopped at the lips (for [p]) and then being released at the teeth (for [t]), the airstream is stopped and released only at the teeth.\(^{12}\)

For the change from [t⊥t], to [t], the tongue presses against the back of the upper front teeth only half as long as it did for [t⊥t]. Since the airflow is stopped and released only once for both [t⊥t] ([t⊥t]) and [t], the same amount of breath is required for the production of both sounds.

Economy results from the change of [p⊥t] to [t⊥t]. There is a saving of one closing and opening of the lips.

Economy also results from the change of [t⊥t] to [t]. The tongue is held in place half as long for [t] as it is for [t⊥t].

6.2.2. In capitvum [kap-tʃi-wum] > [kaʃ-tʃi-wu] > cautivo [kaw-tʃi-ɔo], the [p] voices and, through its voiceless bilabial continuant

capti:vum [kap-ti:wum] > [kaF-ti-wu] > cautivo [kaw-ti:po]

CVC-CV:-VC   CVC-CV-SV   CVS-CV-CV
allophone [o], vocalizes to become a secondary wau. Through these changes, [p] assimilates to the preceding [a]. The secondary wau is realized as a glide after the [a] and forms a diphthong with it.

In distinctive features, the changes occur as follows:

<table>
<thead>
<tr>
<th></th>
<th>[a]</th>
<th>[p]</th>
<th>[t]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCD</td>
<td>+VCD</td>
<td>-VCD</td>
<td>-VCD</td>
</tr>
<tr>
<td>NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
</tr>
<tr>
<td>LOW</td>
<td>+LOW</td>
<td>+BILAB</td>
<td>+DEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CENTRAL</td>
<td></td>
</tr>
<tr>
<td>VWL</td>
<td>+VWL</td>
<td>+STP</td>
<td>+STP</td>
</tr>
<tr>
<td>LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td></td>
</tr>
</tbody>
</table>

In articulatory terms, the changes occur as follows:

For [âp-t], the vocal cords vibrate for [a] but do not vibrate for [p] or [t]. The velum remains open during the entire sequence. To articulate [a], the mouth is widely open, the lips are not spread nor rounded but are in an intermediate position, and the tip of the tongue rests near the lower front teeth while the tongue itself lies low and level in the mouth. The airstream passes uninterrupted through the mouth.
and between the lips. To articulate [p], the lips press together to stop the airstream. To articulate [t], the tip of the tongue presses against the back of the upper front teeth to block the airstream, which is then released abruptly.

For [a<|>-t], the vocal cords vibrate for [a] but not for [φ] and [t]. The velum remains open during the entire sequence. To articulate [a], the mouth is widely open, the lips are not spread nor rounded but are in an intermediate position, and the tip of the tongue rests near the lower front teeth while the tongue itself lies low and level in the mouth. The airstream passes uninterrupted through the mouth and between the lips. To articulate [φ], the lips almost touch each other and the airstream, without being interrupted, passes through the slit formed between the lips. For [t], the tip of the tongue presses against the back of the upper front teeth to stop the airstream, which is released abruptly.

When [a<-t] changes to [aφ-t], one movement is eliminated. Rather than the lips being open in an intermediate position while the airstream passes uninterrupted through them for [a], then the lips closing and the airstream being stopped for [p], this happens: the lips are in an intermediate position while the airstream passes uninterrupted through them for [a], then the lips almost touch each other and the airstream continues to pass uninterrupted through the slit between them for [φ]. There is a saving of one closing and opening of the lips. Thus,
rather than the airstream being stopped at the lips for [p] and then being released at the teeth for [t], the airstream is stopped and released only at the teeth. By becoming fricative, the [p] is assimilating to the [a].

For [aw-t], the vocal cords vibrate for both [a] and [w], but cease to vibrate for [t]. The velum remains open throughout the sequence. For [a], the lips are spread nor rounded but are in an intermediate position, and the tip of the tongue rests near the lower front teeth while the tongue itself lies low and level in the mouth. To articulate [w], the lips are very rounded, and the highest part of the dorsum is in the back of the mouth so close to the velum that the airstream escapes with friction. For [t], the tip of the tongue presses against the back of the upper front teeth to stop the airstream, which is released abruptly.

When [aw-t] changes to [aw-t], two movements are added. In the articulation of a bilabial, such as [o] or [p], the position of the tongue is not important. If the following [t] is anticipated (as in 6.2.1.), the tip of the tongue moves towards the upper teeth. On the other hand, if the preceding vowel influences the articulation of the bilabial (as in this section), the tip of the tongue may not move towards the upper teeth until after the bilabial is produced. When the tip of the tongue moves up and forward to be ready to touch the back of the upper front teeth in anticipation of making closure for a following [t] (as in 6.2.1.),
the back of the tongue consequently is pulled down and is low in the mouth. On the other hand, when the tip of the tongue rests near the lower front teeth while the tongue itself lies low and level in the mouth for a preceding [a], and when this position is maintained for the bilabial (as in this section), the back of the tongue (the dorsum) is free to raise up. Raising the dorsum toward the velum during the articulation of [ɸ] introduces a velar element and results in the co-articulated voiced labiovelar semiconsonant (fricative) [w]. The lips, which almost touch each other in the production of the voiceless bilabial slit fricative [ɸ], can easily become very rounded for the production of the secondary wau. Thus, when [ɸ] becomes [w], two movements are added: the dorsum moves up and the lips round. These additional movements facilitate the tongue movements involved in the articulation of the [a] and the fricative following it: the wau is realized as a glide following the [a] and forms a diphthong with it. The tip of the tongue, which is low in the front of the mouth near the lower front teeth for the articulation of both [a] and [w], can still easily move up and forward to press against the back of the upper front teeth to stop the airstream for the [t] that begins the next syllable.

Economy is introduced by the change for [áp-t] to [áɸ-t]. Through the fricativization of [p] to [ɸ] there is a saving of one closing and opening of the lips.

Economy is also introduced by the change from [áɸ-t] to [áw-t].
The dorsum raises up and the lips round more after the change and the vocal cords, rather than vibrating for the first sound and then not vibrating for two consecutive sounds, vibrate for two consecutive sounds and then do not vibrate for the final sound in the sequence. These slight increases in effort, however, are more than counterbalanced by the fact that they facilitate the articulation of the vowel and the fricative following it.

6.2.3. In tredecim \( [\text{tré}-\text{de}-k'\text{im}] > [\text{tréd}-k'\text{im}] > [\text{tréd}-\text{tse}] \) or \([\text{tréd}-\text{dze}] > [\text{tré}-\text{tse}] \) or \([\text{tré}-\text{dze}] > \text{trece} \ [\text{tré}^{-}\text{θe}] \), the voiceless palatal stop \( [k'] \) is attracted to the front articulation of the vowel following it, and through a series of changes its point of articulation moves progressively forward in the mouth. The \( [k'] \) assimilates to become the prealveolar affricate \( [ts] \) (or its voiced counterpart \( [dz] \)), and the preceding \( [d] \) is absorbed by the dental element in \( [ts] \) or \( [dz] \). Then the point of articulation of the \( [ts] \) moves more forward, and the \( [ts] \) becomes the voiceless interdental fricative \( [θ] \) in Modern Castilian. The change from \( [i] \) to \( [e] \) (at the end of the word) is a regular vocalic development.

The \( [k'] \) develops to \( [ts] \) or to \( [dz] \), or to both. There was a certain degree of confusion between these sounds and in their orthographic representation. The Old Spanish spellings \( z \) and \( dz \) usually indicated \( [dz] \) rather than \( [ts] \). The distinction between \( [ts] \) and \( [dz] \) was lost very early in Castilian and was lost during the Old Spanish
6.2.3. Secondary [dk'] followed by a front vowel becomes

Old Castilian [ts] or [dz] and then becomes [θ] in

Modern Castilian.

tredecim [tré-de-k'imum] > [tré'-d-k'im] > [tré'-d-tse] or

[tré'-d-dze] > [tré'-tse] or [tré'-dze] > trece [tré'-θe]

CRV-CV-C VC CRVC-C VC CRVC-C V

CRVC-C V CRV-C V CRV-C V CRV-CV
period in the other Spanish dialects. Both pronunciations existed simultaneously.

In distinctive features, the changes occur as follows:

<table>
<thead>
<tr>
<th></th>
<th>[e]</th>
<th>[d]</th>
<th>[-]</th>
<th>[k']</th>
<th>[i]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>-VCD</td>
<td>+VCD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+MID</td>
<td>+DEN</td>
<td>+PAL</td>
<td>+HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAL</td>
<td>PAL</td>
<td>PAL</td>
<td>PAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+STP</td>
<td>+STP</td>
<td>+VWL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>[e]</th>
<th>[d]</th>
<th>[ts]</th>
<th>[e]</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td>+VCD</td>
<td></td>
</tr>
<tr>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td>-NSL</td>
<td></td>
</tr>
<tr>
<td>+MID</td>
<td>+DEN</td>
<td>+PRE</td>
<td>+MID</td>
<td></td>
</tr>
<tr>
<td>PAL</td>
<td>PAL</td>
<td>ALV</td>
<td>PAL</td>
<td></td>
</tr>
<tr>
<td>+VWL</td>
<td>+STP</td>
<td>+FRIC</td>
<td>+VWL</td>
<td></td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
<td></td>
</tr>
</tbody>
</table>

In articulatory terms, the changes occur as follows:

In all the sequences described in this section, the velum remains closed throughout the sequence.

For [e-d-k'i], the vocal cords vibrate, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, to articulate [e]. The vocal cords continue to vibrate, and the tip of the tongue rises up to press against the back of the upper front teeth to stop the airstream, to articulate [d]. The vocal
cords stop vibrating, the dorsum presses against the palate and the airstream is released, to produce [k']. Then the vocal cords vibrate, the lips spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth very close to the alveolar ridge and front palate, to articulate [i].

For [éd-tse], the articulations of the first two sounds remain unchanged. Then the vocal cords do not vibrate, the tongue tip touches almost against the back of the upper front teeth (i.e., the tip is in a pre-alveolar position), a groove is formed in the tongue tip as for [s], 17 and the airstream (which was stopped by the tongue tip pressing against the back of the upper front teeth in the articulation of [d]) is released through the groove to produce [ts]. Then the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth for [e].

In the transition from [éd-k'i] to [éd-tse], the tongue movements change. After the articulation of the first two sounds, rather than the dorsum pressing against the palate to make closure and the airstream (which was stopped at the teeth for [d]) being released for [k'], then the tip of the tongue resting against the lower front teeth while the dorsum is in the front of the mouth very close to the alveolar ridge and front palate for [i], the following happens: after the articulation of the first two sounds, the tip of the tongue retracts slightly so that it
touches almost the back of the upper front teeth, a groove is formed in the tongue and the airstream (which was stopped at the teeth for [d]) is released through the groove to produce [ts], then the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum does not move as high in the front part of the mouth as it did for [i]. The change from [kʰ] to [ts] facilitates the movements of the tongue: it is easier for the tongue tip to articulate a sound that is towards the front of the mouth than it is for the dorsum to articulate it. Also, the transition from [kʰ] to [i], in which the dorsum has to form two consecutive articulations, is replaced by the transition from [ts] to [e], in which the tongue tip forms the first articulation and the dorsum forms the second. In the change in the final sound in this sequence, the dorsum is not as high in the front of the mouth as it is for [i], and the result is [e]. Thus, less effort is required in the movement of the dorsum for the articulation of the final sound. For both [e-d-kʰ] and [e-d-tse] the vocal cords vibrate for the same three sounds. In both sequences they stop vibrating after [d] and begin vibrating again for the last vowel.

[kʰ] is similar to [kj]. [kj] merges with [tj] in Vulgar Latin, and they apparently develop together and assimilate to [ts].[^18] [kʰ] develops to become [θ] in this section. Cf. section 4.2.1., in which [tj] develops into [ts] and then into [θ]. [kj] and [tj] are similar: both consist of a voiceless stop followed by a yod.

For [e-θe], the vocal cords vibrate, the tip of the tongue rests
against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, to articulate [e]. Then the vocal cords cease vibrating, the tip of the tongue is placed between the front teeth (or sometimes lightly against the back of the upper teeth), and the airstream is released through a slit formed by the tongue and teeth, to produce [θ]. Next, the vocal cords vibrate, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, to articulate the final [e].

In the transition from [éd-tse] to [é-θe], the tongue movements change. After the articulation of the first [e], instead of the tongue tip pressing against the back of the upper front teeth to stop the airstream for [d], the tip of the tongue then retracting slightly so that it touches almost the back of the upper front teeth, a groove being formed in the teeth, and the airstream being released through the groove to produce [ts], and then the tip of the tongue resting against the lower front teeth while the highest part of the dorsum is in the front of the mouth to articulate [e], the following occurs: after the articulation of the first [e], the tip of the tongue moves up so that it is between the upper and lower teeth, and the airstream is released through the slit formed by the tongue and teeth to articulate [θ], then the tip of the tongue moves down and rests against the lower front teeth while the highest part of the dorsum is in the front of the mouth for [e]. Through these changes, the [d] is lost by assimilation to the dental element in
[ts]: instead of the tongue tip pressing against the back of the upper front teeth and then retracting to a pre-alveolar position, the tongue tip just assumes a pre-alveolar position. The change from [ts] to [θ] facilitates the movements of the tongue. Instead of the tongue touching almost the back of the upper front teeth to stop the airstream, and then the airstream being released through a groove formed in the tongue, this occurs: the tip of the tongue is placed between the teeth and the airstream is released through the slit formed by the tongue and teeth. As a result of this change, the tip of the tongue has moved forward, and, consequently, the distance that it must move has been increased; on the other hand, however, the airstream does not have to be stopped, and a groove does not have to be formed in the tongue. For [éd-tsē] the vocal cords vibrate for three sounds, but for [é-θe] they vibrate for two sounds.

Economy is introduced in the change from [éd-k'ī] to [éd-tsē]. The change from [k'] to [ts] facilitates the movements of the tongue, and the change from [i] to [e] reduces the effort required of the dorsum.

Economy is also introduced in the change from [éd-tsē] to [é-θe]. The loss of the [d] reduces the effort required of the tip of the tongue. The change from [ts] to [θ] requires that the tongue tip move further; but after the change, the airstream is not stopped, and a groove is not formed in the tongue. In addition, after these changes, the vocal cords vibrate less.
6.2.4. Primary [gn] palatalizes to become [n] in Castilian.

\[ [\text{lǐg-num}] \rightarrow [\text{lǐg'-nu}] \rightarrow [\text{lěj-no}] \rightarrow [\text{lě'-no}] \]

\text{RVČ-CVC} \quad \text{RVČ-CV} \quad \text{RVŚ-CV} \quad \text{RV-CV}
6.2.4. In [līg-num] > [līg'-no] > [lēj-no] > [lē'-no], the stop assimilates to the sounds preceding and following it, and vocalizes to a secondary yod. Then the nasal is attracted to the point of articulation of the preceding yod and becomes [n]. The change from [i] to [e] is a regular vocalic development.

In distinctive features, the change is as follows:

<table>
<thead>
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For each sequence in this development, the vocal cords vibrate during the entire sequence and the velum is closed for the first two sounds but is open for the third.

For [ɪg-ŋ], to articulate [i] the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate. To produce [g], the dorsum presses against the velum to stop the airstream. To articulate [n], the velum opens so that the airflow released from the articulation of [g] passes through and resonates in the nasal cavity as well as in the mouth, and the tip of the tongue is placed against the alveolar ridge.

For [ɪg'-n], the articulation of the first sound, [i], remains unchanged. To articulate [g'], the dorsum presses against the midpoint of the palate to stop the airstream. The articulation of the last sound, [n], remains unchanged.

When [ɪg-ŋ] changes to [ɪg'-n], the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is high in the front of the mouth to articulate [i]. For both [g] and [g'], the dorsum stops the airstream, but, rather than the dorsum pressing against the velum for [g], it presses against the palate for [g']. Then the velum opens so that the airflow released from the [g'] passes through and resonates in the nasal cavity as well as in the mouth, and the tip of the tongue is placed against the alveolar
ridge, to articulate [n]. Through this change, the [g] has assimilated to the point of articulation of the preceding front vowel and to that of the alveolar nasal, both of which are articulated more to the front of the mouth than [g]. The [g] is attracted forward to a mid-palatal point of articulation; instead of rising to make closure at the back of the palate, the tongue rises to make closure at the mid-point of the palate. After this change, the distance the dorsum is required to move is lessened: rather than the dorsum being in the front of the mouth for [i], then moving to the back of the mouth for [g], and then the tip of the tongue moving up to press against the alveolar ridge for [n], this happens: the dorsum is high in the front of the mouth for [i], stays in the front of the mouth and presses against the palate for [g'], and then the tip of the tongue presses against the alveolar ridge for [n].

For [ëj-n], the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, to articulate [e]. The tip of the tongue continues to rest against the lower front teeth, the dorsum arches and almost touches the palate, and the airstream continues to pass through the slit formed by the tongue and palate, to articulate [j]. Then the velum opens so that the airflow passes through and resonates in the nasal cavity as well as in the mouth, and the tip of the tongue is placed against the alveolar ridge, to produce [n].

When [ɪg'-n] changes to [ëj-n], for both [i] and [e] the lips are
spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, but for [e] the dorsum is not as high in the front of the mouth as it is for [i]. Instead of the dorsum pressing against the palate to make closure for [g'], then the velum opening and the tongue tip rising up and pressing against the alveolar ridge for [n], the following happens: the tongue moves towards, but does not quite complete, the closure necessary to produce a velar stop. The result is stricture instead of closure: the airstream passes through a slit formed by the tongue and the palate when the dorsum does not quite touch the palate, and rather than [g'], the result is [j]. Then the velum opens, and the tongue tip touches the alveolar ridge for [n]. Therefore, the effort required of the dorsum is reduced: for [g'] the dorsum moves to the palate and presses against it to stop the airstream, but for [j] the dorsum moves towards the palate but does not touch it. Rather than the airstream being stopped for [g'] and then released at the alveolar ridge for [n], the airstream is stopped and released only at the alveolar ridge.

For [e'-n], the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth to produce [e]. Then the velum opens, and the dorsum arches and makes extensive contact with the palate by pressing against it, to articulate [n].

When [ej-n] changes to [e-n], the yod palatalizes the nasal: the
alveolar nasal is attracted to the palatal point of articulation of the yod. The number of articulatory movements required of the tongue is reduced. Instead of articulating [j] and then [n], this happens: the dorsum stays high in the front of the mouth after the articulation of [e], the velum opens and the dorsum makes a compromise articulation which is intermediate between [n] and [j], and the result is [n]. Two tongue movements are consequently reduced to one.

Economy is introduced by the change from [ɪg-n] to [ɪg'-n] because the distance the dorsum is required to move is lessened. Also, economy is brought about by the change from [ɛg'-n] to [ɛj-n], because the effort required of the dorsum is reduced. Finally, economy is introduced through the change from [ɛj-n] to [ɛ'-]: the number of tongue movements is reduced from two (for [j] and [n]) to one (for [n]).

6.2.5. In [nók-tem] > [nók'-tem] > [nój-te] > [nój-tʃe] > noche [nó-tʃe], the [k] vocalizes to become a secondary yod. The [t], attracted to the point of articulation of the yod, palatalizes. The yod closes the preceding vowel and is lost by complete assimilation to it. 

In distinctive features, the changes occur as follows:

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6.2.5. Primary [kt] palatalizes to become ch [ts] in Castilian, generally, after all vowels except [i:].

[nok-tem] > [nok'-tem] > [noj-te] > [noj-te] > noche [no-tse]  
CVC-CVC  CVC-CVC  CVS-C  CV-C  CV-C  CV-C
6.2.5. (Continued)
In articulatory terms, the changes occur as follows:

Throughout each sequence in this development, the velum remains closed.

For [ók-t], the vocal cords vibrate, the lips are rounded, and the highest part of the dorsum is in the back of the mouth in an open mid
velar position, to articulate [o]. The vocal cords stop vibrating, the
dorsum rises up and presses against the velum to stop the airstream
to produce [k]. Then the vocal cords do not vibrate, the tip of the
tongue rises up and presses against the back of the upper front teeth,
and the airstream is released abruptly to articulate [t].

In [ók'-'t], the articulation of the first sound, [o], is the same as
described in the preceding paragraph. Then the vocal cords cease to
vibrate, and the dorsum presses against the mid-point of the palate to
stop the airstream to produce [k']. The articulation of the last sound
in the sequence, [t], is the same as described in the preceding para-
graph.

When [ók-t] changes to [ók'-'t], the articulation of the first sound,
[o], remains unchanged. After being low in the front of the mouth for
[o], the tongue tip stays low for [k] and [k']. For both [k] and [k'], the
dorsum stops the airstream, but, instead of the dorsum pressing against
the velum for [k], it presses against the palate for [k']. Then the tip
of the tongue rises up to touch the back of the upper front teeth for [t].
By this change, the [k'] assimilates to the point of articulation of the
following [t], which is more to the front of the mouth than that of [k].
The [k] is attracted forward to a mid-palatal point of articulation:
instead of rising to make closure at the back of the palate, the tongue
rises to make closure at the mid-point of the palate. After this change,
the distance that the tongue moves is lessened. Rather than the dorsum
contacting the velum, then the tip contacting the upper teeth, this
happens: the dorsum contacts the palate, then the tip contacts the upper
teeth.

For [ój-t], the vocal cords vibrate, the lips are rounded, and the
highest part of the dorsum is in the back of the mouth in an open mid-
velar position to produce [o]. The vocal cords continue to vibrate, the
tongue tip rests against the lower front teeth, the dorsum arches so
that the highest part of the dorsum is in the front of the mouth almost
touching the palate, and the airstream passes with friction through the
slit formed by the tongue and the palate, to articulate [j]. Then the
vocal cords stop vibrating and the tip of the tongue moves to press against
the back of the upper front teeth to stop the airstream, which is then
released abruptly, to articulate [t].

When [ók'-t] changes to [ój-t], after the articulation of [o], rather
than the vocal cords not vibrating, the dorsum pressing against the
palate to make closure for [k′], then the tongue tip rising up and pressing
against the back of the upper front teeth to stop the airstream for [t], this
occurs: after the articulation of [o], the vocal cords continue to vibrate,
and the dorsum attempts, but does not quite complete the closure neces-
sary to produce a velar stop. The result is stricture rather than
closure: the airstream is released through the slit formed by the tongue
and the palate when the dorsum does not quite touch the palate, and
instead of [k′], the result is [j]. Then the vocal cords do not vibrate,
and the tongue tip rises up and presses against the upper front teeth
to articulate [t]. Thus, the effort required of the dorsum is decreased:
for [kʰ] the dorsum moves to the palate and presses against it to stop
the airstream; but for [j] the dorsum moves towards the palate, but
does not touch it. Also, the yod in [ój-t] facilitates the transition from
[o] to [t]. Rather than the airstream being stopped at the palate for
[kʰ] and then being released at the teeth for [t], the airstream is stopped
and released only at the teeth. The yod is realized as a glide following
the [o] and forms a diphthong with it. In addition, as a result of this
change, the vocal cords vibrate for two sounds, [o] and [j], rather than
for one sound, [o].

In the sequence [ój-tʃ], the articulations of [o] and [j] are the
same as described above. To articulate [tʃ], the vocal cords stop
vibrating; the blade and tip of the tongue rise up and touch the alveolar
ridge and the front part of the palate; then the sides of the dorsum touch
the sides of the palate and the upper back teeth, leaving an opening in
the middle. [tʃ] is an affricate: for it, the airstream is momentarily
interrupted, as for a stop, by the blade of the tongue contacting the
front palate; then the blade releases the contact quickly, forming a
round opening between itself and the front palate, and the airstream
passes through this groove, as it does for a fricative.

When [oj-t] changes to [oj-tʃ], rather than the tongue tip resting
low in the front of the mouth while the dorsum is in the back of the mouth
in a mid-velar position for [o], then the tongue tip continuing to rest against the lower front teeth while the dorsum moves forward to almost touch the palate for [j], and then the tip moving forward to touch the back of the upper front teeth for [t], this happens: after articulating [o] and [j], the blade and tip of the tongue touch the alveolar ridge and front part of the palate while the sides of the dorsum touch the sides of the palate and the upper back teeth, then the blade releases the contact quickly, forming a round opening between itself and the front palate. Thus, the dental stop is attracted to the palatal point of articulation of the yod. Consequently, the distance that the tongue moves is lessened.

For [o-tʃ], the vocal cords vibrate, the lips are rounded, and the highest part of the dorsum is in the back of the mouth in a close mid-velar position, to articulate [o]. The vocal cords stop vibrating, the blade and tip of the tongue rise up and touch the alveolar ridge and the front palate, then the sides of the dorsum touch the sides of the palate and the upper back teeth, leaving an opening in the middle, for [tʃ]. The affricate modification of the airstream for [tʃ] is the same as described in the preceding paragraph.

When [oʃ-tʃ] changes to [o-tʃ], the yod is lost. It has assimilated to and closed the preceding vowel. 22 Instead of the dorsum being in an open mid-velar position in the back of the mouth for [o], then the dorsum arching so that it is in the front of the mouth almost touching the palate, for [j], and then the blade of the tongue contacting the front palate, the
blade releasing the contact and forming a round opening between itself and the front palate, for \([t\underline{s}]\), this happens: the dorsum assumes a higher (a close) mid-velar position for \([o]\), then the blade contacts the front palate, releases the contact, and forms a round opening between itself and the front palate, for \([t\underline{s}]\). Rather than articulating an open variety of \([o]\) and then articulating \([j]\), the tongue makes a compromise and articulates a close variety of \([o]\). Thus the sequence \([o\ j]\), in which the dorsum has to form two consecutive articulations, is avoided, and the three articulations found in \([\acute{o}\ j-t\underline{s}]\) are reduced to two in \([\acute{o}-t\underline{s}]\). In addition, the vocal cords do not vibrate as long: in \([\acute{o}-t\underline{s}]\) they vibrate for two sounds, but in \([\acute{o}-t\underline{s}]\) they vibrate for only one sound.

Economy is introduced through the series of changes which the \([k]\) undergoes as it assimilates to the point of articulation of the following consonant, which is produced more towards the front of the mouth than \([k]\) is. The change from \([\acute{o}\ k-t]\) to \([\acute{o}\ k'-t]\) lessens the distance the tongue moves. In the change from \([\acute{o}\ k'-t]\) to \([\acute{o}j-t]\), the effort required of the dorsum is decreased: the yod facilitates the transition from \([o]\) to \([t]\); and, although the vocal cords vibrate twice as long as a result of this change, this slight increase in effort is more than offset by the economy that has been introduced. Through the change from \([\acute{o}j-t]\) to \([\acute{o}j-t\underline{s}]\), the distance that the tongue moves is lessened. The change from \([o\ j-t\underline{s}]\) to \([o-t\underline{s}]\) reduces the number of articulatory movements required of the tongue and reduces the length of time that the
6.2.6. Primary [ks] palatalizes to [ʃ] in Old Castilian, then velarizes to become [x] in Modern Castilian.

\[ \text{di:xi: [di:k-si:] \rightarrow [dik'-se] \rightarrow [dij-se] \rightarrow dixe [dij-se] \rightarrow dixe [dij-xe]} \]

\[ \text{CV':C-CV: CV'C-CV CV'S-CV CV'-CV} \]

\[ \text{CV'-CV} \]
6.2.6. (Continued)
vocal cords vibrate.

6.2.6. In [d\textipa{k}-si:] > [d\textipa{k}'-se] > [d\textipa{j}-se] > dixe [d\textipa{j}-\textipa{xe}] > dije [d\textipa{i}-xe], the [k] vocalizes to become a yod. The [s], attracted to the point of articulation of the yod, palatalizes to [\textipa{z}], which develops into [x] in Modern Castilian.\textsuperscript{23}

In distinctive features, the changes occur as follows:

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After the voiceless velar stop [k] vocalizes to a secondary yod, the voiceless alveolar fricative [s] palatalizes to become a voiceless palatal fricative [ʃ], then changes further to become the voiceless velar fricative [x].

In articulatory terms, the changes occur as follows:

Throughout each sequence in this development, the velum remains closed.

In [iːk-siː], the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, and this articulation is prolonged, for [iː]. The vocal cords stop vibrating and the dorsum presses against the velum to stop the airstream to articulate [k]. The vocal cords still do not vibrate, the tip of the tongue rests against the alveolar ridge, a groove through which the airstream passes as it is released from [k] is formed in the tongue tip, and the tongue is flat on top, to articulate [s]. Then the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, and this

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<td>+HIGH</td>
<td>+VEL</td>
<td>+MID</td>
</tr>
<tr>
<td>PAL</td>
<td>PAL</td>
<td>PAL</td>
</tr>
<tr>
<td>+VWL</td>
<td>+FRIC</td>
<td>+VWL</td>
</tr>
<tr>
<td>-LONG</td>
<td>-LONG</td>
<td>-LONG</td>
</tr>
</tbody>
</table>
After the voiceless velar stop [k] vocalizes to a secondary yod, the voiceless alveolar fricative [s] palatalizes to become a voiceless palatal fricative [ʃ], then changes further to become the voiceless velar fricative [x].

In articulatory terms, the changes occur as follows:

Throughout each sequence in this development, the velum remains closed.

In [iːk-siː], the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, and this articulation is prolonged, for [iː]. The vocal cords stop vibrating and the dorsum presses against the velum to stop the airstream to articulate [k]. The vocal cords still do not vibrate, the tip of the tongue rests against the alveolar ridge, a groove through which the airstream passes as it is released from [k] is formed in the tongue tip, and the tongue is flat on top, to articulate [s]. Then the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, and this
articulation is prolonged, for [i:].

In [ɪk'-se], the articulation of the first [i] is the same as described in the preceding paragraph, but the articulation is not prolonged. The articulation of [k'] is the same as that for [k], except that the dorsum touches the palate instead of the velum. The articulation of [e] is the same as that for the final [i] above, except that the dorsum does not move as high in the front of the mouth as it does for [i] and the sound is not prolonged.

When [ɪk-si:] changes to [ɪk-se], the prolongation of the first [i:] is lost, and therefore the amount of air required for the articulation is reduced by one-half. After the change from [k] to [k'], the distance the dorsum has to move is lessened: rather than the dorsum being in the front of the mouth for [i], then the dorsum being in the back of the mouth and pressing against the velum for [k], then the tip of the tongue touching the alveolar ridge and forming a groove for [s], this occurs: the dorsum is in the front of the mouth for [i] and stays in the front of the mouth and presses against the palate for [k'], and then the tip of the tongue touches the alveolar ridge and forms a groove for [s]. The prolongation of the last [i:] is lost, and thus the amount of air required for the articulation is reduced by one-half; in addition, when the final sound becomes [e], the dorsum does not rise as high in the front of the mouth as it did for [i:], and therefore the effort required of the dorsum is lessened.
In [ɪj-se], the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, to articulate [i]. The vocal cords continue to vibrate and tongue tip continues to rest against the lower front teeth, the dorsum is arched and almost touches the palate, and the airstream continues to pass through the slit formed by the tongue and the palate, to produce [j]. The vocal cords stop vibrating, the tip of the tongue moves up to rest against the alveolar ridge, a groove through which the airstream passes is formed in the tongue tip, and the tongue is flat on top, to articulate [s]. Then the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth, for [e].

When [ɪk'-se] changes to [ɪj-se], the [i] is articulated as described above, and then, rather than the vocal cords not vibrating and the dorsum pressing against the palate to make closure for [k'], this happens: the vocal cords continue to vibrate and the dorsum moves towards, but does not quite complete, the closure necessary to produce a velar stop. The result is stricture rather than closure, and instead of [k'], the result is [j]. Thus, the effort required of the dorsum is reduced: for [k'] the dorsum moves to the palate and presses against it to stop the airstream, but for [j] the dorsum moves towards the palate but does not touch it. The articulation of each of the two remaining sounds in this sequence is unchanged.
When [ɪk-se] changes to [ɪj-se], rather than the vocal cords vibrating for two sounds, they come to vibrate for three. Thus, there is a slight increase in effort in the vibration of the vocal cords.

In [ɪ-ʃe], the articulation of [i] is the same as described above. To articulate [ʃ], the vocal cords do not vibrate; the sides of the dorsum touch the sides of the palate and upper teeth; the tongue tip drops slightly, making an opening between the tongue tip and the front part of the roof of the mouth; and the airstream is channeled through that opening. The articulation of the [e] is the same as described above.

When [ɪj-se] changes to [ɪ-ʃe], the yod palatalizes the sibilant. The sibilant is attracted to the palatal point of articulation of the preceding yod, and rather than articulating [ʃ] followed by [s], the tongue makes a compromise movement that results in [ʃ]. Two tongue movements are consequently reduced to one. Also, for [ɪj-se] the vocal cords vibrate for three sounds, but in [ɪ-ʃe], they vibrate for two. Therefore, there is less effort in the vibration of the vocal cords.

In [ɪ-xe], the vocal cords vibrate, the lips are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth close to the alveolar ridge and front palate, to produce [ɪ]. The vocal cords stop vibrating; the back of the tongue is placed lightly against or very close to the velum; and the airstream, instead of being stopped, passes between the tongue and the velum to produce [x]. Then the vocal cords vibrate, the lips
are spread, the tip of the tongue rests against the lower front teeth, and the highest part of the dorsum is in the front of the mouth to articulate [e].

When [ɪʃe] changes to [ɪxe], rather than the tongue tip being low in the front of the mouth for [i], moving up and forming an opening between itself and the roof of the mouth for [ʃ], then being low in the front of the mouth for [e], this occurs: the tongue tip remains low for all three sounds in [ɪxe]. Rather than the dorsum being required to articulate three consecutive sounds in the front of the mouth in [ɪʃe], this happens: the dorsum is close to the palate in the front of the mouth for [i], the dorsum is high in the back of the mouth and lightly touches or is very close to the velum to impede the airstream for [x], then the dorsum is high in the front of the mouth for [e]. Thus, the change facilitates the movements of the tongue.

Economy is introduced through the series of changes that the [k] undergoes as it assimilates to the point of articulation of the following consonant, which is produced more towards the front of the mouth than [k] is. The changes from [ɨk-si:] to [ɨk'-se] reduce the amount of air required for the first sound and for the final sound, and lessen the distance that the dorsum moves when [k] changes to [k'] and when [i] changes to [e]. In the change from [ɨk-se] to [ɨj-se], the increase in effort in the vibration of the vocal cords is counterbalanced by the reduction of effort required in the movement of the dorsum when [k']
vocalizes. In the change from \([\acute{i}-\acute{s}e]\) to \([\acute{i}-\breve{s}e]\), there are two reductions of effort that are introduced by the palatalization of the sibilant: the reduction of the number of tongue movements and the reduction of the length of time that the vocal cords vibrate. The change from \([\acute{i}-\breve{s}e]\) to \([\acute{i}-\breve{x}e]\) brings about economy by facilitating the movements of the tongue.
CHAPTER 7

CONCLUSION

As explained in the Introductory Chapter and in Chapter 1, a language is a system which is constantly evolving. Whenever the system is disrupted, changes occur to restore the disrupted portion to the general nature of the system.

As pointed out in Chapter 2, syncope and the elimination of hiatus are two major forces disrupting the system and bringing about unacceptable medial consonant combinations. The combinations undergo changes which often resolve them into combinations consisting of onsets and codas acceptable to the phonological structure of the language. The resolutions, therefore, act to restore many of the unacceptable combinations—the disrupted portion—to the system.

This chapter summarizes the findings of Chapters 3 through 6 to show how the resolutions have brought about economy.

Through syncope and through the elimination of hiatus, an entire syllable is often lost. In both instances, economy obviously takes place, for when the number of syllables decreases, the effort required also decreases. Further economy is achieved through the various resolutions of combinations that have arisen from syncope and the elimination of hiatus.
In Class 1, stop + [r] combinations usually develop through the assimilation of the stop; but occasionally, if the combination consists of a voiced stop + [r], the voiced stop vocalizes. A few continuant + [r] combinations remain unchanged, but most of them develop through epenthesis or metathesis. Stop + [l] combinations are usually resolved through assimilation of the stop, through palatalization, or through metathesis. The only continuant + [l] combination is resolved through palatalization, epenthesis, or metathesis. Thus, Class 1 combinations are resolved through assimilation of the stop, vocalization, palatalization, metathesis, or epenthesis. Of these processes, all but metathesis and epenthesis are types of assimilation.

In Class 2, most consonant + primary yod combinations are resolved through assimilation or through palatalization. Metathesis may or may not precede the resolution. Some of these combinations are resolved through metathesis and loss of the yod by assimilation of the yod to a preceding vowel. Consonant + primary wau combinations are resolved through assimilation of the consonant, which is always a stop that develops as if it were intervocalic. Metathesis may or may not precede the resolution. Thus, Class 2 combinations are resolved through assimilation, palatalization, metathesis followed by loss of yod, or the assimilation of a stop. All these changes involve assimilation.

In Class 3, approximately one-third to one-half of the combinations
belonging to this class remain unchanged or undergo very little change (See 5.1.1.). Of the combinations that do change, two-consonant combinations are resolved by assimilation of the stop, by vocalization, by vocalization followed by palatalization, by the assimilation of two continuants, or by the interchange of [l], [r], and [n] (which is further subdivided into those resolved through dissimilation and those resolved through dissimilation followed by epenthesis). All these processes, except the interchange of [l], [r], and [n], are types of assimilation. Three-consonant combinations are resolved through loss of the first consonant or through loss of the second consonant. Only those undergoing loss of the second consonant may involve assimilation. Thus, of the Class 3 combinations that change, most are resolved through various types of assimilation.

In Class 4, combinations in the first group are resolved through assimilation of the first stop to the second, or through the vocalization of the first of the two stops. Combinations in the second group are resolved through assimilation. Combinations in the third group are resolved through vocalization followed by palatalization, or through vocalization followed by palatalization and then followed by velarization. Thus, all Class 4 combinations are resolved through types of assimilation.

From the preceding paragraphs, one can see that there are these possibilities for changes in consonant combinations; the combination is
resolved through a process that is a type of assimilation; the combination is resolved through a process that is not a type of assimilation; the combination remains unchanged, or undergoes little change. The vast majority of combinations that change are resolved through various types of assimilation. As shown in numerous instances in the commentaries (e.g., at the ends of 3.2.1., 4.2.1., 5.2.5., and 6.2.2.), assimilation results in economy of effort. A few combinations that change are resolved through a process that is not a type of assimilation: metathesis occurs in Class 1 and Class 2; epenthesis occurs in Class 1; and the interchange of [l], [r], and [n] occurs in Class 3. As shown in several commentaries (e.g., at the ends of 3.2.3., 3.2.4., 5.2.1.A., and 5.2.1.B.), these resolutions also introduce economy. Combinations that remain unchanged or that undergo very little change occur in Class 3. In combinations that remain unchanged, no economy is introduced, but no increase in effort is introduced either. In those that undergo little change in Class 3, the change (a voiced stop assimilates to the sounds around it and becomes fricative) introduces economy.

From the findings of this study, therefore, we may conclude that, in the combinations which undergo change, economy of articulatory movements is introduced through the resolution of medial consonant combinations as the combinations develop from Latin into Modern Castilian.
FOOTNOTES

Notes for introductory chapter

1Cf. Lyle Campbell, "Review of King, Historical Linguistics and Generative Grammar," in Language 47 (1971), 191-209. (Hereafter referred to as Campbell, "Review of King.")

Campbell says that many linguists have the mistaken belief that naming a process explains the process. Just because we can describe the situations before and after a sound change does not mean that we know why the change occurred, i.e., what motivated the change in the first place. Metathesis, for instance, is the name of a process, but it is not the explanation of why that process occurs.

As will be discussed in 2.3.0, resolutions involve conformity to patterns in the phonological structure of the language and bring about economy. By themselves, however, neither conformity nor economy is sufficient to explain why sound changes occur. Although linguists cannot fully account for the reasons for sound changes, it is possible to state facts that are definitely observable about these changes, once they occur. It is known, for instance, that most sound changes are gradual and take place through change by allophones. The progression of such changes can best be understood through articulatory phonetics. Other sound changes can be understood with reference to the changing morphological and syntactic patterns of the language (for example, analogy in the irregular preterites discussed in Chapter 4).

As N. C. W. Spence stresses in his "Quantity and Quality in the Vowel-System of Vulgar Latin," in Readings in Romance Linguistics, ed. by James M. Anderson and Jo Ann Creore (The Hague: Mouton, 1972), pp. 313-314: the systems of language function as an interrelated whole. No change in one particular aspect of language is the cause of change. Spence points out that A. Martinet has questioned the validity of the usual contention that stress accent exerted an irresistible influence on the development of Latin. Martinet suggests that quantitative differences in unaccented syllables were slurred and finally abandoned not solely due to the effects of the stress accent--a change in phonology--but also due to the fact that lexical, morphological and syntactical developments were making redundant the distinction between the unaccented vowels concerned, such as the vowels in the declension endings in Latin.

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For a discussion of the theory that habits of articulation change and thus bring about changes in the sound system of a language, see John T. Waterman, *Perspectives in Linguistics* (Chicago, Ill.: University of Chicago Press, 1970).

Mario Pei, *Glossary of Linguistic Terminology* (New York: Doubleday and Co., 1966), p. 178. According to Pei, the Neogrammarians were

A linguistic school of the late nineteenth century
. . . which taught and believed in the universal and absolute validity of phonetic (sound) laws
. . . they advocated more exact formulation of the phonetic laws, and their more rigid application to linguistic phenomena, maintaining that 'phonetic laws admit no true exception,' and recognizing the residue as ANALOGY, BORROWING and CONDITIONED SOUND CHANGE, all normal factors in linguistic change.

This book is hereafter referred to as Pei, *Glossary*.


Hall succinctly states the following:

The fundamental assumption of historical linguistics is that sound-change would be regular--i.e., that when a sound changes, all of its occurrences would show the same change under the same conditions--if it were not for the interference of other factors. Without this assumption, historical linguistics would have no guide-line by which to separate phenomena due to sound-change from those due to other factors such as analogy (internal borrowing) or external borrowing. It was the absence of this assumption (which is best termed the Regularist Principle) that impeded the development of valid historical linguistics before the nineteenth century, with few exceptions.

Through a series of explanations, such as Grassman's Law and Verner's Law, of why a certain soundshift did not occur under specific circumstances (aspiration in successive syllables for Grassman's Law and the placement of stress for Verner's Law) historical linguistics was placed on a firm footing. Linguists gradually learned that they had to consider a sound's entire environment in order to understand its development.

6Campbell, "Review of King," p. 205. Campbell reminds us not to overlook massive borrowing, bilingualism, socially stigmatized forms, literacy, and other factors in the search for the cause of sound change. Many kinds of change, he thinks, will ultimately have their causes explained by physiology. Other kinds of change may be explained through perceptual or psychological factors. Concerning the communication process, Campbell says that maximal differentiation as a principle of change may be in response to the need for perceptual ease, and changes producing preferred syllable structures may be considered as changes toward maximal differentiation for perceptual ease. In other words, the articulatory and auditory aspects of the communication process mutually influence each other and both must be taken into account in attempting to explain sound changes.


8N.B. The terms "Castilian" and "Spanish" are not interchangeable. "Castilian" here is limited to the standard dialect of Spain, the variety of Spanish spoken in Castile. "Spanish" refers to the entire language, the aggregate of the dialects such as Castilian, Caribbean Spanish, the Spanish of the Río de la Plata region, etc.


See the bibliography for numerous studies of Castilian.


Anderson studied the effect of phoneme distribution on intervocalic consonant clusters and showed that the consonant clusters that result from diachronic change reflect the permitted distributional
phoneme patterns of Spanish. Burstynsky compared the major consonantal changes in the historical development of Spanish with Modern Spanish. He stated, however, in his abstract: "this [consonant cluster resolution] is perhaps one of the most interesting but least developed parts of the presentation." Burstynsky's dissertation is, in part, an attempt to apply the distinctive feature analysis framework to historical Spanish phonology. No articulatory analysis using diagrams to illustrate the movements of the articulatory organs has been undertaken until now.

11See 1.4.0. for the articulatory distinctive features used in this study and how they compare with the terms used in distinctive feature analysis.


13Ibid., p. 99. Lehmann states that we often do not have sufficient information to determine the distinctive features with accuracy. Therefore, Lehmann feels, "the rules proposed may include poorly supported assumptions."


Also see John O'Connor, Phonetics (Baltimore, Md.: Penguin Books, Inc., 1973), p. 95. O'Connor states the same opinion, in somewhat different words:

... all such experiments depend for their success on the human ear; acoustics alone cannot give the answers. It is only by submitting ... speech to people's judgment that we can find out what is relevant and what is not.

O'Connor's book is hereafter referred to as O'Connor, Phonetics.

15By making clear the fundamental difference between consonants and vowels, Alarcos Llorach confirms the view that this information adequately specifies consonants. See Emilio Alarcos Llorach, Fonología española (2ª ed. corregida y aumentada; Madrid: Editorial Gredos, 1954), pp. 57-58, where he states:

... Para la consonante lo esencial es un movimiento desde la cerrazón a la abertura, con un máximo articulatorio entre los dos puntos ...
Lo esencial para la vocal es un movimiento desde la abertura a la cerrazón, con un mínimo articulatorio en su coyuntura . . . . Lo característico, articulatorialmente, en la consonante, es establecer un obstáculo y vencerlo, y en las vocales, la falta de este impedimento u obstáculo . . . .

His book will hereafter be referred to as Alarcos Llorach, Fonología.

16 The earliest written attestation that we have of Old Latin (i.e., the Latin in use before the first century B.C.) dates from the seventh century B.C. Latin was, naturally, in existence before that time, as a branch of Indo-European. Latin, as a language spoken by people who use it as their native language, has never ceased to exist, although it has slowly evolved into Italian, Spanish, and the other Romance languages. From approximately the fifth century A.D. until the eighth century A.D., a variety of Latin called Low Romance was spoken throughout most of the area formerly occupied by the Roman Empire. It gradually fragmented into dialect areas which gave rise to the various Romance languages. The earliest documents written in what can be distinguished as definitely Spanish in character are the Glosas Silenses and the Glosas Emilianenses, which date from the tenth century A.D.


19 See Uriel Weinreich, "Mid-Century Linguistics: Attainments and Frustrations," Romance Philology, XIII (1959-1960), p. 329: In connection with sound change it is easy for the structural linguist to tie himself into a conceptual knot. He has struggled hard to develop an analysis of the sounds of a language in which the units are discrete, each distinct from the other on an all-or-none basis. But the contemplation of history forces him to reintroduce continuous variation in spite of himself.

Refer to pp. 1 and 2 of this study, where the need to specify the entire environment of a sound undergoing change is discussed. Also see Robert P. Stockwell and J. Donald Bowen, *The Sounds of English and Spanish* (Chicago: The University of Chicago Press, 1965), p. 141.

Burstynsky states that the use of distinctive feature analysis imposes a partial ordering on the rules, and that its use does not allow the traditional treatment of sound shifts by categories and by position. See Burstynsky, *Dissertation*, p. ii.

See Heinrich Lausberg, *Lingüística Románica*, traducción de J. Pérez Riesco y E. Pascual Rodríguez, Tomo I (Madrid: Editorial Gredos, 1965), pp. 554-556, the part of the general index concerning the consonants, where this arrangement is clearly reflected. Hereafter referred to as Lausberg, *Lingüística Románica*.
Notes for Explanatory Material

1 For lists correlating the orthographic symbols with the phonemes they represent in Latin and in Castilian, consult Elizabeth L. Thompson, "An Introduction to Old Spanish" (unpublished textbook, Louisiana State Univ., 1976), pp. 19-24. Hereafter referred to as Thompson, "Introduction."

The orthographies of some languages (e.g., Modern French and Modern English) show little correspondence to the spoken language. Orthographies for other languages, however (such as Standard Latin and Modern Castilian), are almost phonemic representations of the language. See Roland G. Kent, The Sounds of Latin (2nd edition, revised; Baltimore, Md.: Linguistic Society of America, 1940), pp. 43-44.

2 The terms "onset," "coda," "nucleus," and "interlude" are used in this study as they are defined in Sol Saporta and Heles Contreras, A Phonological Grammar of Spanish (Seattle, Washington: University of Washington Press, 1962), p. 15 and pp. 33-36. Their book will hereafter be referred to as Saporta, Phonological Grammar.

At a given synchronic stage, onsets are those sounds which can start a syllable, and codas are the sounds which can end it. A syllable must consist of at least one nucleus, which may be a vowel or a combination of vowel sounds. Although a nucleus is an obligatory element in the make-up of a syllable, both onsets and codas are optional. Interludes consist of medial consonant combinations of the type: coda plus onset (i.e., consonant combinations are usually of the form: word-medial consonant at the end of one syllable plus word-medial consonant at the beginning of the following syllable).

3 See John Laver, "Production of Speech," in New Horizons in Linguistics, ed. by John Lyons (Baltimore, Md.: Penguin Books, Inc., 1970), pp. 56-58. He says that speech has gradually been recognized as a dynamic process involving many co-ordinated articulatory processes, instead of a sequence of static positions involving only one or two of the articulatory organs, then states:

The dynamic concept of speech production is now one of the foundations of modern articulatory phonetics, though the . . . postural view . . . continues to exert an insidiously seductive influence, especially through some of the implications underlying parts of the established descriptive terminology.
The terms used in this study differ somewhat from those used in distinctive feature analysis. In the chart below, the terms in this study are on the left hand and the corresponding terms in distinctive feature analysis are on the right.

<table>
<thead>
<tr>
<th>Labial</th>
<th>ANTERIOR (produced with the body of the tongue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BILAB = bilabial</td>
<td></td>
</tr>
<tr>
<td>LABDEN = labiodental</td>
<td></td>
</tr>
<tr>
<td>Dental</td>
<td></td>
</tr>
<tr>
<td>DEN = dental</td>
<td></td>
</tr>
<tr>
<td>INTERDEN = interdental</td>
<td></td>
</tr>
<tr>
<td>Palatal</td>
<td></td>
</tr>
<tr>
<td>PAL = palatal</td>
<td></td>
</tr>
<tr>
<td>Velar</td>
<td></td>
</tr>
<tr>
<td>ALV = alveolar</td>
<td></td>
</tr>
<tr>
<td>VEL = velar</td>
<td></td>
</tr>
<tr>
<td>Glottal</td>
<td></td>
</tr>
<tr>
<td>GLOT = glottal</td>
<td></td>
</tr>
</tbody>
</table>

These features, used to describe the manner of articulation, are expressed in articulatory terms. Those used in distinctive feature analysis to describe the manner of articulation are mainly in auditory terms. Both involve aspects of the same entity: articulatory terms describe the production of the sound in the mouth, while auditory terms describe the sound after it has been produced and is perceived by the listener. The two sets of terms, then, do share some similarities. The complex correlations between the terms can be determined from charts such as those in Pierre Bec, Manuel Pratique de Philologie Romane, II (Paris: Editions A. et J. Picard, 1971), pp. 448-450 (hereafter referred to as Bec, Manuel Pratique). Alarcos Llorach says that continuous/interrupted and strident/mellow are used in distinctive feature analysis to specify the manner of articulation. See Alarcos Llorach, Fonología, p. 86 and p. 171.

In auditory terms, closed vowels are called "compact" and open vowels are "diffuse." See Alarcos Llorach, Fonología, p. 55 and p. 59; also see Roman Jakobson, C. Gunnar M. Fant, and Morris Halle,
In terms of compact and diffuse, vowels are classified as shown in this table selected from Alarcos Llorach, *Fonología*, p. 176.

<table>
<thead>
<tr>
<th>compact/diffuse</th>
<th>o</th>
<th>a</th>
<th>e</th>
<th>u</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

7In auditory terms, front vowels are referred to as grave and back vowels are acute; see Alarcos Llorach, *Fonología*, p. 55 and pp. 59-60, and also see Jakobson, Fant, and Halle, *Preliminaries*, p. iv.

Auditorily, vowels may be completely classified as shown in the following chart, from Alarcos Llorach, *Fonología*, p. 176.

<table>
<thead>
<tr>
<th></th>
<th>o</th>
<th>a</th>
<th>e</th>
<th>u</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>vocal/no vocal</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>consonant/no consonante</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>denso (compact)/difuso</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>grave/agudo</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Other classification schemes are possible for Spanish, such as that in Burstynsky, *Dissertation*, p. 14 and p. 18.

8See Alarcos Llorach, *Fonología*, pp. 169-179, for a list of these features.

In comparing the articulatory distinctive features in this study with the auditory distinctive features used by Alarcos Llorach, these facts should be taken into account:

A. Alarcos Llorach uses vocal/no vocal and consonante/no consonante as the first two distinctive features. In this study the distinctive features "vocalic" and "consonantal" are dealt with in the discussion in 1.5.0. They are used to divide the sounds into the categories "consonants," "vowels," "semi-consonants," and "resonants," all of which appear on the left-hand side of the chart in 1.4.2.

B. The features denso/difuso and grave/agudo used by Alarcos Llorach correspond closely to "point of articulation" used in this study. The following sources confirm this correspondence: Alarcos Llorach, *Fonología*, pp. 76, 85, 169-171; Burstynsky, *Dissertation*, p. 19; Bec, Manuel, *Pratique*, p. 433.

C. The feature oral/nasal is the same in both Alarcos Llorach and in this study.
D. Alarcos Llorach uses the feature continuo/interrupto to divide the stops from the fricatives and to set off [r] and [r:] from [l] and [λ]. This study takes a similar view. Sounds are divided into the two major sets "continuants" and "obstruents" (=interrupted sounds) on the left-hand side of the chart in 1. [r] and [r:] are grouped together under "vibrants" and are separate from [l] and [λ] (and [k]), which are grouped together under "latterals."

E. The opposition sonoro (flojo)/sordo (tenso) are written in this way by Alarcos Llorach because flojo/tenso distinguishes only [r] and [r:] from each other in Modern Castilian (Alarcos Llorach, Fonología, p. 83) and since flojo/tenso is concomitant with sonoro/sordo in Modern Castilian (Alarcos Llorach, Fonología, p. 170). In this study, voiced/voiceless is used as one feature, and long/short is listed as a separate feature. This procedure is followed since this study embraces both Latin and Castilian. Long/short is phonemic in Latin and is a major distinction that influences the development of sounds from Latin into Modern Castilian. Long/short is independent of voiced/voiceless in Latin (e.g., [s:] vs. [s], [m:] vs. [m], and [o:] vs. [o]). The opposition [r:] vs. [r] is the sole survivor in Modern Castilian of the long/short distinction. For this reason [r:] is listed here as long, and [r] is listed as short, rather than following Alarcos Llorach's procedure of adding another category (such as tense/lax, or flojo/tenso) which has only one member: [r:]/[r].


10For instance, the chart below is that given by Alarcos Llorach in his Fonología, p. 170:

<table>
<thead>
<tr>
<th>GRAVES</th>
<th>AGUDAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Orden labial</td>
</tr>
<tr>
<td>DIFUSAS</td>
<td>m b f</td>
</tr>
<tr>
<td></td>
<td>g k ċ y</td>
</tr>
<tr>
<td></td>
<td>x s</td>
</tr>
<tr>
<td></td>
<td>Orden velar</td>
</tr>
</tbody>
</table>

The symbols ċ, ŋ, and ɭ represent [tʃ], [ŋ], and [λ] respectively.
This chart is particularly attractive since his distinctive features correspond closely to those used in this study. Since Alarcos Llorach used the same criteria (namely, grave/acute and compact/diffuse) to classify both the consonants and the vowels, an additional chart could be drawn up as shown below, based on the information in Alarcos Llorach, *Fonología*, pp. 60, 76, 176, and 179.

<table>
<thead>
<tr>
<th>GRAVES</th>
<th>AGUDAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFUSAS</td>
<td></td>
</tr>
<tr>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>DENSAS</td>
<td></td>
</tr>
<tr>
<td>o</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>e</td>
</tr>
</tbody>
</table>

Even charts as intellectually appealing and economical as those by Alarcos Llorach are valid only for Modern Castilian, since we have no informants for the other stages.

The articulatory chart given in 1.5.2. contains all the sounds used in this study (except for the long variants, which are listed in 1.5.1. for clarity). It would be rather difficult to make a single distinctive feature chart that would contain all the sounds needed for a diachronic study, because such charts are drawn so that they are as economical as possible and so that they involve only those features (or binary phonetic oppositions) that are distinctive (phonemic) for the synchronic stage that they represent. As pointed out in Noam Chomsky and Morris Halle, *The Sound Pattern of English* (New York: Harper and Row, 1968), p. 296, the very nature of the transformational theory, to which such charts pertain, imposes the restriction of economy. In addition, rather than charts like the articulatory one used in this study, distinctive feature analysis usually takes the form of a matrix governed by a set of ordered transformational rules. The matrix is often a chart in which the features are listed down the left-hand side, the phonetic symbols are listed across the top, and pluses and minuses in the cells show which features the phonemes have.

This book is hereafter referred to as Chomsky and Halle, *Sound Pattern*.

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11 These same classes are used in illustrating the syllabic structure in this study in 1.1.4.

See Jakobson, Fant, and Halle, *Preliminaries*, pp. 18-19. They recommend the same "fundamental source-features." Alarcos Llorach,
in his Fonología, advises the use of the same initial divisions. His term "líquidas" is "resonants" in this study. What Alarcos Llorach calls "glotales" are called "semiconsonants" in this study.

12 For consonants, the airflow is obstructed, but for vowels it is unobstructed. Obviously, then, consonants are -vocalic and +consonantal, while the opposite holds true for vowels. It may not be immediately obvious, however, why resonants are +vocalic and +consonantal, while semiconsonants are -vocalic and -consonantal. The following remarks clarify this point.

For both resonants and semiconsonants, the airflow passes through the mouth unobstructed, as for vowels, but these sounds differ from vowels in that the lips and tongue are moving while these are being produced. [l], [r], and [j], [w] are usually pronounced along with another sound. When they are articulated, the flow of air and the vibration of the vocal cords begin at the same time that the lips and the tongue begin to move. The tongue and lips then move quickly to the position for the next sound. If the resonant or semiconsonant were prolonged, it would become a vowel.

Some phoneticians group resonants and semiconsonants together as glides. There are differences, however. In the production of semiconsonants, the gliding movement is predominant. Semiconsonants are transitional sounds that are neither vocalic or consonantal. In the production of resonants, the manner in which the air is channeled as it moves through the mouth (lateral escape for [l] and vibratory escape for [r] is predominant). Resonants are both vocalic (because the air passes through unobstructed) and consonantal (because the air is channeled a certain way). Resonants do not have a glide and are not transitional sounds.

13 Chomsky and Halle, Sound Pattern, pp. 301-302. Chomsky and Halle state that

Reduced to the most rudimentary terms, the behavior of the vocal tract in speech can be described as an alternation of closing and opening . . . . This skeleton of speech production provides the basis for the major class features . . . .
Notes for "The Formation and Resolution of Medial Consonant Combinations"

The following deal with syncope by listing the environments in which it occurs, but do not relate syncope to the phonological system nor explain why syncope does not always occur in the environments listed:


Anderson's study, listed below, tries to isolate one factor influencing syncope, by relating the consonantal distributions of environments in which syncope is found to the phonological system of consonantal distribution in the language.


On p. 84, he concludes:

Some environments will be more conducive to syncope than others, due to their compatibility to the overall patterns of phonemic distribution.

Kiss, however, points up several shortcomings of Anderson's study. See Sandor Kiss, Les Transformations de la structure syllabique en Latin tardif (Debrecen: Kossuth Lajos Tudományegyetem, 1971), p. 102. Hereafter this book is referred to as Kiss, Les Transformations.

Quoique la syncope ait créé de nouveaux groupes de consonnes, ceux-ci ont été souvent éliminés, conformément à la tendance aux syllabes ouvertes. Notice that the pattern CV-CV consists of two consecutive open syllables.

The book, La Estructura Silábica by Germán de Granda Gutiérrez, is also an indepth study of the development of the syllabic patterns of Castilian. Overall, de Granda is in agreement with Kiss: through the various resolutions of consonant combinations arising through syncope and through the elimination of hiatus, the pattern of CV-CV has become increasingly frequent.
Vowels in hiatus come together without contraction and with or without a slight pause or break. They do not form a diphthong, as can be seen in these examples from Modern Castilian: [ma-és-tro] and [ří-o]. Two vowels may come together in successive syllables (called "internal hiatus"), or they may come together in successive words (called "external hiatus"). This study deals with internal hiatus only. The two vowels are said to be "in hiatus." The word "hiatus" may also refer to the pause or break that may exist between the two successive vowels.

Kiss, Les Transformations, p. 97.
Ainsi, la chute des implosives ou la consonantification des voyelles en hiatus sont à interpréter, au point de vue de la chaîne, comme les signes d'une évolution vers ce contraste constant . . .

Earlier on the same page, he explains what "contraste constant" means:
. . . correspondra à la généralisation d'un certain type, c'est l'uniformisation de la structure syllabique. Celle-ci tendra donc à avoir la forme CV+CV+CV . . .

Ibid., p. 93. Medial syllables which do not have a syllable-initial margin (i.e., whose vowel is immediately preceded by the vowel) represent only about 5 percent of all syllables in Classical Latin. In Late Latin (Latin from 200 A.D. to 700 A.D.), a process involving several stages tends to eliminate that small group of syllables.

Ibid., p. 101.
On observe en latin, depuis l'époque prélittéraire, la disparition progressive de voyelles inaccentuées, de sorte que la proportion des formes syncopées est toujours croissante. Il est certain cependant que l'histoire de la langue a connu des vagues de syncoppe successives; en effet, le conditionnement du phénomène n'est pas absolument le même à toutes les époques.

Anderson has done a thorough study of what interludes (what combinations of codas and onsets; that is, what medial combinations) are acceptable in each of the synchronic stages in the development of Latin into Castilian. He has also theorized as to degrees of acceptibility. See footnote 18 in 9.1.0.

Saporta and Contreras have carefully investigated Modern Castilian to determine what onsets, codas, nuclei, and interludes (and consequently, what medial combinations) are acceptable to its phonological
system. See Saporta, *Phonological Grammar*, pp. 35-36. Saporta uses the term "grammatical" instead of "acceptable." "Grammatical" is the usual term in transformational grammar to describe elements that conform to the system, or grammar, of the language. The onsets and codas permitted in Castilian are specified on p. 35, in rules 4 through 6. The combinations resulting from them are acceptable, except for those pointed out as unacceptable (ungrammatical) in rules 7 through 11 on pp. 35-36. Acceptable onsets and codas are listed on p. 15.

8Pei, *Glossary*, p. 234.


10Kiss, *Les Transformations*, p. 90. He deals with the resolution of consonant combinations arising from syncope and with the elimination of hiatus, then says that the net result of these changes is that Des trois possibilités classiques, [the syllabic types V, CV, and CCV] c'est donc la deuxième qui est retenue de préférence, celle de la marge consonantique simple (ÇV et CCV peuvent être éliminés aux dépens de CV).

Also see Tomás Navarro Tomás, *Studies in Spanish Phonology*, translated by Richard D. Abraham (Coral Gables, Florida: University of Miami Press, 1968), p. 41. Navarro Tomás lists nine syllabic types occurring in Castilian. He says that syllables of the type CV make up 58.45 percent of the syllables in Modern Castilian, those of the type CVC constitute 27.35 percent, and those of the type V make up 5.07 percent. This book is hereafter referred to as Navarro Tomás, *Studies*.

11Such sequences often have alternate pronunciations. For example, [kons-trwír] alternates with [kos-trwír] and [eks-plí-kár] alternates with [es-plí-kár]. (In [kons-trwír] and [kos-trwír], the wau is part of the syllabic nucleus of the second syllable and does not serve as part of the onset.)

Such sequences may be learned: they occur in words which may not have undergone the popular developments found in most Castilian words. At some older period in the development of Castilian, sound sequences such as these were unacceptable and were resolved. Cf. 5.2.2., in which the sequence [ns-t] is resolved to [s-t]. (Also see 5.1.1.D. in which [ns] changes to [s] in Vulgar Latin.) Similarly, [ns-tr] in [kons-trwír] tends to be pronounced as [s-tr].

Although Castilian orthography is reasonably faithful in representing the pronunciation of Castilian words, one must be careful in dealing with
instances such as these, in which the spelling may reflect learned pronunciation or may be regressive. Cf. 6.2.3, in which the regres-sive spelling dz occurs.

12Navarro Tomás, Studies, p. 42.

The general direction of a great deal of sound-change is toward a simplification of the movements which make up the utterance of any given linguistic form. Thus, consonant-groups are often simplified.

Also see Menéndez Pidal, Manual, pp. 178-179. He concurs and brings out the importance of studying sounds in the context of their environment and emphasizes the preponderance of assimilation:
Los sonidos . . . no funcionan en el lenguaje como elementos aislados, sino formando palabras y fra-ses; y al tener que pronunciarse juntos varios de esos sonidos, sucede a veces que unos influyen sobre otros, pues el aparto vocal procura allanar las dificultades de pronunciación que pueden resul-tar de la proximidad de unos a otros, y así se pro-ducen varios fenómenos debidos a la influencia en-tre dos sonidos de la misma palabra o de dos pala-bras inmediatas en la frase . . . . La asimilación es uno de los mas poderosos moviles en la evolución fonética. Los principales cambios regulares . . . se fundan en ella.
Notes for Class One: Medial Combinations

Ending in a Resonant in Latin

1 As stated in 1.2.3. and 1.6.0., the resonants [r] and [l], are considered types of consonants in this study. Thus, consonant + resonant combinations are medial consonant combinations.


3 In intervocalic position such a fricative sometimes completely assimilates through further weakening (further opening of the mouth) and is lost, e.g., [d] > [ζ] > [η] as in [fi-de:-lem] > fiel [fjel].

4 Vocalization is the change of a consonant to a semivowel or a vowel. Pei, Glossary, p. 389. Vocalization is not the same as voicing. It plays an important role in Chapters 5 and 6. See Thompson, "Introduction," pp. 54-56 for a detailed discussion of vocalization in Castilian.

5 Epenthesis is the interpolation, into a word or into a sequence of sounds, of a sound which has no etymological justification for being there, but whose usual function is to ease a difficult transition between two adjacent sounds or to bring about euphony. "Anaptyxis" and "svarabhakti" are similar terms, but some authorities apply them only to vowel sounds, while "epenthesis" may refer to the insertion of either consonant or vowel sounds. The sound interpolated may be referred to as "epenthetic," "anaptyctic," "excruciant," "parasitic," or "intrusive." Thompson, "Introduction," p. 48.

6 There are two types of metathesis: simple and reciprocal. Simple metathesis is involved in sections 3.1.1, B.2, and 3.1.2.A.3. of this chapter. In simple metathesis a sound moves or migrates from one syllable to another. In reciprocal (or mutal) metathesis, two sounds change places. Metathesis involving [l] and/or [r] is particularly common. Metathesis apparently is brought about, as are many sound changes, by adjustment to a more acceptable sound sequence. See Menéndez Pidal, Manual, p. 160 and p. 185 for further discussion and examples of simple metathesis.

...las formas porné, verné, terné, sucumbieron, 
tras un período de alternancia que duró hasta fines 
del siglo XVI, ante pondré, vendré, tendré, más 
fieles a la raíz de poner, venir, tener.

8In medial combinations ending in a resonant in Latin, palatalization develops in the environments discussed in 3.1.2.A.2.:
-C-voiceless stop+[l]+V-
-V-[k'] or [g']+[l]+V-
-V+stop-[l]+V-

It does not occur with combinations ending in a resonant in other environments:
-V-voiced or voiceless stop+[r]+V- (3.1.1.A.1.; the stop assimilates)
-V-voiced or voiceless stop+[l]+V- (3.1.2.A.1.; the stop assimilates)
(-V+stop-[l]+V- (3.1.1.A.3.; metathesis occurs as an alternate development to palatalization in the same environment)
-V+continuant-[r]+V- (3.1.1.B.1. and 3.1.1.B.2.; epenthesis or metathesis occurs)

From the two lists above, one can see that for palatalization to occur, the combination must consist of a stop followed by [l]. The stop and the [l], as pointed out at the end of 3.1.2.A.2., do not have to be in the same syllable. Not all combinations consisting of a stop followed by [l] palatalize, as can be seen from the second list above.

Saporta, Phonological Grammar, pp. 35-36, specifies the environments in which a stop + [l] or stop + [r] can occur. Their environments are the same.

From these remarks, it is clear that—rather than the environment in which the stop + resonant combination occurs—it is the difference in the articulation of the [l] and [r] which determines that palatalization occurs in stop + [l] combinations and does not occur in stop + [r] combinations.

9Kent, Sounds of Latin, p. 59.

10Why [l] will readily palatalize and why [r] will not palatalize can be understood more clearly from the following remarks.

For both [l] and [λ], the vocal cords vibrate and the airstream escapes on one or both sides of the tongue. For [l] the tip of the tongue presses against the alveolar ridge. For [λ] the tip rests against the lower front teeth and the dorsum arches and makes extensive contact with the palate.
While the tongue tip is on the alveolar ridge to produce the [1],
the main body of the tongue is free to take up any position. See
O'Conner, *Phonetics*, p. 148. The change of [l] to [\lambda] (that is, the
palatalization of [l] is thus easily accomplished, since both are voiced
laterals and only the tongue position has to change. From the tongue
position for [l], the dorsum is free to make the necessary change:
it can arch and make extensive contact with the palate. When the
dorsum moves up to make contact with the palate, the tongue tip will
naturally move down to rest against the lower front teeth. These
tongue movements are illustrated in the accompanying diagrams.

To articulate [r], the vocal cords vibrate and the tongue-tip
quickly strikes the alveolar ridge once as the airstream passes
through. The tongue-tip is fairly close to the back of the alveolar
ridge, the sides of the tongue make contact with the sides of the
palate, and there is lateral bunching of the tongue. See O'Conner,
*Phonetics*, p. 150.

[r] will not palatalize to [\lambda] since its articulation involves two
features that are in conflict with the requirement for the articulation
of [\lambda]. First, for [r] the sides of the tongue make contact with the
palate, thus blocking air from escaping along the sides of the tongue;
for [\lambda] the sides of the tongue must be dropped down, so that the air
can escape along the sides of the tongue (i.e., so that lateral escape
is possible). Second, for [r] the tip of the tongue must be raised, be
close to the back of the alveolar ridge (slightly further back than the
tip is for [l]), and be turned slightly up and back in the mouth. See
Tomás Navarro Tomás, *Manual de Pronunciación Española* (Sexta
edición; New York: Hafner Publishing Co., 1967), p. 115. (Here-
after referred to as Navarro Tomás, *Manual de Pronunciación*.)
The tongue is not as retroflex for the [r] in Castilian as it is for the
[r] in American English. See John Dalbor, *Spanish Pronunciation Theory and Practice* (New York: Harper and Row, 1968), p. 127. (Hereafter referred to as Dalbor, *Spanish Pronunciation*.) The position that the tongue assumes for the articulation of [r] impedes the arching of the dorsum (and concomitant dropping of the tip of the tongue) which is necessary for the production of [λ]. The position of the tongue for [r] and the position for [λ] can be seen in the first set of diagrams below. Where the tongue contacts the roof of the mouth (and consequently either allows or prevents lateral escape of the airstream) can be seen in the second set of diagrams, which are from Navarro Tomás *Manual de Pronunciación*, pp. 113, 115, and 133. They show the roof of the mouth and the upper set of teeth. The darkened areas are where the tongue makes contact.
Syllable-initial consonants at the beginning of words, syllable-initial consonants preceded by another consonant in the middle of a word, and consonants in accented syllables are stronger than syllable-final consonants at the end of words, syllable-final consonants in the middle of a word, and intervocalic consonants, and consonants in unaccented syllables. A consonant preceded by another consonant is stronger than an intervocalic consonant, even though an intervocalic consonant is syllable-initial. See Menéndez Pidal, *Manual*, p. 182.

Strong means tense. Tense consonants are pronounced with more air pressure. With tense stops, the strength of the explosion is greater; with other tense consonants, the length of the sounding-period is greater. Long consonants are more tense than short ones. See Jakobson, Fant, and Halle, *Preliminaries*, p. 60 and p. 36.


Thompson, "Introduction," p. 92, rule 8.12.3.a.

In Castilian the consonant which preceded the [l] was lost through assimilation. Lausberg, *Lingüística romanica*, p. 334. Pottier is of the same opinion. In addition, Pottier points out the relation between syllable-initial stop + [l] at the beginning of a word and syllable-initial stop + [l] in the middle of a word. According to him, word-initial [pl], [kl], and [fl] assimilate to [pʎ], [kʎ], and [fʎ], then all become [ʎ]. Word-medial [pl], [kl], and [fl] also assimilate to [pʎ], [kʎ], and [fʎ], then change to [pj], [kj], and [fj]; all converge to [tj], which develops to [τʃ]. See Bernard Pottier, *Introducción a L’Etude a la Philologie Hispánique, Fasicule I* (Troisième edition revue et corrigée; Paris: Ediciones Hispano-Americanas, 1964), pp. 51-52, sections 85-87.

In De Ferrari’s opinion, in the Latin spoken in Spain and Italy the [l] was pronounced with the front of the tongue raised somewhat towards the hard palate and thus had a marked palatal quality. He thinks the [l] was very strongly articulated, even when it was second in a medial group, as in [ṭ-klu]. This strong articulation obscured the preceding consonant and brought about its assimilation.

Syncope occurs before the [t] can become voiced. [tʎ] is incompatible, or unacceptable, to the phonological pattern of Vulgar Latin and simplifies by metathesis to [lt]. It develops thereafter as [lt], that is, it palatalizes to [tʃ] when preceded by [u]. Syncope occurred too late for the resulting [tl] to merge with [kl], as [tl] did in vetulu [wɛ-tu-.lu] > [bɛk-lu] > viejo [bjɛ xo]. For the merger of [tl] with
[kl], see Menéndez Pidal, *Manual*, p. 159.

17 In the modern spelling of this word the first letter is inorganic.


19 Dalbor, *Spanish Pronunciation*, p. 87.

20 [tʃ] is a digraph representing one sound. George Kopp, Harriet Green, and Angelo Angelocci, *Visible Speech Manual* (Detroit: Wayne State University Press, 1967), p. 91, say that in the production of [tʃ], the tongue, lips, and jaw are in the position for [t], and the breath is stopped momentarily, then released quickly by moving the tongue to the position for [ʃ]. Their book is hereafter referred to as Kopp, *Visible Speech*.

21 Pei, *Glossary*, p. 116, defines honorganic as follows:

Two or more different phonemes whose utterance requires the articulation of the same vocal organ (p, b, both requiring bilabial articulation); two or more phonemes articulated in the same part of the speech mechanism, but which differ in one or more features of phonation (the bilabials [p], [b], [m]).

The bridge consonant has the same point of articulation as the preceding continuant, as can be seen from the list of combinations that develop through epentheses: [mbr], [ndr], [ldr], and [mbl].


Notes for Class Two: Medial Combinations Ending

in a Semiconsonant in Latin

1See 5.2.4. and 6.2.3.--6.2.5. for secondary yod combinations, and 5.2.3. and 6.2.2. for secondary wau combinations.

As pointed out in 0.4.4., primary and secondary combinations arise from different sources and often develop differently, so a careful distinction must be drawn between the two.

A primary yod is a yod that already existed in Standard Latin (e.g., [ma-jo-rem]) or that developed into Vulgar Latin from an [e] or [i] in hiatus with another vowel in Standard Latin (e.g., vinea [wǐ:-ne-a] > [wǐn-ja]). A secondary yod is one that developed in Vulgar Latin or Romance through the fall of a consonant or through another change in a word which resulted in an [e] or [i] coming into secondary hiatus with another vowel (e.g., [te-pi-dum] > [ti-bjo]); that developed through primary diphthongization (e.g., [sep-tem] > [się-te]); or that developed through the vocalization of a consonant (e.g., [fak-tum] > [faj-tu]). Only those yods affecting the development of medial consonant combinations are discussed in this study; other yods, such as those arising through primary diphthongization, result from vocalic developments and are not discussed.

A primary wau is a wau that already existed in Standard Latin (e.g., aequa:lem [aj-kwa:-lem]) or that developed into Vulgar Latin from an [o] or [u] in hiatus with another vowel in Standard Latin (e.g., [sa-pu-i:] > [sa-pwi]). A secondary wau is one that developed through the fall of a consonant or through another change in a word which resulted in an [o] or [u] coming into secondary hiatus with another vowel (e.g., [ju-di-ki-um] > juicio [jwǐ-jojo]); that developed through primary diphthongization (e.g., [pór-fam] > [pwêr-ta]); or that developed through the vocalization of a consonant (e.g., [ał-te-rum] > [aw-tro]). Only those waus involved in the development of medial consonant combinations are discussed in this study.

In Class 1 (discussed in the preceding chapter) some combinations ending in a resonant arise through syncope in Vulgar Latin. Since the classes are set up according to how the combination ends in Latin, all combinations ending in a resonant—whether they are primary or secondary—are grouped together in Class 1. In Class 2 (discussed in this chapter), however, some combinations ending in a semiconsonant are found in Standard Latin, others develop in Vulgar Latin, and still others develop later. Because these classes are set up according to how the combination ends in Latin, the primary combinations ending in a semiconsonant are grouped into Class 2, but the combinations which eventually give rise to a combination ending in a semiconsonant are grouped with the various other combinations found in Class 3 and Class 4.
Due to this friction, yod and wau are best analyzed as consonants rather than vowels or semivowels. See John B. Dalbor, *Spanish Pronunciation*, pp. 171 and 178. As indicated in 1.2.3. and 1.6.0., semiconsonants (yod and wau) are considered as types of consonants in this study. Thus consonant + semiconsonant combinations are medial consonant combinations.

In Vulgar Latin this combination is a consonant followed by a resonant. See 3.1.1.B.1.

See Bloomfield, *Language*, pp. 117 and 376. In palatalization the tongue and lips, during the production of a consonant, take up (so far as is compatible with the main features of the phoneme) the position of a front vowel, such as [i] or [e]. The consonant, in other words, is assimilated to the tongue-position of the yod. Such assimilation is very common, especially in the case of dentals and velars, and is known as palatalization. Jakobson, Fant, and Halle, *Preliminaries*, pp. 31 and 32. They define palatalization in a very similar way.

This study is concerned with consonantal developments. For specific information concerning which vowels are affected by which yods and concerning how the vowels change, see Menéndez Pidal, *Manual*, pp. 45-50; Thompson, "Introduction," pp. 74-82; and Max Krepinsky, *Inflexión de las vocales en español*, traducción y notas de Vicente García de Diego (2ª edición; Madrid: Consejo Superior de Investigaciones Científicas, 1962).

This is the phonetically regular course of development. The yod in the inflectional endings of the third and fourth conjugations in Latin did not follow this development. Due to analogy, it underwent changes that were different in regard to both vocalic and consonantal changes. See Menéndez Pidal, *Manual*, p. 269. Because this study is concerned with phonological developments in medial consonant combinations, such morphological developments are not discussed. For a full discussion of the development of regular and irregular preterites, see Thompson, "Introduction," pp. 183, 198, and 212-218.

This is a Vulgar Latin postulated form. The Standard Latin verb is deponent with the infinitive sequi: [sé'-kwí:].

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3Due to this friction, yod and wau are best analyzed as consonants rather than vowels or semivowels. See John B. Dalbor, *Spanish Pronunciation*, pp. 171 and 178. As indicated in 1.2.3. and 1.6.0., semiconsonants (yod and wau) are considered as types of consonants in this study. Thus consonant + semiconsonant combinations are medial consonant combinations.


5In Vulgar Latin this combination is a consonant followed by a resonant. See 3.1.1.B.1.

6See Bloomfield, *Language*, pp. 117 and 376. In palatalization the tongue and lips, during the production of a consonant, take up (so far as is compatible with the main features of the phoneme) the position of a front vowel, such as [i] or [e]. The consonant, in other words, is assimilated to the tongue-position of the yod. Such assimilation is very common, especially in the case of dentals and velars, and is known as palatalization. Jakobson, Fant, and Halle, *Preliminaries*, pp. 31 and 32. They define palatalization in a very similar way.

7This study is concerned with consonantal developments. For specific information concerning which vowels are affected by which yods and concerning how the vowels change, see Menéndez Pidal, *Manual*, pp. 45-50; Thompson, "Introduction," pp. 74-82; and Max Krepinsky, *Inflexión de las vocales en español*, traducción y notas de Vicente García de Diego (2ª edición; Madrid: Consejo Superior de Investigaciones Científicas, 1962).

8This is the phonetically regular course of development. The yod in the inflectional endings of the third and fourth conjugations in Latin did not follow this development. Due to analogy, it underwent changes that were different in regard to both vocalic and consonantal changes. See Menéndez Pidal, *Manual*, p. 269. Because this study is concerned with phonological developments in medial consonant combinations, such morphological developments are not discussed. For a full discussion of the development of regular and irregular preterites, see Thompson, "Introduction," pp. 183, 198, and 212-218.

9This is a Vulgar Latin postulated form. The Standard Latin verb is deponent with the infinitive sequi: [sé'-kwí:].
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Wau-perfects are verb forms that contain wau combinations and that are built on the perfect stem of the Latin second and third conjugations. In Old Castilian and Modern Castilian these are used as preterite forms. [sá-pu-i:] > [sá-pwi] > [sáw-pi], [pó-tu-i:] > [pó-twí] > [pów-tí], [plá-ku-i:] > [plá-kwi] > [pláw-ki], and [há-bu-i:] > [há-bwi] > [áw-bi] are wau-perfects; [só-pe] > [sú-pe], [pó-ţe] > [pú-ţe], [pló-ţe] > [plú-ţe], and [ţ-ţe] > hube [ţ-ţe] are the corresponding wau-preterites.

The four wau-perfects above developed phonologically. Insofar as sound changes are concerned, their development is regular. Old Castilian, however, had several other preterite stems which developed both phonologically and analogically. Because this study deals with phonological rather than morphological developments, these other preterites are not discussed. For a full discussion of the development of regular and irregular preterites, see Thompson, "Introduction," pp. 183, 189, and 212-218.

All combinations in this category involve secondary waus. Other late developments also giving rise to secondary wau combinations (i.e., the fall of a consonant and primary diphthongization) have to do with the development of a single consonant or the development of a vowel, rather than the development of a medial consonant combination, and therefore are not included herein.

For numerous examples of the developments of Latin words with medial [kw] and a few with medial [g], see Peter Boyd-Bowman, From Latin to Romance in Sound Charts, pp. 109-111.

For the specific effects of waus on various vowels, see Thompson, "Introduction," p. 75.

Assibilation of [tj] is attested to some extent as early as the second century A.D. and apparently had become general by the fourth century, according to Thompson, "Introduction," p. 126. The assibilation of both [tj] and [k'j] was so early that the yod did not affect the preceding vowel. See Menéndez Pidal, Manual, p. 47.


The loss of the initial [f] in words such as this is a well-known development in Castilian. See Menéndez Pidal, Manual, pp. 121-124.

18 See footnote 7 in this chapter.

19 See footnote 7 in this chapter.

20 The change from [o] to [u] was probably influenced by the closing effect of the yod in the third plural ending, 
[-[je'-ron]], and by dissimilation from the third singular ending, 
[-[o]], according to Thompson, "Introduction," p. 213.
Notes for Class Three: Medial Combinations Beginning with

[l], [r], [m], [n], or [s], and Not Ending with

a Resonant or Semiconsonant in Latin

To avoid repetitious listing of the consonants beginning and ending the combinations in this chapter, combinations that begin with [l], [r], [m], [n], or [s] in Latin and at the same time do not end in [l], [r], [j], or [w] are called Class 3 combinations. The continuants [l], [r], [m], [n], and [s] are referred to as Class 3 continuants.

If the Class 3 continuant [m] is followed by the voiced stop [b], the [b] does not become a fricative. If [n] or [l] is followed by [d], the [d] does not become a fricative. If [n] is followed by [g], the [g] does not become a fricative. Dalbor, Spanish Pronunciation, pp. 271-272.

See 3.1.1.A.2. where vocalization is also discussed.

This environment is different from that in which the stop assimilates in 3.1.1.A.1. (-V-stop+[r]+V-) and 5.1.1.A. (V+Class 3 continuant-primary voiced stop+V-, or V+Class 3 continuant-secondary voiced stop.)

The [t], as well as being syllable-initial, precedes another consonant, and is therefore tense. See footnote 11 in Chapter 3.

The environment at this point is -V+[j]-stop+V-, which is different from the environment in which a stop became assimilated in 3.1.1.A.1 and 3.1.1.A.2., viz., -V-stop+[r]+V, or -V+stop-[l]+V-.

In Standard Latin, the opposition between long and short consonants was phonemic. Long consonants were pronounced with greater duration than short consonants. Concurrent with, or possibly leading to, the loss of the phonemic distinction between long and short consonants, a phonetic change took place which consisted of a shortening of duration. The shortened consonants did not develop further; the loss of duration occurred too late for the shortened consonants (which were previously long) to develop with their originally short counterparts. In the case of those voiced stops which acquired fricative allophones, however, the shortened consonants merging with the phonemes /b/, /d/, and /g/ also acquire fricative allophones. Three long consonants, [l:], [n:], and [r:], did not change through shortening of duration: [l:] palatalized
to [λ], [n:] palatalized to [n], and [r:] remained unchanged. Thompson, "Introduction," pp. 100-101.

Long consonants exist in Modern Castilian, but they are phonetically, not phonemically long. See Dalbor, Spanish Pronunciation, p. 147.

Cf. 5.2.6., in which [n:] results from assimilation and then changes to become [n], and 6.2.1., in which a long stop results from assimilation and simplifies to become a short stop.

Compensatory lengthening occurs with the vowel preceding the [ns], e.g., Standard Latin [pén-sum] > Vulgar Latin [pe'-su]. Compensatory lengthening may be defined as the changing of a Standard Latin vowel from short to long, or a Vulgar Latin vowel from open to close, to compensate for the loss in syllabic duration through a consonant change.

Many words with [rs] developed [s] and then regressed to [rs] under learned influence.

According to Leonard Bloomfield, Language, p. 390:
In the languages of Europe, the sounds [r, l, n] are especially subject to... replacement; the replacing sound is usually one of the same group. Where the replacement occurs, it follows quite definite rules, but we cannot predict its occurrence.

[r] tends to be especially unstable and to migrate or metathesize, either undergoing reciprocal metathesis with an [l] in the same word or undergoing simple metathesis from one syllable to another. Often, if a word has two [r]'s or two [l]'s, one will dissimilate out or will dissimilate and become the other. Thompson, "Introduction,"p. 121.

Reciprocal, or mutual, metathesis often involves the continuants [l] and [r], and to a lesser extent the continuant [n]. Menéndez Pidal, Manual, p. 184.

Cf. 3.1.1.B., in which continuant + resonant (continuant) combinations are resolved through epenthesis.

The position of the tongue is not important in the articulation of [m]. For it, the tongue assumes the position of the next sound for which the tongue position is important. Kopp, Visible Speech, p. 48.
Here, the next sound for which the tongue position is important is [a], so the tongue is low in the center of the mouth (so that it will be ready to articulate the [a]) during the articulation of [m].

15 To articulate [l], the tongue tip blocks the airflow at the alveolar ridge (or, for the dental variety of [l], at the back of the upper front teeth). The back sides of the tongue drop slightly so that they are not in contact with the sides of the palate along all their length. Kopp, Visible Speech, p. 56. The airstream passes over the sides of the tongue, around the alveolar (or dental) obstruction, and out of the mouth. O'Connor, Phonetics, p. 148.

16 See footnote 14 above.

17 The position of the tongue is not important in the articulation of [m] or [p]. For both of them, the tongue assumes the position of the next sound for which the tongue position is important. (Kopp, Visible Speech, p. 48 and p. 16.)

Here, the next sound for which the tongue position is important is [t], so the tongue tip moves towards the upper front teeth (so that it will be ready to make closure there for [t]) during the articulation of [m] and remains there during the articulation of [p].

18 The loss of syllable-final consonants is a wide-spread phenomenon that has occurred throughout the history of Latin and Castilian, with progressively fewer syllable-final consonants acceptable as codas. Kiss, Les Transformations, pp. 63-73. See 7.2.0.

In the change from [kom-pu-tum] to [kom-tu], [p] is syllable-initial before syncope but syllable-final after syncope.

19 Since [p] and [t] share all features except point of articulation, [p] is lost by complete assimilation when it changes from a bilabial stop to a dental stop.

20 Assimilation of a nasal to the consonant following it is a common phenomenon and also occurs in two-consonant combinations, such as [ko-mi-tem] > [kom-de] > [kon-de] and [in-wes-ti-re] > [in-bes-tiř] > investir [im-bes-tiř].

21 See footnote 17 above.

22 The [l] preceding the [t] is +DEN rather than +ALV. An [l]
followed by [t] or by [d] assimilates to the dental point of articulation of the stop: the tip of the tongue presses against the back of the upper front teeth rather than the alveolar ridge, to articulate the [l]. This assimilation occurs in both Latin and Castilian. Kent, The Sounds of Latin, p. 59, and Navarro Tomás, Manual de Pronunciación, p. 104.

23 Thompson, "Introduction," pp. 54-55.

24 See footnote 22 in this chapter.

25 See footnote 15 in this chapter.

26 Cf. 6.2.4. in which [t] also palatalizes to [tʃ].

27 See footnote 18 in this chapter.

28 See footnote 7 in this chapter.

29 See footnote 7 in this chapter.

30 See footnote 14 in this chapter.
Notes for Class Four: Medial Combinations not Belonging to Any of the Preceding Classes

1[^ks] undergoes vocalization followed by palatalization, but it also undergoes a further development: velarization.

2[^n] is also occlusive in nature. It is homorganic with [d] (Cf. footnote 21 in Chapter 3). For the articulation of [n], the tip of the tongue usually touches the alveolar ridge to stop the airflow, but for the dental allophone of [n], the tip of the tongue is placed against the back of the upper front teeth, as it is for [d], to stop the airflow. The only functional difference between [n] and [d] is that for [n] the velum is open and the airflow passes through and resonates in the nasal cavity as well as in the mouth, whereas for [d] the velum is closed and the airflow passes through and resonates only in the mouth.

3The development of [ps] in [íp-se] > [e's-se] > [e'-se] is very similar to that of [pt] in 6.2.1., except that [s] is an alveolar fricative rather than a dental stop.


5The development of [k'] to [ts] or [dz] is discussed in 6.2.3.

6See 6.1.3.C.2. for another development of secondary [kt]. In this section, the secondary [kt] is followed by a vowel. In 6.1.3.C.2. the secondary [kt] is followed by a consonant. (Primary [kt] is discussed in 6.1.3.C.1.)

7See 5.1.2.B. for a discussion of this type of loss.

8See 5.1.2.A. for a discussion of a very similar type of loss.

9This is a late primary development. [pt] merges with [t:], then develops as [t:] does (i.e., the combination [t-t], or [t:], is shortened to [t]).

10See footnote 18 in Chapter 5 concerning the loss of syllable-final consonants.
For the articulation of bilabials, such as [p] and [β], the position of the tongue is not important. During the articulation of the bilabial, the tongue usually assumes the position of the next sound for which the tongue position is important. See Kopp, Visible Speech, pp. 16, 23, and 48. Here, the next sound for which the tongue position is important is [t]; so, during the articulation of the bilabial, the tip of the tongue moves towards the back of the upper front teeth to be ready to press against the teeth to make closure for the [t].

Since [p] and [t] share all features except that of point of articulation, the [p] is lost by assimilation when it changes from a bilabial stop to a dental stop, and [p-t] becomes [t-t].

In both [kap-tǐ:-wum] and [rǔp-tum], the syllable division falls between the [p] and the [t]. In the development of [rǔp-tum] (6.2.1.), the syllable-final [p] is eliminated by assimilation to the following syllable-initial [t]. In the development of [kap-tǐ:-wum] (in this section), although the syllable-final [p] is weakened by assimilation to the preceding [a] in the same syllable, it is not eliminated. By "weakening" we mean that the [p], by voicing and becoming fricative, becomes less consonant-like and more vowel-like. See footnote 18 in Chapter 5 concerning the loss of syllable-final consonants.

See footnote 11 above.

Since the tip of the tongue rests near the lower front teeth in the production of [a] and since tongue position is not important in the production of [β], the tongue may maintain its position near the lower front teeth until the lips have come close to each other in the articulation of the [β]. Then the tip of the tongue moves the back of the upper teeth to articulate the following [t]. See footnote 11 above.

See Martinet, "Unvoicing of Sibilants," p. 152. Also see Thompson, "Introduction," pp. 117 and 126. Although other developments have been hypothesized, they are more problematic and less probable than the development given here.

Cf. 6.2.6. for a detailed description of the articulation of [s].


This combination occurs in the environment -V+voiced velar stop-alveolar nasal+V-. This environment is similar to that of several
combinations that have been studied (3.1.1.A.1., 3.1.2.A.1.,
5.1.1.A., and 3.1.1.A.2), and the development is the same: the stop
assimilates to the sounds preceding and following it. Here, the environment
changes to -V+voiced velar fricative-alveolar nasal+V-, then to
-V+semiconsonant-alveolar nasal+V-, and then to -V-palatal nasal
+V-. This development is similar to that of [wi:-ne-a] in 4.2.2. In
both, the [n] is attracted to the point of articulation of a neighboring
yod and palatalizes.

20Sturtevant states that there is evidence that gn possibly was
pronounced [gn] in Standard Latin. See E. H. Sturtevant, The Pro-

21The vocalization of the [k] is similar to the vocalization of [g]
in [l'g-num] in 6.2.4. The assimilation of the yod to a preceding vowel,
a common phenomenon, was discussed in 4.1.1.2.B. and was illustrated
in 4.2.4. and 4.2.5. Section 4.1.1.2.B. deals with a primary yod that
metathesizes and thus comes to follow a vowel: this section deals with
a secondary yod that follows a vowel. The effect of the yod in both
instances is the same: it closes the vowel. The development of [múl-tum]
in 5.2.4. is similar to the development in this section: in both instances
the consonant preceding the [t] vocalizes to a secondary yod, then the
yod palatalizes the [t] and assimilates to the preceding vowel.


23The vocalization of [k] is the same as that described in the pre-
ceding section, 6.2.4. The change from [k] to [x] begins approximately
1550 and concludes approximately 1650, according to Martinet,
"Unvoicing of Sibilants," p. 150.

24The [s] may also be articulated as follows: the vocal cords do
not vibrate, the tip of the tongue rests against or near the lower front
teeth, a groove through which the airstream passes is formed in the
tongue blade or in the front of the dorsum as it presses against the
alveolar ridge, and the tongue is convex in shape.

25See footnote 24 above.
BIBLIOGRAPHY
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Articles:


**Books:**


Grandgent, Charles H. *An Introduction to Vulgar Latin.* Boston, 1907.


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Robert Anthony Quinn was born in Greenwood, Mississippi, on March 4, 1947. He received the B.A. in Spanish and in English from Delta State University in May, 1969. He studied at the University of Miami, at Miami, Florida, and Florida Atlantic University, where he received the M.A. in Linguistics in December, 1971. His thesis was a comparative study of Papiamento and Spanish verbs.

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