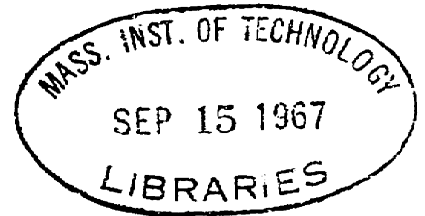


SPANISH PHONOLOGY



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The phonological component of a transformational generative grammar of a dialect of Spanish is studied in the framework of the phonological theory whose most recent and comprehensive formulation appears in Chomsky and Halle, The Sound Pattern of English. The purpose of this study is twofold: first, it strives for deeper insight into the widely studied facts of Spanish pronunciation by presenting a theory of these facts in the form of a generative grammar; second, this study confronts the current theory of generative phonology for the first time with the results of an extensive and detailed investigation of the sound structure of Spanish. It is shown on the one hand that, in general, the phonological theory proposed by Chomsky and Halle, including recent innovations, is strongly supported by the data of Spanish, and on the other hand that serious inadequacies remain. Several controversial and heretofore unresolved problems of Spanish phonology yield to insightful analysis in this theory. For example, the question of certain assimilatory phenomena before glides finds a natural and simple solution, and substantive clarification is achieved of the phonological and phonetic representations of the various r-type phones.

Chapter I presents a general introduction to the investigation. Chapter II provides a close examination of rules involving the phonetic features of nasals, glides, voiced obstruents, and nonlateral liquids. Chapter III considers the wide range of phonological processes involved in the rich inflectional system of the verb. Chapter IV investigates various additional consonantal alternations, and concludes with an ordered list of all the rules discussed in the study. Chapter V is a historical excursus which traces the evolution of the medieval stridents in two dialects.

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CHAPTER I - Introduction

This work presents the results of an investigation of the sound structure of Spanish within the framework of transformational generative grammar. Its purpose is twofold. First, it strives for deeper insight into the widely studied facts of Spanish pronunciation by presenting a theory of these facts in the precise form of a generative grammar. Such precise and explicit formulation can lead to the discovery of serious gaps in our understanding, and may have the heuristic value of suggesting a principled way to fill these gaps. Secondly, this investigation makes available a large and detailed body of data of the appropriate sort needed to confront the universal phonological theory whose most recent statement is found in Chomsky and Halle (1968). This phonological theory, perhaps the most elaborate and richest yet postulated, is based primarily, though by no means exclusively, on a deep and massive study of the phonological component of a transformational generative grammar of English. At present this theory can best be tested, sharpened, and enriched by examining it in the light of phonological studies of other languages, which approach in both scope and depth Chomsky and Halle's study of English. At various points in the exposition, observations are made regarding the empirical adequacy of the current formulation of the phonological theory in question. It is shown on the one hand that recent theoretical innovations are strongly supported by the data, and on the other hand that serious inadequacies remain. Detailed proposals for the solution of such difficulties are not made in the present work. This would be premature. Rather, the observations made here are intended as a contribution to the large body of reasonably clear data which must underly future theoretical revisions.

This study does not purport to be exhaustive. Rather, it contains what I believe is a fairly comprehensive account of the rules for the central and crucial phonological processes of Spanish, plus a minutely detailed examination of certain areas in which there is near certainty that all the relevant data have been considered, and which, furthermore, promise to contribute significantly to the understanding of the sound structure of Spanish and to phonological theory in general. For example, considerable attention is paid to the question of the phonological and phonetic representation of glides and of the flapped and trilled varieties of r in Spanish. On the other hand the distribution in phonetic representations of tenses and laxer allophones of vowels is completely ignored. As another example of an intentionally neglected topic, no rules are proposed to account specifically for the alternations illustrated orthographically in the double-underlined letters of él/ellos, aquél/aquellos, doncel/doncella, and desdén/desdeñar, since these four pairs of examples exhaust the cases to which such rules would apply, and are of no further interest. Also not included is a full account of many morphophonemic phenomena which have traditionally been considered irregular or exceptional, for example, irregular preterit and present tense forms of verbs. While apparently irregular and exceptional forms are of value in dealing with questions whose solutions are underdetermined by the data provided by clearly regular forms, it seems to me misguided to attach much weight to irregularities until at least the outline of a theory of regular cases is clear. Exclusions of the sort just mentioned do not contradict the claim of comprehensiveness of major phonological processes made for this study. It is only in the light of the total grammar that detailed exploration of particular areas can be carried out with a reasonable assurance of relevance. Lack of such assurance greatly reduces

the interest of recent work in Spanish phonology such as Foley (1965), Sableski (1965), and Saporta (1965).

The dialect of Spanish described is that of educated speakers from Mexico City, specifically, my own (virtually, though not technically, native) pronunciation and that of a few Mexican friends. This dialect was chosen out of necessity. There does not exist for Spanish anything equivalent to, say, Kenyon and Knott's A Pronouncing Dictionary of American English, and the state of the study of Spanish dialectology is deplorable by the standard of such work in other major languages. Therefore the only body of data accessible to me in sufficient breadth and detail is that which I am familiar with from first-hand experience. Information about other dialects plays an entirely peripheral role in this study. The extent to which the results of this investigation may carry over to other dialects is, of course, an empirical question, and must be left to future research.

A word about transcription: For the sake of readability, as little or as much phonetic detail is indicated in examples as the discussion requires. As a result, transcriptions range from standard orthography, which is largely unambiguous and well known, through mixed representations like haβrá and prote[x]er (where confusion might result from not knowing whether a given character is a letter or a phonetic symbol), to conventional phonetic transcription.

CHAPTER II - Some Consonantal Phenomena

1. Background

The facts to be discussed in this chapter are well known; so much so that many of them are to be found in almost any elementary treatment of Spanish pronunciation. Knowledge of the facts, however, has not generally been accompanied by understanding of them, and careful studies (several of which will be cited below) have ended up in irreconcilable disagreement and puzzlement.

Stockwell, Bowen and Silva-Fuenzalida (1956) argue that certain of the phenomena to be discussed here might be handled by "ascrib[ing these] alternations to free variation at this [phonemic] level, presumably controlled by stylistic choice... [This] solution is easily eliminated because it is equivalent to saying that the variation cannot be described systematically even when it can be... At any rate, we would not object to recognizing free variation in an instance of this sort, where there is fair assurance that the variation will actually be storable on a stylistic level... It is, of course, recognized that no one has, to our knowledge, actually described the conditioning on this higher level" (pp.408-409). Evidence will be presented here that the correct solution to the problems referred to does in fact involve recognition of levels of style. The following are impressionistic characterizations of the four styles which will be taken into account.

- (1) a. Largo: very slow, deliberate, over-precise; used, for instance, when trying to communicate with a foreigner with little competence in the language, or when correcting a misunderstanding over a bad telephone connection.

- b. Andante: slow, careful, but unaffected; used when one is minding his p's and q's but not selfconsciously. Typical of, say, teaching a class or delivering a lecture in a large hall without electronic amplification.
- c. Allegretto: moderately fast tempo, casual, colloquial. In many situations one might easily alternate between Andante and Allegretto in mid discourse or even in mid sentence.
- d. Presto: fast, careless or sloppy.

We will be concerned primarily with Andante and Allegretto, but will mention Largo and Presto at various appropriate points. The dialect under consideration, educated Mexico City speech, is generally thought of among Latin Americans as hyper-careful and sometimes slightly affected. This can be interpreted as meaning that in this dialect, the span of differences between Andante and Presto is smaller than in some other dialects, e.g. educated Havana speech. There is in fact much less difference between Mexico City Andante and Havana Andante than between Mexico City Presto and Havana Presto, as the following example will show.

(2)	<u>Mexico City</u>	<u>Havana</u>	
Largo	[mísmo]	[mísmo]	
Andante	[mí ^z mo]	[mí ^z mo]	
Allegretto	[mí ^z mo]	[mí ^h mo]	([^h] = voiced [h])
Presto	[mí ^z mo]	[mí:mo]	

As hinted at above, a finely detailed phonetic transcription of a sufficiently long discourse might reveal considerable mixing of styles.

I agree, however, with Stockwell et al. that it is wrong to toss everything into the limbo of free variation, however defined, since, for example, [mismo] and [mizmo] simply are not free variants: the difference can be described systematically, as will be shown. The crucial point is the following: certain alternations can be correctly accounted for only by recognizing discrete levels of style.

As the exposition proceeds, the vague descriptions given in (1) will be replaced by the sets of rules which explicitly characterize each style, and a few tentative observations will be made concerning the notions "style" and "stylistic level," as these are reflected in the formal differences among the sets of rules.

2. Nasal Assimilation

In the examples to follow, [m̥] represents a labiodental nasal, [n̥] represents a dental - not alveolar - nasal, and [n̥] represents an alveolar nasal. Standard orthography is used otherwise, except for [ŋ].

2.1 The following is the data for Largo.

(3)

Nasal before:	<u>bilabial</u>	labio- <u>dental</u>	<u>dental</u>	<u>alveolar</u>	<u>palatal</u>	<u>velar</u>
<u>Obstruents</u>	campo	emfático	cuanto	canso	rancho	aŋca
	cambio		cuando			gan̄ga
						aŋeŋjo
<u>Liquids</u>				onra		
<u>Nasals</u>	in̄menso			innato		

Further details and observations:

a. "Normally," that is, before vowels and finally, n is alveolar [n̥].

- b. Bilabial [m], alveolar [n], and palatal [ɲ̃] contrast intervocalically: amo, ano, año. On the other hand, labiodental [m̥], dental [n̥], and velar [ŋ] occur only as assimilatory phenomena.
- c. Navarro Tomás (1965) states that palatal [ɲ̃] occurs before palatals, e.g. ra[ɲ̃]cho, but with the qualification that "la pronunciación lenta y sílabeadada puede hacer que la n mantenga en estos mismos casos su forma ápticoalveolar, más o menos palatalizada, sin asimilarse por entero al modo de articulación de la palatal siguiente" (p. 133). Note carefully palatalizada, "palatalIZED," not palatal, "palatal." Many writers, possibly copying Navarro carelessly, have stated flatly that only [ɲ̃] occurs before palatals. This is patently false in the dialect and style under consideration. In the phonological theory which characterizes palatals as [-diffuse, -grave], we can only say that this nasal is [+diffuse, -grave], and leave the qualification "más o menos palatalizada" up to n-ary phonetic detail rules.
- d. In Largo there is no assimilation across word boundaries. Thus while *nb, *nt, etc., are impossible within a word, the following do occur (where space indicates word boundary): [un beso], [un kakto], etc.
- e. There is no assimilation before glides within a word: nuevo [nweβo], nieto [nyeto].

On the basis of the above data, we might formulate rule (4) if we ignore the bilabial-labiodental and dental-alveolar distinctions, and if we assume that the nonassimilated n is [+diffuse, -grave]:

$$(4) \quad [+nasal] \rightarrow \begin{bmatrix} +grave \\ \emptyset \text{diffuse} \end{bmatrix} / \text{---} \begin{bmatrix} +obstruent \\ +grave \\ \emptyset \text{diffuse} \end{bmatrix}$$

We must use [+grave] rather than [βgrave] in order to exclude assimilation before palatals. We have used [+obstruent] in the environment in order to exclude assimilation before nasals: [in̄mēnso], not [*immēnso]. This is probably incorrect, but irrelevant to the present discussion.¹

The above, however, does not exhaust the data. Consider words like redimir, "to redeem," redentor, "redeemer," redención, "redemption," and consumir, "to consume," consumto, "consumed," consumción, "consumption." Evidently we have underlying stem final m in these words.² Thus the nasal assimilation rule(s) must have not only the effect of (5), but also that of (6):

$$(5) \quad n \rightarrow \left\{ \begin{array}{l} m / \dots \\ \eta / \dots \end{array} \right\}$$

$$(6) \quad m \rightarrow n / \text{---}[\text{dental}]$$

In other words, since dentals are [-grave] we can no longer state nasal assimilation for Largo as in (4). Among the conceivable alternatives to (4) are the following:

$$(7) \quad [+nasal] \rightarrow \left\{ \begin{array}{l} [-\text{next rule}] / \text{---} \begin{bmatrix} +\text{obstruent} \\ -\text{diffuse} \\ -\text{grave} \end{bmatrix} \\ \begin{bmatrix} \alpha\text{diffuse} \\ \beta\text{grave} \end{bmatrix} / \text{---} \begin{bmatrix} +\text{obstruent} \\ \alpha\text{diffuse} \\ \beta\text{grave} \end{bmatrix} \end{array} \right\}$$

$$(8) \quad [+nasal] \quad \begin{bmatrix} \alpha\text{diffuse} \\ \beta\text{grave} \end{bmatrix} / \text{---} \begin{bmatrix} +\text{obstruent} \\ \alpha\text{diffuse} \\ \beta\text{grave} \end{bmatrix}$$

Conditions:

$$\begin{array}{l} (\beta = +) \supset (\alpha = \gamma) \quad (\gamma = \beta) \supset (\alpha = +) \\ (\beta = -) \supset (\alpha = +) \quad \text{or} \quad (\gamma \neq \beta) \supset (\alpha = \gamma) \end{array}$$

Alternative (7), in addition to theoretical difficulties involving [-next rule],³ assumes that there are no underlying mč clusters, which may or may not be correct; alternative (8) contains an extremely complex set of conditions. We will leave this highly unsatisfactory situation for the moment, and turn to the data for Andante.

2.2 Nasal Assimilation in Andante. Within a word, the data is identical to that of Largo. That is, assimilation occurs before all except palatal obstruents, but does not occur before glides and other nasals.

Across word boundaries, the assimilatory phenomena of nasals are not at all straightforward. The following passage from Navarro Tomas (1965) is, to my knowledge, unique in its lucidity and attention to phonetic detail, and deserves to be quoted in full:

"Nasal ante labial. --En contacto con las consonantes p, b, la n final de una palabra anterior se pronuncia corrientemente m, sin que en este sentido pueda advertirse diferencia alguna entre expresiones como, por ejemplo, con padre y compadre, pronunciadas ambas [kompáʔre], o entre con placer y complacer, pronunciadas [complaθér]. La n final mantiene, sin embargo, su propia articulación, ..., cuando por lentitud o vacilación en el lenguaje aparece desligada de la consonante siguiente. Suelen darse asimismo, según la rapidez con que se hable, formas intermedias de asimilación en que la n, sin perder enteramente su articulación alveolar, resulta

en parte cubierta por la oclusión de los labios [emphasis mine, J.H.].

En la conversación ordinaria, la transformación de la n en m ante las oclusivas bilabiales p, b, se produce de una manera regular y constante" (p.89).

To this is appended the following footnote: "Los gramáticos han discutido extensamente sobre si la n ante p, b, se pronuncia n o m. La realidad da apoyo, como se ve, para varias opiniones. Todo depende de la forma de pronunciación que se tome por base..."

I take Navarro's "lentitud o vacilación" to be characteristic of Largo, where there is no assimilation across word boundaries. On the other hand, his "conversación ordinaria" corresponds precisely to Allegretto, where, letting the exposition get ahead of itself, there is full assimilation across word boundaries. That leaves the "formas intermedias de asimilación," which I claim should be assigned to Andante. I propose the following: the nasal assimilation rule, stated in terms of binary features, is the same in Andante as in Largo, whatever the correct form of this rule is: later scalar rules assign a greater degree of assimilation across word boundaries in Andante than in Largo. In particular, in the case of nasals before labials, the binary rule of nasal assimilation does not apply across word boundaries, hence it does not apply to representation such as con#padre and un#beso.⁴ Then an n-ary phonetic rule assigns to the nasal in question the feature [i labial] where $i_{\text{Andante}} > i_{\text{Largo}}$ (i_{Largo} possibly equal to 0).

Navarro's description of the other nasal assimilations are not as detailed as the one quoted, but, in general, they support my proposal. I will cite one more:

"En el grupo nm la articulación de la primera consonante, en la conversación ordinaria, va generalmente cubierta por la de la m: la lengua realiza, de manera más o menos completa, el contacto alveolar de la n; pero al mismo tiempo la m forma su oclusión bilabial, siendo en realidad el sonido de esta última el único que ácusticamente resulta perceptible: innóvil [i^mnóvil], conmigo [ko^mmígo], ...; en pronunciación lenta, ambas articulaciones, m y n, produciéndose sucesivamente, resultan claras y distintas" (p. 113).

2.3 Nasal Assimilation in Allegretto: The data are sufficiently different from those of Largo and Andante to warrant stating them completely, even though this entails some repetition. (Space indicates word boundary.)

(9)

Nasal before:	<u>bilabial</u>	<u>labio-dental</u>	<u>dental</u>	<u>alveolar</u>	<u>palatal</u>	<u>velar</u>
<u>Obstruents</u>	campo	emfático	cuanto	canço	rancho	aŋka
	cambio		cuando			gaŋga
						ajeŋje
	un peso	un foco	un taco	un sacco	un charco	un cacto
	un beso		un dios			un gato
						un juego
<u>Liquids</u>				onra		
				un ron		
				un lago		
<u>Nasals</u>	inmenso			innato		
	un mexicano			un nopal		
<u>Glides</u>	nuevo [nweβo]				miel [myel]	
	nuevo [nweβo]				nieto [nyeto]	
	un huevo [unweβo]				un hielo [unyeio]	

Thus we see that there is assimilation before nasals, and that word boundaries are irrelevant in the sense that the same assimilations occur across word boundaries as within words. Alternatives (7) and (8) could be adapted for Allegretto by substituting [+consonantal] for [+obstruent]⁵ and inserting (#) in the environment, were it not for the w glide. We must add, apparently, to either alternative, a rule with the effect of (10).

(10)

$$[+nasal] \rightarrow \begin{bmatrix} +grave \\ -diffuse \end{bmatrix} / __\# \begin{bmatrix} -vocalic \\ -consonantal \\ +grave \end{bmatrix}$$

There may be some notational device which would permit the incorporation of (10) into (7) or (8), although this would be hair raising -- note that the # is not optional in (10). Obviously something is wrong somewhere. If only the [w] in huevo, but not those in muevo and nuevo, were velar consonants rather than glides there would be no difficulty. This is not just wishful thinking. We will turn presently to a discussion of glides in Spanish (about which more ink has been spilled to less purpose than about any other topic in Spanish phonology); first we must resolve some of the present difficulties.

2.4 Let us refer to as T_1 the phonological theory in which the features [diffuse] and [grave] provide for a four-way distinction among points of articulation for consonants. In T_1 there is no way of making the bilabial-labiodental and dental-alveolar distinctions which have been observed in the nasal assimilation data of Spanish. Let us refer to as T_2 the theory proposed by Chomsky and Halle (1968) in which these distinctions, and others, are handled as illustrated in (11):

(11)		m	ṃ	n	ṇ	ñ	ŋ
	coronal	-	-	+	+	-	-
	anterior	+	+	+	+	-	-
	high	-	-	-	-	+	+
	back	-	-	-	-	-	+
	distributed	+	-	+	-	+	+

(We have been using the diacritic subscript [̣] all along to indicate the [-distributed] nasals [ṃ] and [ṇ].) In T₂ the assimilations represented by [mp̣], [ṃḍ], [ṇṭ], [ṇṣ], and [ŋḳ] will be accounted for if (12) is a proper part of the nasal assimilation rule.

(12)

$$[+nasal] \rightarrow \left[\begin{array}{l} \alpha \text{high} \\ \beta \text{back} \\ \gamma \text{distributed} \end{array} \right] / \text{---} \left[\begin{array}{l} \alpha \text{high} \\ \beta \text{back} \\ \gamma \text{distributed} \end{array} \right]$$

The problem remains, however, of excluding assimilation before palatal [ç] (with the features [+coronal, -anterior, +high] as opposed to [ñ], which is [-coronal, -anterior, +high]) while permitting it in all other positions. One possibility is to say that assimilation occurs in the environment ---[αanterior, -αback]. Thus, still ignoring the problem with w, the nasal assimilation rule might be stated as (13):

(13)

$$[+nasal] \rightarrow \left[\begin{array}{l} \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ -\alpha \text{back} \\ \delta \text{distributed} \end{array} \right] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ -\alpha \text{back} \\ \delta \text{distributed} \end{array} \right]$$

The first impression of complexity that (13) gives is in part illusory: the three features [high], [distributed], and [back] represent simply the

gain in phonetic accuracy which T_2 affords over T_1 , and are thus not to be reckoned as complications. Still, the class $[-\alpha\text{anterior}, -\alpha\text{back}]$ is highly suspicious. Can one really believe that nasal assimilation in Spanish functions in terms of this feature complex? Further, this rule will fail if there are any $\underline{m}^{\check{c}}$ clusters.

One might investigate other possibilities, for example (14), which is analagous to (7), and has the same defects:

$$(14) \quad [+nasal] \rightarrow \left\{ \begin{array}{l} [-\text{next rule}] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ -\text{anterior} \\ +\text{coronal} \end{array} \right] \\ \left[\begin{array}{l} \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{array} \right] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{array} \right] \end{array} \right\}$$

Before proceeding, let us review the source of the difficulty. Nasals assimilate so that they become entirely homorganic with a following consonant except that before $[\check{c}]$ the nasal which occurs is $[\underline{n}]$ and not $[\tilde{n}]$. In T_1 the $[\text{+diffuse}, \text{-grave}]$ nasal $[\underline{n}]$ does not become the $[\text{-diffuse}, \text{-grave}]$ nasal $[\tilde{n}]$ before the $[\text{-diffuse}, \text{-grave}]$ obstruent $[\check{c}]$. In this theoretical framework there is nothing further that can be said. In T_2 , however, there is something further that can be said: in T_2 there is another theoretically possible nasal \underline{n}^* with the features $[-\text{anterior}, +\text{coronal}, +\text{high}, -\text{back}, +\text{distributed}]$. What has been insisted on is that the nasal which occurs before palato-alveolar $[\check{c}]$ is not palatal $[\tilde{n}]$. I am quite willing to believe that this nasal is \underline{n}^* , that is, a palato-alveolar nasal with the same point-of-articulation features as $[\check{c}]$. This is perfectly compatible with Navarro's (rather vague) articulatory description of this nasal as "más o

menos palatalizada." If this is correct, then all the mythical rules presented so far in this discussion can be discarded, and one can state simply that nasals assimilate completely before all consonants, as in (15):

$$(15) \quad [+nasal] \rightarrow \begin{bmatrix} \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ \delta \text{back} \\ \theta \text{distributed} \end{bmatrix} / \text{---} \begin{bmatrix} +\text{consonantal} \\ \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ \delta \text{back} \\ \theta \text{distributed} \end{bmatrix}$$

These considerations provide evidence of a very strong sort for the correctness of T_2 as opposed to T_1 . Facts which cannot be accounted for in T_1 are accounted for in T_2 : the bilabial-labiodental and dental-alveolar contrasts can be expressed in T_2 but not in T_1 ; and further, the possible existence of phonological $m\check{c}$ is no longer a problem. In fact, (15), which is expressible only in T_2 states positively (and correctly) that $[m\check{c}]$ cannot occur phonetically, while in T_1 this fact must be stated ad hoc, there being no independently motivated explanation. In T_2 tricky theoretical issues do not arise (such as those involving [-next rule] and complex conditions on rules), and real simplification is made possible (as opposed to the illusory complications which merely reflect the gain in phonetic accuracy of T_2 over T_1).

2.5 Summarizing, rule (15) may be proposed as it stands as the nasal assimilation rule for Largo and Andante. For Allegretto and Presto, we may add optional # or = to the environment.⁶ More explicitly, the nasal assimilation rule for Allegretto and Presto may be stated as (16):

$$(16) \quad [+nasal] \rightarrow \begin{bmatrix} \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ \delta \text{back} \\ \theta \text{distributed} \end{bmatrix} / \text{---} (\begin{bmatrix} -\text{seg} \\ -\text{FB} \end{bmatrix}) \begin{bmatrix} +\text{consonantal} \\ \alpha \text{anterior} \\ \beta \text{coronal} \\ \gamma \text{high} \\ \delta \text{back} \\ \theta \text{distributed} \end{bmatrix}$$

2.6 The Assimilation of l. In the dialect under study, l is "normally" alveolar, that is, it is alveolar initially, intervocalically, finally, and before labials, labiodentals, palatals, and velars. But before true dentals, viz. t, d, it becomes dental, i.e. [+distributed]. As a first approximation, we might propose the following rule:

$$(17) \quad l \rightarrow [+distributed] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ +\text{anterior} \\ +\text{coronal} \\ +\text{distributed} \end{array} \right]$$

Notice that it is necessary to specify both [+anterior] and [+coronal] in the environment: l does not become [+distributed], i.e. dental, before [+distributed] labials, palato-alveolars, or velars: [felpa, kolča, palko], not [*felpa, *kolča, *palko].

It will have been noted that the l-assimilation data is just a subset of the nasal assimilation data. Rather clearly there is a significant linguistic generalization here: noncontinuant sonorants become homorganic with a following consonant, within the limits set by universal constraints (there are labial and velar nasals, but not labial and velar l's). This generalization will not be captured if both (15), with its Allegretto variant, and (17) are in a grammar.

In order to capture this generalization, one might propose the following. There is the nasal assimilation rule (18) which assimilates nasals with a following consonantal segment in major point of articulation.

$$(18) \quad [+nasal] \rightarrow \left[\begin{array}{l} \alpha\text{anterior} \\ \beta\text{coronal} \end{array} \right] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ \alpha\text{anterior} \\ \beta\text{coronal} \end{array} \right]$$

In Allegretto, the environment of (18) would of course be /___([-seg] [-F3])... Then a separate sonorant assimilation rule (19) assimilates nasals and l in features of phonetic detail with a following consonant with which they already agree in major point of articulation:

$$(19) \quad \left[\begin{array}{l} +\text{consonantal} \\ +\text{sonorant} \\ -\text{continuant} \end{array} \right] \rightarrow \left[\begin{array}{l} \gamma_{\text{high}} \\ \beta_{\text{back}} \\ \theta_{\text{distributed}} \end{array} \right] / \left[\begin{array}{l} \alpha_{\text{anterior}} \\ \beta_{\text{coronal}} \end{array} \right] \left[\begin{array}{l} +\text{consonantal} \\ \alpha_{\text{anterior}} \\ \beta_{\text{coronal}} \\ \gamma_{\text{high}} \\ \beta_{\text{back}} \\ \theta_{\text{distributed}} \end{array} \right]$$

It is clear, however, that (18) and (19) fail to accomplish what they were invented to accomplish. Ceteris paribus, a grammar containing (18) and (19) will be less highly valued than a grammar containing (15) and (17) under the theory of evaluation proposed in Chomsky and Halle (1968).

These facts seem to me to point to a major defect in current phonological theory. It should be possible to state a phonological rule as something like (20):

$$(20) \quad \text{ASSIMILATE: } \left[\overline{l, n} \right] \left[+\text{consonantal} \right]$$

which would be interpreted to mean that l and n take the values of the features, within the limits set by universal constraints, of any following consonantal segment. Thus (20) would yield, e.g. labial and velar nasals, but not labial and velar l's before labial and velar [+consonantal] segments. More generally, it seems that phonological theory should be revised to allow rules which mention processes such as "assimilation," "palatalization," "strengthening," "lenition," "vocalization," "consonantalization," etc., and to include an evaluation measure such that such rules are in general less "costly" than other types of rules. The issues involved are

complex, and we cannot go into them further here. However, the literature abounds in suggestive facts,⁷ and it seems to me that the Spanish data just presented provide prima facie empirical evidence that some revision of phonological theory along the lines vaguely suggested is warranted.

For the present, we will retain the rules of nasal- and l-assimilation as in (15), (16), and (17).

3. Glide/Consonant Alternations

In the literature of Spanish phonetics and phonology, segments generally called glides have either been passed over lightly, or they have caused considerable confusion and controversy, as in Bowen and Stockwell (1955), Saporta (1956a), Bowen and Stockwell (1956), and Stockwell, Bowen, and Silva-Fuenzalida (1956). A minimal introduction to some of the problems was given above at the end of Sec. 2.3. Let us proceed by stating the phonetic facts. The most accessible descriptions are the following:

3.1 King (1952)

As an allophone of /i/:

"[i̠], occurring between vowel and consonant or between consonant and vowel: /siénsia, lasiudad, aídós, óiga, áire/" (p. 51f).

As an allophone of /u/:

"[u̠], occurring between vowel and consonant or between consonant and vowel: /lasuerte, antiguo, kuidádo, oyualo, déudas, automobil/" (p. 52).

As a separate phoneme:

"/w/ is the class of labial semivowels, including only: [w] with varying amounts of voiced velar friction [emphasis mine, J.H.],

occurring initially and medially before vowels: /áwa, manáwa, čiwáwa, suwánte, suswískis, laswértas/. In certain styles of speech [ɣu] and [w] are in contrast: /sónguántes, sónwápos/" (p. 53).⁸

As a separate phoneme:

"/y/ is the class of palatal semivowels, including: [j], with varying amounts of voiced palatal friction [emphasis mine, J.H.], occurring initially and medially before vowels: /áya, yégo, subyúga, losyéba/; [j^x], with varying amounts of voiceless palatal friction [emphasis mine, J.H.], occurring before pause: /mebóy#, áy#, múy#/" (p. 53).

3.2 Bowen and Stockwell's (1960) pedagogical statement:

"Spanish /y/ at the beginning of a word is often considerably more tense than English /y/, but not started as a stop consonant, rather like the /d/ sound, as the English /j/ is. The reason it is sometimes heard as English /y/, sometimes as English /j/ is precisely because it is partially similar to both, but not identical with either: it is, so to speak, between them" (p. 31). "Spanish /w/ is similar to Spanish /y/ in the relative tenseness of its pronunciation when it is the first sound in a word. Where initial /y/ suggests /dy/ or /j/, initial /w/ is often heard as /gw/, and a few words are actually listed in the dictionaries with two variant forms, for example, huaca and guaca" (p. 32).

3.3 Bowen and Stockwell (1955):

"[y] before a vowel is an on-glide from high-front tongue position; [j̥] is the same combined with palatal friction [emphasis mine, J.H.]:

[w] before a vowel is an on-glide from high-back tongue position with lips rounded; [w̃] is the same with velar friction [emphasis mine, J.R.]. The same symbols after a vowel denote off-glides toward high-front or high-back position" (p. 400, note 2).

3.4 We see that these scholars -- and they are typical -- have assumed that the various fricative type phones are glides, not true consonants, with some sort of funny phonetic admixture of fricative noise. Although one does not know what decisions would have been made if these writers had been working within a phonological theory which countenanced distinctive features, it seems never to have occurred to anyone that these fricative phones might be, at some stage of derivation, true consonants. This is just the claim that I am going to make, and we will see that various phenomena (e.g. Allegretto nasal assimilation before [w]) find natural and simple solutions within the current theory of distinctive features.

Let us first establish the following uniform transcription:

<u>King</u>	<u>Bowen and Stockwell</u>	<u>Henceforth</u>
i	y	y
u	w	w
j	ÿ	Y ₁
w	w̃	Y ^w
j ^x		x ₁

The intended interpretation of these symbols with respect to the features relevant to the present discussion is as follows:

(21)		y	Y ₁	x ₁	w	y ^w
	consonantal	-	+	+	-	+
	anterior	-	-	-	-	-
	coronal	-	-	-	-	-
	high	+	+	+	+	+
	back	-	-	-	+	+
	round	-	-	-	+	+
	continuant	+	+	+	+	+
	voice	+	+	-	+	+

Let us now reexamine King's examples (Sec. 3.1) in the light of (21). For simplicity we will consider first only the [-back] phones. (In the following, space stands for word boundary; the ad hoc symbol ## stands for pause, total cessation of phonation.)

- a. Examples with [y]: syénsya, la syudád, áy dós, óyga, áyre
 b. Examples with [Y₁]: áY₁a, Y₁égo, sub=Y₁úga, los Y₁éba
 c. Examples with [x₁]: me box₁##, áx₁##, múx₁##

One has but to recognize boundaries to see that [y], [Y₁], and [x₁] are in complementary distribution, as follows:

(22)

- a. [x₁] occurs in the environment $\overline{\text{##}} \begin{matrix} \text{V} \\ \text{-seg} \\ \text{-FB} \end{matrix} \text{---V}$
 b. [Y₁] occurs in the environment $\left\{ \begin{matrix} \text{-seg} \\ \text{-FB} \end{matrix} \right\} \text{---V}$
 c. [y] occurs elsewhere

Implicit in King's data is the fact that unstressed [i], like [y], does not occur between vowels: [áY₁a], but not [*áya] nor trisyllabic [*aia]. An additional relevant phenomenon which these data do not reveal is that there are alternations between the unstressed simple vowel e and the diphthong

yé: pensamíento, "thought (noun)," pensámos, "we think," pyénso, "I think."

Further, there are alternations between unstressed e and [γ_1 é]: heló [eló],

"it froze," hiéla [γ_1 ela], "it is freezing"; and errar, "to err," yérra [γ_1 erra], "(he) errs." These examples can easily be multiplied. It is

immediately obvious that stressed e diphthongizes to ye under certain conditions, and that the resulting y is changed to [γ_1] in the environments (22b).⁹

All the data of this section can be summarized with the following informal rules. Curved lines indicate the (partial) ordering:

- (23)
- a. $\acute{E} \rightarrow ye$ (under certain conditions)
 - b. $[i, -stress] \rightarrow y / \left\{ \underline{v} \underline{\quad} \underline{v} \right\}$
 - c. $y \rightarrow \gamma_1 / \left\{ \begin{array}{l} \underline{v} \\ [-seg] \\ [-FB] \end{array} \right\} \rightarrow \left\{ \underline{v} \underline{\quad} \underline{\#} \right\}$
 - d. $\gamma_1 \rightarrow x_1 / \underline{\quad} \underline{\#}$

For the moment (23) is simply another way of organizing the data. As the exposition continues and more data are accumulated, these rules will be modified rather drastically.

3.5 We consider now the [+back] phones:

a. Examples with [w]: la swérte, antígwo, kwidádo, o γ_1 wélo, déwdas, awtomóbil

b. Examples with [γ^w]: á γ^w a, maná γ^w a, čí γ^w á γ^w a, su γ^w ánte, sus γ^w ískis, las γ^w értas

As far as these examples show, [w] and [γ^w] have exactly the same distribution as [y] and [γ_1], respectively. The absence of a [+back]

analog to $[x_1]$ need not concern us now. Likewise, $[w]$ and unstressed $[u]$ do not occur between vowels: $[á^w a]$, but not $[*éwe]$ nor trisyllabic $[*áua]$. There are also alternations between unstressed o and the diphthong $wé$: soltamos, "we release," swélto, "I release"; and between unstressed o and $[ɣ^w é]$: olór, "odor," olémos, "we smell," huele $[ɣ^w éle]$, "(it) smells." Henceforth upper case O represents o 's which diphthongize under stress.

We may now extend (simplify) the rules of (23) as follows:

$$(24) \quad \begin{array}{l} \text{a. } \left\{ \begin{array}{c} \acute{E} \\ \acute{O} \end{array} \right\} \rightarrow \left\{ \begin{array}{c} yé \\ wé \end{array} \right\} \quad (\text{under certain conditions}) \\ \text{b. } \left[\begin{array}{c} -\text{consonantal} \\ +\text{high} \\ -\text{stress} \end{array} \right] \rightarrow [-\text{vocalic}] / \left\{ \begin{array}{c} \underline{\underline{v}} \\ \underline{\underline{v}} \end{array} \right\} \\ \text{c. } [-\text{vocalic}] \rightarrow [+consonantal] \quad \left\{ \begin{array}{c} \underline{\underline{v}} \\ [-\text{seg}] \\ [-\text{FB}] \end{array} \right\} \rightarrow \left\{ \begin{array}{c} \underline{\underline{v}} \\ \#\# \end{array} \right\} \end{array}$$

3.6 We now summarize the discussion up to this point, and clarify a few matters:

- a. The phonetic description and transcription of all segments in Secs. 3.1, 3.4, and 3.5 which are glides at some point of derivation are those of the phonetic output of Andante only. Said another way, $[ɣ]$, $[ɣ_1]$, $[w]$, and $[ɣ^w]$ do in fact occur in the final phonetic representation of Andante, as in the examples given.
- b. Segments which heretofore in the literature have been considered as glides plus fricative noise, namely $[ɣ_1]$, $[x_1]$, and $[ɣ^w]$, are not glides but rather true consonants. The specification of these segments as true consonants is clearly necessary on phonetic grounds in any phonological theory in which the relationship between phonetic transcription and articulatory and acoustical data is taken seriously. Moreover, the decision to treat

these segments as true consonants will be further justified below in terms of the set of phonological rules of the language.

c. The distribution of the segments in question can be completely determined by rules which have access to boundary symbols. It will be seen below that these rules are in part independently motivated; that is, they would be necessary even if the segments under discussion did not exist in Spanish.

3.7 The issue of [gw] and [ɣ^w] raised in Sec. 3.1: In some dialects there is a contrast between the initial sound of words like guante, guapo, etc., and the initial sound of words like huéle, huévo, ("egg") etc. On the other hand, in the dialect under study, and in Andante style, no such contrast is possible. All these examples, and all words like them, begin with [ɣ^w]: [ɣ^wánte, ɣ^wápo, ɣ^wéle, ɣ^wépo]. Only in Largo are words written with initial gu pronounced with an initial stop. Now it is clear that the phonological representation of huéle is /Ole/ (because of olór, olémós, etc.) and that of huévo is /Ovo/ (because of ovidúcto, ovifórme, ovíparo, ovulación, ovário, etc.). But the phonological representation of the initial segments of guante, guapo, etc., is not so clear. The only alternations that could provide any evidence are those of the stylistic variants Largo [gwánte, gwápo] versus Andante [ɣ^wánte, ɣ^wápo]. One might take the position that the Largo variants are simply "spelling pronunciations," and hence have no bearing on phonological representations. I will, however, tentatively and rather arbitrarily take the position that guante, guapo, etc. have underlying /g^w/ in all styles,¹⁰ on the somewhat dubious grounds that it would be slightly odd if closely related dialects had different lexical representations for the same items, and extraordinarily odd if different styles of the same dialect showed this disparity in the lexicon. If this is correct, then rule (25) is

needed to account for the data of Andante. This rule is to be ordered before (24c).

(25) $g^w \rightarrow w / \# \underline{\quad}$

Thus the derivations of guante and huevo would include the following steps:

$g^w\acute{a}nte$	$\acute{O}vo$	
	$w\acute{e}$	(24a)
w		(25)
γ^w	γ^w	(24c)
<u>$\gamma^w\acute{a}nte$</u>	<u>$\gamma^w\acute{e}vo$</u>	

Presumably, (25) is missing in dialects which contrast the initial sounds of guante and huevo, and in Largo in the dialect under study.

3.8 The data given so far for Andante are not quite exhaustive. For some speakers, the words hiena, "hyena," and hiato, "hiatus", are both trisyllabic: [$i\acute{e}na$] and [$i\acute{a}to$], and form nearly minimal contrasts with yema and vate, which are [$\gamma_1\acute{e}ma$] and [$\gamma_1\acute{a}te$]. There is one -- and to my knowledge, only one -- apparent [+back] analog, namely the formative which occurs in huir, "to flee," huida, "flight," huidizo, "fugitive (adjective)," "fleeing," and other words. Huida, for example, is trisyllabic [$u\acute{i}\acute{s}a$], contrasting with dissyllabic guira [$\gamma^w\acute{i}ra$]. The question that hiena, hiato, huida, etc., present is why doesn't (24b) turn the initial high vowels into glides, which are then turned into consonants by (24c). For reasons which are not relevant to the present discussion, it is conceivable that huida and the other words with the same formative have a consonant between the u and the i, which would

block (24b), and which would subsequently be deleted. Whether or not this is correct, no such possibility exists to explain the initial full vowel of hiena and hiato, since there is no conceivable motivation for assuming an underlying consonant immediately after the initial i. One might say that these are lexically marked as exceptions to (24b): alternatively one could assume for yema and yate the underlying representation /yema/ and /yate/ but for hiena and hiato the representations /iena/ and /iato/, and further, change the first environment of (24b) to /C__V. This would complicate the rules minimally, and would make hiena and hiato unexceptional. With only these two words (and possibly huida, etc.) involved, the decision is hardly an important one. Having gotten the data into the record, I leave the question unresolved.¹¹

3.9 Assimilatory phenomena of consonants and the glides: Let us take as representative examples muevo, nuevo, un huevo and miel, nieto, un hielo. The rules that have been suggested will give derivations which include the following steps:

$m'Óvo$	$n'Óvo$	$un\ Óvo$	$mÉl$	$nÉto$	$ún\ Élo$	
$wé$	$wé$	$wé$	$yé$	$yé$	$yé$	(24a)
		y^w			Y_1	(24c) (15) fails
		$ú_n^w$			$ú_n^w$	Scalar Nasal Assimilation
<u>$m'wévo$</u>	<u>$n'wévo$</u>	<u>$ú_n^w w'évo$</u>	<u>$myél$</u>	<u>$nyéto$</u>	<u>$ú_n^w y_1'élo$</u>	

Rule (15) and Scalar nasal assimilation (page 14) fail for muevo, nuevo, miel, nieto because at the time of application the nasal in question is not followed by a [+consonantal] segment; (15) fails for un huevo and un hielo

because the word boundary blocks it. Scalar nasal assimilation, on the other hand, does apply across word boundaries before [+consonantal] segments. With respect to $[\text{u}_n^{\tilde{n}} \gamma_1' \text{elo}]$, note that since $[\gamma_1]$ is [-coronal, -anterior], the scalar nasal assimilation will be toward palatal $[\tilde{n}]$, without loss of the alveolar point of articulation. This is the intended interpretation of the representation $[\text{u}_n^{\tilde{n}}]$.

3.9.1 There is one further set of data which will be presented, without going into great detail, to support the claim that the phones under discussion which have been traditionally called glides are in fact true consonants: in Andante, s voices to z before certain voiced segments:

- a. Before obstruents: dezde, loz dientes (vs. hasta, loz tientes)
- b. Before liquids: izla, loz lagos, Izrael, loz ricos
- c. Before nasals: mizmo, loz monos, azno, loz nuevos

Additionally, s voices before "glides" across a word boundary, but not within a word: loz yates, loz huevos, but desverto, reswello. Voicing assimilation never occurs before vowels, either across a word boundary or within a word: los osos. Now, if the initial segment of e.g. yates, huevos were really glides, then the rule of s-voicing would be rather complicated. In the first place, the environment before which assimilation occurs would have to include obstruents, liquids, nasals, and glides, while excluding vowels.¹² Secondly, the rule would have to be rigged somehow to apply in the environments of (26) but not in that of (27):

- (26)
- /___#Obstruent
 - /___Obstruent
 - /___#Liquid
 - /___Liquid
 - /___#Glide

(27) /___Glide

Presumably this could be done, but only at the cost of severe complications to the extremely simple rule (28):

(28) $s \rightarrow z / \text{---} \left(\begin{array}{l} [-\text{seg}] \\ [-\text{FB}] \end{array} \right) \left[\begin{array}{l} +\text{consonantal} \\ +\text{voice} \end{array} \right]$

Note further that if (28) is ordered after (24c), which change glides into consonants in the environment #___, these complications would be an otiose duplication of part of the work of (24c). Thus it is clear that the phones in question must be true consonants not only on phonetic grounds, but also because this is demanded by the internal organization of the rules. An even stronger case will be presented immediately below.

3.10 The Glides in Allegretto: The differences between Andante and Allegretto with respect to the glides are the following: (a) in the few words with iV and uV in Andante, [iéna], [iáto], [uísa], etc., the corresponding glides appear in Allegretto, [yéna], [yáto], [wísa], etc., and (b) where Andante has [Y₁] and [Y^w], Allegretto has [y] and [w], respectively.

At first blush it might appear that Allegretto lacks rule (24c), which in Andante turns [y] and [w] into consonants. This, however, cannot be the case. Observe that in Allegretto, both [ŋ] and [n] occur before [w], across a word boundary:

sin güira [siŋwíra] but sin huida [sinwísa]

and that both [z] and [s] occur before [y] and [w] across a word boundary:

las llenas [lazyénas] but las hienas [lasyénas]

las güiras [lazwíras] but las huidas [laswísas]

These examples show that there is nasal assimilation and voicing of s before some instances of [y] and [w], but not before others.¹³ Now, since nasal assimilation and voicing of s occur before the instances of [y] and [w] which are consonants in Andante, but not before those which are vowels in Andante, it is reasonable to suppose that the former are consonants also in Allegretto at the time the rules of nasal assimilation and s-voicing apply, and that Allegretto, but not Andante has a later rule with the effect of (29):

$$(29) \quad \left\{ \begin{array}{c} \gamma \\ \gamma^w \end{array} \right\} \rightarrow \left\{ \begin{array}{c} y \\ w \end{array} \right\}$$

It is slightly embarrassing that the grammar proposed has a rule which turns glides into true consonants, (24c), and then another rule that turns the latter back to glides again, (29). But this is infinitely less embarrassing than being unable to account for the otherwise mysterious contrasts in nasal assimilation and voicing of s illustrated above.

The following partial derivations of huevo, un huevo (versus nuevo), and los huevos (versus Suevo, "Swabian") will illustrate the application of relevant rules:

(30)	wevo	un wevo	nwevo	los wevos	swevo	(after 24a)
	γ^w evo	γ^w evo		γ^w evos		(24c)
		un				(16)
				loz		(28)
	<u>vevo</u>	<u>unwevo</u>	<u>nwevo</u>	<u>lozwevos</u>	<u>swevo</u>	(31)

It was observed in the first paragraph of this section that hiena, hiato, etc. have initial GV in Allegretto, rather than initial VV as in Andante. If (24b) is allowed to apply to these words, then (24c) will change into consonants the glides resulting from the application of (24b); then (15) and (28) will apply, giving incorrect results. To avoid this, (24b) can be ordered after (24c). There will be no undesirable consequences in Allegretto. One may well wonder if this is not the correct order for Andante also. We will assume that it is, but change in the previously given order will be without permanent consequence, since these rules will still undergo considerable revision.

3.11 Further Observations and Summary of Rules

3.11.1 Rules (24 b,c), (25), and (29) imply a close relationship among the segments [i, y, γ_1] and among [u, w, γ^w , g^w]. Evidence is provided by these rules, even in their present tentative formulation, for the correctness of T_2 as opposed to T_1 . Let us compare the feature specification of the segments in question in the two theories:

a. T_1 :	i	y	γ_1	u	w	γ^w	g^w
vocalic	+	-	-	+	-	-	-
consonantal	-	-	+	-	-	+	+
diffuse	+	+	-	+	+	-	-
grave	-	-	-	+	+	+	+
:							
:							

b. T_2 :	i	y	γ_1	u	w	γ^w	g^w
vocalic	-	-	-	+	-	-	-
consonantal	-	-	+	-	-	+	+
anterior	-	-	-	-	-	-	-
coronal	-	-	-	-	-	-	-
high	+	+	+	+	+	+	+
back	-	-	-	+	+	+	+
:							
:							

It is not necessary to belabor the point that T_2 , but not T_1 , reflects precisely the fact that the alternations $\underline{i} \sim \underline{y} \sim \gamma_1$, $\underline{u} \sim \underline{w} \sim \gamma^w$, and $\underline{w} \sim \underline{g}^w$ are essentially alternations of major class features ([vocalic] and [consonantal]) and not of cavity (point-of-articulation) features.

3.11.2 Consider King's example hovuelo (sec. 3.1, second paragraph), which in Andante is $[\text{o } \gamma_1 \text{w}'\text{é} \text{lo}]$, not $*[\text{oy } \gamma^w \text{é} \text{lo}]$ or $*[\text{o } \gamma_1 \gamma^w \text{é} \text{lo}]$. Hovuelo is a diminutive of hoyo; it is presumably represented as oy+ólo before, and as oy+wélo after, the application of (24a). Now the problem is to refine (24c) so that it converts $[\underline{y}]$ to $[\gamma_1]$, but not $[\underline{w}]$ to $[\gamma^w]$ in this example. More generally, we must determine whether (24c) should apply to only the first of a sequence of two glides, or whether it should apply only to the \underline{y} in either of the sequences yw or wy. Unfortunately, no clear examples of wy at this stage of derivation come to mind.¹⁴ I will therefore assume, tentatively and rather arbitrarily, that the first alternative above is correct; that is, that (24c) should apply to the first of two glides. I adopt this alternative rather than the other, since the result is a simplification rather than a complication of (24c); the right-hand environment can be revised to $\left\{ \begin{array}{l} [-\text{consonantal}] \\ \#\# \end{array} \right\}$. This rule still does not operate correctly, however, as is shown in the following partial derivations, which make only minimal assumptions about superficial syntactic structure. Let us assume that (24c) applies cyclically:

(31)

$[\text{oywelo}]$	$[[\text{ay}] [\text{wevos}]]$	$[[\text{ay}] [\text{una}]]$	$[\text{ayuna}]$	<u>First cycle:</u>
γ_1	γ^w		γ_1	(24c)
	$[\text{ay } \gamma^w \text{evos}]$	$[\text{ay una}]$		<u>Second cycle:</u>
				(24c) fails

Hay una should be [a γ_1 una] rather than *[ayuna] as in (31). We could correct this by changing the environment of (24c) to /...___(#)...

Now let us assume that (24c) is a rule of word-level phonology, which applies only once in a given derivation. It is easily seen from inspection of (31) that under this assumption, and with any immediately obvious modification of the right environment of (24c), either hay huevos will be derived incorrectly as *[a γ_1 γ^w evos], or hay una will again come out incorrectly as *[ayuna]. More specifically, if (24c) is a word-level rule and applies in the environment ...___#, then hay huevos will be incorrect; if (24c) is a word-level rule and applies only in the environment /...___(#) [-consonantal], then hay una will be incorrect.

One way out of these problems is to split (24c) into two rules, (32) and (33):

$$(32) \quad [-\text{vocalic}] \rightarrow [+consonantal] / \left[\begin{array}{l} -\text{seg} \\ -\text{FB} \end{array} \right] \underline{\quad}$$

$$(33) \quad [-\text{vocalic}] \rightarrow [+consonantal] / \text{V} \underline{\quad} \left\{ \begin{array}{l} \left[\begin{array}{l} -\text{seg} \\ -\text{FB} \end{array} \right] [-\text{consonantal}] \\ \# \end{array} \right\}$$

This solution, while giving the correct results, may seem somewhat inelegant, to say the least. However, evidence will be given in Sec. 5.24 that it is in fact correct. In Sec. 6.2 we will discuss the theoretical status of the ad hoc notation "~~#~~."

3.11.3 There are several difficulties with rule (24b) which we will outline but leave unresolved in this section.

Consider the nearly minimal pair cuidado [kwi δ á δ o] and ciudad [syu δ á δ]. In neither sequence of diffuse vowels ui and iu (if in fact

this is the representation before the application of (24b), which is not at all clear) is either vowel stressed; hence, if the two environments of (24b) were unordered, the rule could apply to either vowel. The fact that (24b) must apply to the first vowel in both sequences seems to establish the order of the environments as they have been given.

But we have gone too quickly: we have not actually shown that (24b) is in fact a rule of Spanish phonology. What has been noted is that, with a few exceptions, Spanish does not have sequences of the form $\underline{CV_1V_2C}$ nor of the form $\underline{CV_2V_1C}$ where $\underline{V_1}$ is [+high, -stress], but does have sequences of the form \underline{CGVC} and \underline{CVGC} . It is gratuitous, however, to assume that the only explanation for the absence of $\underline{CV_1V_2C}$ and $\underline{CV_2V_1C}$ is that all such sequences are converted into \underline{CGVC} and \underline{CVGC} , respectively, by rule (24b). There exists, in fact, crushing evidence that this assumption is false, to which we now turn.

Foley (1965) proposed that stress in Spanish can be entirely accounted for by the familiar Latin stress rule. This is patently false, as will be shown in Chapter III, Sec. 9. It can be argued, however, that the Latin stress rule is one of the rules that play a role in assigning stress in Spanish. In any event, neither the Latin stress rule nor any reasonable adjunct to it will assign stress farther to the left than the antepenultimate syllable of a word. Now consider words like the following:¹⁵

(34)

- a. láudano, náufrago, áulico, áureo, cáustico, hidráulico, náutico, cláusula, farmacéutico, terapéutico, enfitéutico, Seléucidas
- b. alícuota, ventrílocuo, cónyuge

It is clear that if all the segments which are represented orthographically as vowels (and the y of cónyuge) were represented phonologically as vowels at the time the stress rule(s) applied, then stress could not be assigned correctly: in every case stress would have to be assigned to the fourth vowel from the end of the word. If the stress rules are correct, then either (a) the segments written i, u, y which are contiguous to a vowel are not vowels in the lexical representations of these words, or (b) there must be a rule roughly like (35) which is ordered before the stress rules:

$$(36) \quad \left[\begin{array}{l} \text{-consonantal} \\ \text{+high} \end{array} \right] \rightarrow \left[\text{-vocalic} \right] / \left\{ \begin{array}{l} \text{---v} \\ \text{v---} \end{array} \right\}$$

Observe now that (24b), if it is in the grammar, is ordered after the stress rules, crucially. Therefore, if both (35) and (24b) are in the grammar, we are faced with the situation of having two nearly identical rules which cannot be collapsed. We turn now to evidence in support of the existence of (24b).

Examples like the following can easily be multiplied:

(36)

- a. amplio, ampliámos, ampliár
vacio, vacyámos, vacyár
insinúo, insinwámos, insinwár
individúo, individwámos, individwár
- b. pais, paysáno
baúl, bawléro

The examples in (36a) are all verb forms. Amplio is first person singular present indicative, ampliámos is first person plural present indicative, ampliár is the infinitive, "to enlarge." The other examples in (36a) are

arrayed in the same manner. The examples in (36b) show stress shifts accompanying the common suffixes -ano and -ero. Clearly the vowel-glide alternations in all these examples are determined by the position of stress, hence there must be a rule like (24b) which applies after stress is assigned.

In short, if alternative (b) above is correct, then (35) must apply before stress is assigned, and (24b) must apply after stress is assigned; yet (35) and (24b) are apparently identical except that (24b) applies only to segments which are [-stress]. The question now arises as to why the application of (35) does not remove all the cases to which (24b) might apply, e.g., how do país and baúl escape (35)? One particularly simple answer would be that (35) does not exist. We will accept this answer until contrary evidence is presented.

3.11.4 I now collect the rules proposed so far, renumbering them as (37)

(37)

- a. (25) $g^w \rightarrow w / \# \underline{\quad}$
- b. (24a) $\begin{Bmatrix} \acute{E} \\ \acute{O} \end{Bmatrix} \rightarrow \begin{Bmatrix} ye' \\ we' \end{Bmatrix}$ (under certain conditions)
- c. (30a) $[-\text{vocalic}] [-\text{consonantal}] / \begin{Bmatrix} -\text{seg} \\ -\text{FB} \end{Bmatrix} \underline{\quad}$
- d. (24b) $\begin{Bmatrix} -\text{consonantal} \\ +\text{high} \\ -\text{stress} \end{Bmatrix} \rightarrow [-\text{vocalic}] / \left\{ \begin{array}{c} \underline{\quad} \text{v} \\ \text{v} \underline{\quad} \end{array} \right\}$
- e. $\begin{array}{l} \text{Andante (15): } [-\text{nasal}] \rightarrow \begin{Bmatrix} \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{Bmatrix} / \underline{\quad} \begin{Bmatrix} +\text{consonantal} \\ \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{Bmatrix} \\ \text{Allegretto (16): } [-\text{nasal}] \rightarrow [\quad] / \underline{\quad} \begin{Bmatrix} -\text{seg} \\ -\text{FB} \end{Bmatrix} [\quad] \end{array}$
- f. $\begin{array}{l} \text{Andante (17): } l \rightarrow [+distributed] / \underline{\quad} \begin{Bmatrix} +\text{consonantal} \\ +\text{anterior} \\ +\text{coronal} \\ +\text{distributed} \end{Bmatrix} \\ \text{Allegretto: } l \rightarrow [+distributed] / \underline{\quad} \begin{Bmatrix} -\text{seg} \\ -\text{FB} \end{Bmatrix} [\quad] \end{array}$
- g. (30b) $[-\text{vocalic}] \rightarrow [+consonantal] / \text{V} \left\{ \begin{array}{l} \begin{Bmatrix} -\text{seg} \\ -\text{FB} \end{Bmatrix} \\ \text{##} \end{array} \right\} \underline{\quad} [-\text{consonantal}]$
- h. (23) $s \rightarrow z / \underline{\quad} \begin{Bmatrix} -\text{seg} \\ -\text{FB} \end{Bmatrix} \begin{Bmatrix} +\text{consonantal} \\ +\text{voice} \end{Bmatrix}$
- i. Allegretto (31) $\begin{Bmatrix} \acute{y} \\ \acute{y}^w \end{Bmatrix} \rightarrow \begin{Bmatrix} y \\ w \end{Bmatrix}$

4. The Voiced Obstruents

4.1 The statement is nearly always found in school grammars that /b, d, g/ "normally" occur as [b, d, g] initially, after nasals, and sometimes after /l/, but as the nonstrident continuants [β, δ, γ] elsewhere. This statement is approximately accurate, but needs clarification. First let us clear up what is meant by "sometimes after /l/." In the dialect under study, only d occurs as a stop after l; b and g occur as continuants: calvo, caldo, and algo are [káɪβo, káɪdo, áɪɣo].¹⁶ Next, let us demonstrate that the "elsewhere" statement is actually true. The pronunciations indicated in (38) are to be taken as illustrative of Allegretto. (I had to reach pretty far for examples in some cases; assimilated foreign words and substandard forms are marked with the symbol !.)

(38)

	<u>β</u>	<u>δ</u>	<u>γ</u>
V__V:	haβa	naδa	haγa
l__:	calβo	[d]	alγo
__l:	haβla	aδlátteres	aγlommerar
r__:	árβol	arδe	arγamasa
__r:	haβra'	paδre	aγrio
y__:	jayβo	!nayδen	!hayγa
__y:	aβyerto	aδyestrar	siγyendo
w__:	?	dewδa	(!)zewγma
__w:	aβwelo	?	aγwero
^C [+voice] ---:	aδβerso	aδδomen	suδγlotal
__ [+nasal] :	suβamarino	aδmiración	diaγnóstico
__ [-voice] ^C : ¹⁷	aδ [†] surδo	aδ ^θ quirir	!aδ ^θ γ ^θ fa
__#:	iclupβ [†]	ses ^θ	?

Thirdly, let us clarify the statement that b, d, and g occur as stop [b, d, g] "initially": an utterance such as Beatriz babea, "Beatriz slobbers," occurs as both [beatrizbaβea] and [beatrizβaβea]. The former represents the more careful pronunciation, and the latter the more casual pronunciation. Let us say that the former is Andante and the latter is Allegretto. Thus, for Andante, "initially" means both /##___ and /#___. (And probably also /=___. I will assume that this is correct, although it is not known in all cases where = belongs.) In Allegretto, on the other hand, "initially" means only /##___. Notice that the bracketing of Beatriz babea is [S [NP [N^{Beatriz} N] NP [VP [V^{babea} V] VP] S]. Hence the break between Beatriz and babea is at precisely the point at which the greatest possible number of # boundaries might occur. Still the initial b of babea is [β] in Allegretto.

Let us concentrate on Andante for the moment. Let us assume, perhaps incorrectly, that the directionality of the b-β, d-δ, g-γ alternations is from stop to continuant. Under this assumption we will make a first approximation to a rule to account for the alternations. We will call this rule "Spirantization." Now, since anything in the environment /##___ will automatically be in the environment /#___, and since we are assuming that "initially" in Andante also means /=___, we may say, as a first step:¹⁸

$$\begin{bmatrix} \text{-sonorant} \\ \text{-tense} \end{bmatrix} \rightarrow \begin{bmatrix} \text{+continuant} \\ \text{-strident} \end{bmatrix} \text{ EXCEPT / } \begin{bmatrix} \text{-seg} \\ \text{-FB} \end{bmatrix} \underline{\quad}$$

As a second step, we incorporate the fact that Spirantization does not occur after nasals: bomba, donde, and ganga are [bomba, donde, ganga]. We extend the environment of Spirantization to

$$\text{EXCEPT/} \left\{ \begin{array}{l} [-\text{seg}] \\ [-\text{FB}] \\ [+nasal] \end{array} \right\} \text{---}$$

As stated at the beginning of this section, only d occurs as a stop after l ([kaldo]); b and g occur as continuants ([kalβo, alʝo]). Thus we further extend the environment of Spirantization to

$$\text{EXCEPT/} \left\{ \begin{array}{l} [-\text{seg}] \\ [-\text{FB}] \\ [+nasal] \\ \langle l \rangle \end{array} \right\} \quad [\langle +\text{coronal} \rangle]$$

Observe now that there are generalizations which this formulation does not capture. If nasal assimilation, (37e), precedes Spirantization, then the nasals before b, d, g will always have the same point of articulation as the latter. Now note that l and d have the same point of articulation, namely [+coronal, +anterior], while l and b, and l and g do not. Thus the voiced obstruents appear as stops when they follow certain homorganic segments. We must look closely at the [+coronal] clusters with d as the second member, however, for it is not the case that d occurs as a stop in all cases. The occurring sequences are nd, ld, but rδ and sδ. On the assumption that l is [-continuant] while r is [+continuant], we may now say, refining our previous generalization, that the voiced obstruents appear as stops after homorganic noncontinuant. Apparently, then, we may reformulate the environment of Spirantization as

$$\text{EXCEPT/} \left\{ \begin{array}{l} [-\text{seg}] \\ [-\text{FB}] \\ [-\text{continuant}] \\ \alpha\text{coronal} \\ \beta\text{anterior} \end{array} \right\} \quad [\alpha\text{coronal} \\ \beta\text{anterior}]$$

But this is unnecessarily complex: anteriority plays no role since nasals will never disagree in anteriority with a following voiced obstruent, and l is always [+anterior]. Eliminating [anterior], and stating the environment positively, the Spirantization rule for Andante can be given as (39):¹⁹

$$(39) \quad \begin{bmatrix} \text{-sonorant} \\ \text{-tense} \end{bmatrix} \rightarrow \begin{bmatrix} \text{+continuant} \\ \text{-strident} \end{bmatrix} / \left\{ \begin{bmatrix} \text{+continuant} \\ \text{-\alpha coronal} \end{bmatrix} \right\} \left[\overline{\alpha \text{coronal}} \right]$$

Recall that in Allegretto, "initially" means only ##___. Thus in Allegretto, if Spirantization occurs in the environment X___, it also occurs in the environments X#___ and X=___ . Otherwise, Spirantization is just as in Andante. We may therefore state the rule for Allegretto as (40):

$$(40) \quad \begin{bmatrix} \text{-sonorant} \\ \text{-tense} \end{bmatrix} \rightarrow \begin{bmatrix} \text{+continuant} \\ \text{-strident} \end{bmatrix} / \left\{ \begin{bmatrix} \text{+continuant} \\ \text{-\alpha coronal} \end{bmatrix} \right\} \left(\begin{bmatrix} \text{-seg} \\ \text{-FB} \end{bmatrix} \right) \left[\overline{\alpha \text{coronal}} \right]$$

4.2 Recall that the last five examples of (38) contained voiceless segments which we transcribed as $[\beta^{\text{h}}, \delta^{\text{h}}, \gamma^{\text{h}}]$: a $[\beta^{\text{h}}]$ surdo, clu $[\beta^{\text{h}}]$, a $[\delta^{\text{h}}]$ quirir, se $[\delta^{\text{h}}]$, and A $[\gamma^{\text{h}}]$ fa.²⁰ It is immediately apparent that the voiced continuants $[\beta, \delta, \gamma]$ become voiceless before voiceless obstruents and in final position (more precisely, in the environment ___###). Further data, however, indicate that closer scrutiny is warranted. We will limit our observations to careful speech (Andante) since in more rapid speech (a) additional assimilations occur which complicate the picture, and (b) the fine distinctions discussed here are extremely difficult to perceive (if they exist).²¹

Consider the contrasts illustrated in the following examples (for simplicity I give examples of dentals only; similar contrasts exist also among labials and velars):

- a. voiceless [t]: cuanto, etcetera, atleta, atroz
 b. voiced [t^d]: atmósfera, étnico, fútbol
 c. voiced [d]: cuando, donde
 d. voiced [ð]: admiro, padre, adláteres, amígdalas
 e. voiceless [s^h]: adquirir, adscribir, adjunto (j = [x]), sed, ataúd

The contrasts illustrated in these examples could be marked as in (41):

(41)

	t	t ^d	d	ð	s ^h
continuant	-	-	-	+	+
tense	+	+	-	-	-
voice	-	+	+	+	-

While the specifications indicated in (41) are sufficient to mark all the contrasts and are quite plausible, recent instrumental investigations suggest that (41) might well be refined in the direction of greater acoustico-articulatory accuracy. I give now summary sketches of two relevant studies.

Lisker and Abramson (1964) have measured the onset time of vocal cord vibrations in the vowels following the release of stop consonants in a number of languages, including Spanish. From their measurements it may be concluded that the onset times of vocal vibrations fall into four distinct categories.²²

- (a) onset of voicing precedes stop release
- (b) onset of voicing substantially coincides with stop release
- (c) onset of voicing lags moderately after stop release
- (d) onset of voicing lags considerably after stop release.

Lisker and Abramson have shown that in initial position, Spanish [t] falls into category (b) and Spanish [d] falls into category (a). The span of

prevoicing of Spanish [d] is on the order of 100 milliseconds, which, although Lisker and Abramson do not specifically point it out, is clearly audible under good acoustical conditions.²³

Kim (1965) has described three phonemically contrastive sets of voiceless stops in Korean, which can be represented schematically as

- t₁ : voiceless, unaspirated
- t₂ : voiceless, lightly aspirated
- t₃ : voiceless, heavily aspirated.

Pressure measurements made by Kim indicate that t₁ and t₃, but not t₂, are produced with heightened subglottal pressure. Further, t₁ falls into category (b), virtual coincidence of stop release and vocalic onset; t₂ falls into category (c), with moderate lag of onset; t₃ falls into category (d), with considerable lag of vocalic onset. Thus Korean t₁ and Spanish t are in the same category.

By an odd coincidence, there are Korean words phonetically identical to Spanish words (though of course different in meaning). For example, Korean t₁al, Spanish tal. The words "phonetically identical" were not used loosely: Mr. Kim accepts my pronunciation of Spanish tal as an absolutely native Korean pronunciation of t₁al; I find Mr. Kim's pronunciation of t₁al utterly indistinguishable from a native Spanish pronunciation of tal. Thus it is possible - though hardly necessary - that Korean t₁ and Spanish [t] are produced with identical articulatory mechanisms and therefore should have the same feature specification.

Largely on the basis of the investigations of Lisker and Abramson and of Kim, Chomsky and Halle (1968, Chapter 7, Section 6.2) have proposed that

Korean \underline{t}_1 , \underline{t}_2 , and \underline{t}_3 be assigned the following feature specifications:

	\underline{t}_1	\underline{t}_2	\underline{t}_3
tense	+	-	+
voice	+	-	-
{Heightened subglottal pressure}	+	-	+
{Glottal Con- striction}	+	-	-

I cannot reproduce or even summarize here the intricate argument which Chomsky and Halle give to support these specifications. The point most germane to the present discussion is the assignment of the feature [+voice] to "voiceless" \underline{t}_1 .²⁴ This feature is correlated with the nonspread position of the vocal cords appropriate for voicing; but \underline{t}_1 is not "voiced" because of the tenseness of the supraglottal musculature ([+tense]), and glottal constriction. Onset of voicing of a following vowel is simultaneous with release of the glottal constriction, however, since the vocal cords are already in voicing position. In \underline{t}_2 , on the other hand, there is a moderate lag in the onset of vocal vibrations since the vocal cords are not in voicing position when the stop closure is released.

For the sake of argument, let us suppose that Spanish [t] has the same feature specification as Korean \underline{t}_1 , and see what rules would be necessary to assign the specification correctly. For completeness, we will consider all the rules in the grammar which play a role in assigning features to the segments mentioned in (41), including two early "morphophonemic" rules which will be treated in more detail in Chapters III and IV. The first of these rules is:

$$[-\text{sonorant}] \rightarrow [+tense] / ______ \begin{bmatrix} -\text{sonorant} \\ +tense \end{bmatrix}$$

This rule is needed to account for the alternations illustrated in the underlined segments of describir -- descripción and legible -- lectura.

The next is:

$$[-\text{sonorant}] \rightarrow [-tense] / V ______ [+vocalic] \text{ (under certain conditions)}$$

This rule is needed to account for the alternations illustrated in natación-nadar, recipiente-recibir, and persecución-perseguir. It is highly restricted, applying only to a small subset of the lexicon. The next rule is the Spirantization rule discussed in the previous section. After application of these three rules, the segments of (41) will be specified as follows:

	t	t ^d	d	ɬ	ɬ ^h
continuant	-	-	-	+	+
tense	+	+	-	-	-
voice	-	-	+	+	+

Now recall that we already have in the grammar a rule which voices s in certain environments, which for convenience is repeated here as (42):

$$(42) \quad s \rightarrow z / ______ \left(\begin{bmatrix} -\text{seg} \\ -\text{FB} \end{bmatrix} \right) \begin{bmatrix} +\text{consonantal} \\ +\text{voice} \end{bmatrix}$$

We clearly must generalize (42) so that it will yield [t^d] and [ɬ^h] in the appropriate environments. But there is a problem: s voices before voiced obstruents (des^zde, ras^zgo), nasals (mis^zmo, as^zno), and, N.B., liquids (is^zla, mus^zlo -- s does not occur before [r]); noncontinuant obstruents, on the other hand, voice before voiced obstruents (co^hñak bueno -- examples

are hard to find since p, t, k do not occur in final position in native words), nasals (at^dmósfera, téknico), but, N.B., not before liquids (aplicar, aprecio, atleta, atroz, aclarar, acreditar). Thus, apparently, rule (42) cannot be generalized to account for the voicing assimilation of noncontinuant obstruents and still maintain the simplicity implied in the present formulation.

But now recall that, ex hypothesis, we must assign more features to [t] than those listed just above. Suppose we insert the following rule before rule (42):

$$(43) \quad \left[\begin{array}{l} \text{-continuant} \\ \text{+tense} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{+voice} \\ \text{+HSPressure} \\ \text{+glot. con.} \end{array} \right] / \text{---} \left(\left[\begin{array}{l} \text{-seg} \\ \text{-FB} \end{array} \right] \right) \left[\begin{array}{l} \text{+sonorant} \\ \text{-nasal} \end{array} \right]$$

Then rule (42) can be stated simply as (44):

$$(44) \quad \left[\begin{array}{l} \text{-sonorant} \\ \text{-HSPressure} \end{array} \right] \rightarrow \left\{ \begin{array}{l} \left[\begin{array}{l} \text{+voice} \\ \text{-FB} \end{array} \right] / \text{---} \left(\left[\begin{array}{l} \text{-seg} \\ \text{-FB} \end{array} \right] \right) \left[\begin{array}{l} \text{+consonantal} \\ \text{-voice} \end{array} \right] \\ \left[\text{-voice} \right] / \text{---} \# \end{array} \right\}$$

It is easily seen that (43) and (44) assign the appropriate features correctly to segments incompletely specified as in (41).

We now make the following concluding observations:

- a. We have found motivation internal to the grammar of Spanish, namely the problem of the reformulation of (42) to account for voicing assimilation of noncontinuant obstruents (obviously a grammar would be less highly valued with two nearly identical obstruent voicing assimilation rules), which lead us to postulate some entirely nonobvious feature which distinguishes some noncontinuant obstruents from others.

- b. Attention to phonetic detail, in particular the simultaneity of voicing onset after [t], has suggested certain nonobvious feature specifications.
- c. It turns out that the features suggested by a and b above are consonant with theoretical observations arrived at independently of the present data. Specifically, it is tense noncontinuants which are assigned the features [+voice, +HSP, +GC] in certain environments.
- d. It is interesting that the occurrence of heightened subglottal pressure is coincident with syllable onset. For example, atleta with [t] is syllabified a-tle-ta, while atmósfera with [t^d] is at-mós-fe-ra.²⁵
- e. Instrumental investigation of the dialect under study, which is badly needed at this point, may confirm the proposals made in this section, or it may show that they are in need of refinement and correction. In any event, we have surely disclosed an area in which recent theoretical innovations may be confronted with a valuable body of empirical data.

5. The Nonlateral Liquids

It is well known that there is a phonemic contrast between the intervocalic segments spelled r and those spelled rr. Minimal pairs are plentiful: pero/perro, caro/carro, amara/amarra, torero/torrero, and perhaps hundreds more. For ease of discussion, let us use the symbol [r̄] for the segment spelled r intervocalically, and, temporarily, the non-committal symbol [R] for the segment spelled rr.²⁶

Presumably, both [r] and [R] are liquids, distinguished from [l] (and from [λ] in the dialects which have this palatal liquid) at least in being nonlateral. In the theoretical framework which we accept, one must eventually determine what phonetic features fully characterize [r] and [R], and, concomitantly, distinguish [R] from [r]. This is, to my knowledge, completely unexplored territory, and the task does not promise to be a simple one. If it is to be accomplished in a principled way, consideration must be given to (hopefully, the convergence of) inferences from (a) acoustico-articulatory data, and (b) the rules that involve [r] and [R].

3.1 Acoustico-Articulatory Data: The segment [r] is simply a voiced apico-alveolar single flap. We may confidently assign to it at least the features [+vocalic, +consonantal, +sonorant, +voice, +coronal, +anterior, -distributed, -strident], and, with only slightly less confidence, [+continuant, -tense]. The specification of [R] is more vexed.²⁷ As a first approximation, let us say that [R] is a voiced apical trill, or multiple flap, where "multiple" means greater than 2. N.B. that [r] is exactly one flap; anything more will be interpreted as [R], in any style of speech. It is safe to estimate that, on the average, the trill consists of 3 or 4 flaps. In highly emphatic speech, however, the trill is often quite prolonged, and may, in extreme cases, reach as many as a dozen or so flaps.

In addition to this fully trilled phone, there also occur in the dialect under study the phones which we now describe, which we have subsumed under the symbol [R]:

- a. In nonenergetic speech, particularly at low volume, [R̃] followed by a vowel, either word-initially or intervocalically within a word, ceases to be a trill and becomes some sort of fricative. It seems that the articulatory phenomena involved are the following: the air stream does not act on the tongue with sufficient force to initiate or maintain a trill, for which considerable energy is required. (The trilled [R] is quite "tense," using this as an impressionistic term.) This fricative is voiced, and quite "strident" (again, impressionistically). The tongue seems to be slightly retracted or retroflected. Let us use the ad hoc symbol [ʀ̣] for this phone to distinguish it from fully trilled [R].
- b. Erratically, in pre-pause, but not pre-consonantal, position, a voiceless apical fricative occurs, which I will represent as [ṣ]. This [ṣ] is distinct from the normal alveolar [s]: tomar# [tomáṣ], versus Tomás# [tomás]. [ṣ], like its voiced counterpart [ʀ̣], seems to be slightly retracted.
- c. The cluster sr, whether divided by a word boundary as in los ricos or within a word as in Israel (which, along with israelita, etc., is the unique example of morpheme-internal sr), has a number of pronunciations. Navarro Tomás (1965, pp. 109-123) states that simply [R], with the s completely absorbed, is a normal Castilian pronunciation of this cluster. This pronunciation is not common, however, in the dialect under study; when it is heard, it is generally taken as an affectation. What does occur ranges from a voiced s followed by a trilled [R] to what seems to be a

single phonetic segment which I will transcribe [ř], because it seems to be very much like the phone spelled ř in Czech. Now the question arises as to whether [ž] and [ř] are phonetically distinct. The closest I can come to minimal pairs are irreal/Israeł and irreligioso/es religioso. When I pronounce these as [ižeał, iřaeł] and [iželixyóso, éřelixyóso], I feel that [ž] and [ř] are different, but I cannot objectively hear any difference.

What inference might we draw from these data about the features of the segments under discussion? First, [š] and [ž][?]=[ř] are surely strident, theoretically as well as impressionistically. (It would be a conceivable but rather implausible extrapolation to say that the trilled [R] is distinguished from the flap [r] in that [R] is [+strident] while [r] is [-strident].) In any event, [r] and [R] should be distinguished by tenseness: [r] is [-tense] and [R] is [+tense]; Navarro (1965) states emphatically that "la tensión muscular es en [R] mucho mayor que en [r]" (p. 123).

We have used the locutions "retracted" and "retroflexed" above. I assume that in the segments under discussion, "retractedness" should be characterized with the features [-anterior, -high]. However, neither my own kinesthetic sense nor Navarro's drawings and comments (1965, p. 121) are precise enough to permit us to assert categorically that some of the segments under discussion should be specified as [-anterior, -high] and others not. It seems to be a reasonable guess, however, that [R] is [+anterior], since it seems to have the same point of articulation as [r], which is clearly alveolar, i.e. [+coronal, +anterior, -distributed], as are the normal n, ɲ, and ɳ. On the other hand, [š] and [ž][?]=[ř] seem to

differ from [s̄] and [s̄^z] only in their slightly retroflected articulation; hence I will assume that the former are [-anterior, -high].

I give in (45) a first hypothesis, based on acoustico-articulatory data, concerning the feature specification of relevant segments. The specifications enclosed in parentheses are, of course, extremely tentative.

(45)	r	R	ř	ž	š	z	s
vocalic	+	(-)	(-)	-	-	-	-
consonantal	+	+	+	+	+	+	+
sonorant	+	(+)	-	-	-	-	-
anterior	+	(+)	-	-	-	+	+
coronal	+	+	+	+	+	+	+
distributed	-	-	-	-	-	-	-
high	-	-	-	-	-	-	-
continuant	+	+	+	+	+	+	+
tense	-	+	+	+	+	+	+
voice	+	+	+	+	-	+	-
strident	-	(-)	+	+	+	+	+

5.2 Let us now approach the problem from the other side, by investigating the rules that [r̄], [R̄], etc., figure in. For ease of exposition, let us make a bipartite stylistic split, and consider more careful speech (Largo and Andante) separately from more casual speech (Allegretto and Presto). Further stylistic differentiation seems to me to be pointless here.

5.2.1 I now describe the distribution of flapped [r̄] and trilled [R̄] in careful speech, assuming that [ř̄]≠[ž̄] and [š̄] occur only in casual speech.

- a. Both [r̄] and [R̄] occur intervocalically, as illustrated by pero/perro [péro/péRo], etc.
- b. Only [R̄] occurs word-initially and presumably after ɸ. As an example of the latter case, subrayar, "to underline", is

[supRa...], the underlying representation of which is taken to be /sub=ra.../ . Note carefully that "word-initially" must be interpreted as /#___, not as /#___. For example, la ropa is [laRópa], not *[larópa].

- c. Only [R] occurs after l, n, and s. For example, alrededor, honra, and Israel have lR, nR, and sR, respectively. However, the following observations should be made: (a) Alrededor is the only example in the entire lexicon of lr,²⁸ and this is historically two words, al and rededor (and this by metathesis from derredor, which in turn is also two words, de and redor, roughly). Thus there is no clear example of lr within a morpheme. (b) Honra, plus the related honrar, honrado, and a handful of proper names like Enrique, Manrique exhaust the instances of nr. (c) Israel, israelita, etc., are unique with sr. Thus these words might be considered exceptional, in the sense that there are few of them. They are not exceptional in the sense they would be if there were other forms with lr, nr, and sr instead of lR, nR, sR. There are no such forms. Two further details: since both final s and initial r are extremely common, the sequence s#r occurs very frequently, and Section 5.1c should be borne in mind. Secondly, honra, etc. may be related to honor, honorable, honorífico, etc., although this is not at all clear. If so, then either the nr cluster in the former arises from the deletion of a vowel, or, extremely implausibly, the norV sequences in the latter arise from the insertion of o in the nr cluster. This should be considered in assessing the "exceptionality" of the forms discussed in this paragraph.

- d. Only [r] occurs after consonants other than l, n, s: brazo, compra, frito, ladrón, tres, grito, crea, etc.
- e. Only [R] occurs before consonants: arma, [áRma], arte [áRte], árde [áRðe], árbol [áRðol], etc.
- f. Only [R] occurs in the environment /___##. Cf. paragraph b above. It is crucial to observe that the environment in question there is /#___, not /##___. In contrast, in the present paragraph the relevant environment is /___##, not /___#. For example, amor eterno, "eternal love," is [amoretəRno], not *[amoretəRno]. If, however, the next word begins with a consonant, [R] occurs: amor paterno, "paternal love," is [amopateRno]. In utterance final position, [R] tends to devoice slightly if the final syllable is stressed, and a little more than slightly if the final syllable is unstressed.

In short, [r] and [R] contrast only in intervocalic position; post-consonantly, except after l, n, s, only [r] occurs; after l, n, s, pre-consonantly, and finally, only [R] occurs. (with the qualification of f just above).

5.2.2 The distribution of [r] and [R], phonetic details aside, (i.e., disregarding [ṣ, ẓ, ʃ̣]) in casual speech is as described in 5.2.1, with the exception that [r] rather than [R] occurs in the environment ___C. Thus arma is [áRma] in more careful speech and [árma] in more casual speech.²⁹

5.2.3 Lexical representation of [r] and [R]: the phonological representation of [r] and [R] intervocalically is /r/ and /rr/, respectively. For example, pero and perro are /pero/ and /parro/. The representation of intervocalic [R] as /rr/ is based on just one familiar set of examples which are extremely convincing. The future tense forms of the verb querer are querrá, querrás, querrá, querramos, querrán, phonetically [kaRé, kaRás, ...]. It will be argued in Chapter III, sections 11 and 12, that these forms are derived from the following representations, irrelevant details ignored: /ker+ré, ker+rás, ker+rá/, etc. That is, the future endings, -ré, -rás, -rá, etc., are attached to the stem ker-, which brings together the final r of the stem and the initial r of the endings.³⁰ Thus it is unarguable that at least some instances of intervocalic [R] are derived from /rr/. It is therefore reasonable to assume, until evidence is presented to the contrary, that all instances of intervocalic [R] have the same source.

It was shown in 5.2.1b and c that [R] is predictable in the environments of (46):

- (46)
- a. / [$\begin{matrix} -\text{seg} \\ -\text{FB} \end{matrix} \text{] } \underline{\quad}$
 - b. /l
 - c. /n
 - d. /s

Therefore we could write r in these environments in underlying representations, and get [R] by rules. Alternatively, we could write #rr, lrr, nrr, srr. It is clear that the second alternative must be rejected in favor of the first: there are literally hundreds of words with initial [R], and none with initial [r]; there are a handful with [lR, nR, sR], and none

with [lr, ar, sr]. Therefore some vague notion of "simplicity" might be invoked which would demand that the first alternative be selected as yielding a more highly valued grammar. More to the point, however, is the fact that if we do not choose the first alternative, we leave unstated the fact that non-occurring *[#r, lr, nr, sr] are not accidental gaps in the lexicon.³¹

Section 5.2.1e, f and 5.2.2 indicate other environments in which the occurrence of [R] is predictable, namely ___C and ___#C in Andante, and ___# in both Andante and Allegretto. It is presumably beyond question that the underlying representation should be r in these cases, and the occurrences of [R] are given by rule. Suffice it to mention that phonetically final [R] is, in the vast majority of cases, intervocalic r at a higher level of derivation, as is shown by hundreds of singular-plural pairs like amor/amores, honor/honores, tambor/tambores, pajar/pajares, alfiler/alfileres. It is clear that the phonological representation of e.g. amor/amores is amore/amore+s, where s is the plural formative, and where the final e of the singular amore is deleted (see Chapter III, Section 4.3). Thus we must have rules with the effect of (47):

(47)

$$r \rightarrow R \text{ EXCEPT / } ___ (\#) V$$

In short, we have shown that the distribution of [r] and [R] is predictable except in intervocalic position. We have shown that in this position [r] and [R] are represented as /r/ and /rr/, respectively; in all other positions [R] is represented as /r/.

5.2.4 Rules. Let us examine the environments listed in (46). In order to extract some generalization from this list, we must compare the sequences

lr, nr, sr with the consonant clusters which have [r] rather than [R] as the second member. These are: pr, br, fr, tr, dr, kr, gr. (As far as I know, xr occurs only in Jruschef [xrusčéf]; *mr and *cr do not occur at all.) Since l, n, s, which figure in (46) are all dentals, i.e. [+coronal, +anterior], we need consider only tr and dr of the other Cr clusters. The set [l, n, s] are distinguished from [t, d] in that the former are [-distributed] while [t, d] are [+distributed]. Thus we may account for the occurrence of [R] in the environments of (46) with rule (48):

(48)

$$r \rightarrow R / \left\{ \begin{array}{l} [-\text{seg}] \\ [-\text{FB}] \\ [+coronal] \\ [-distributed] \end{array} \right\} \text{---}$$

Note that [+coronal] is required in the environment of (48) in order to exclude f, which is also [-distributed].

Now let us look more closely at (47), which is only an approximation to the correct rule. First of all, we must replace (47) by (49);

(49)

$$r \rightarrow R \text{ EXCEPT } / \text{---}(\#) [-consonantal]$$

since [vocalic] plays no role in the environment as is shown by the following examples: CaRlos, áRbol, but pero, Maryo. Now we must state the environment of (49) positively. Since [R] occurs in ___[+consonantal], ___(#)[-consonantal], and ___## in Andante; and in ___## in Allegretto, we replace (49) with (50):

(50) a. Andante:

$$r \rightarrow R / \text{---} \left\{ \begin{array}{l} (\#) [+consonantal] \\ \#\# \end{array} \right\}$$

b. Allegretto:

$$r \rightarrow R / \text{---}\#$$

One is immediately struck by the similarity between (50a) and (37g), which, for the convenience of the reader, we repeat here as (51):

$$(51) \quad [y, w] \rightarrow [+consonantal] / V _ \left\{ \begin{array}{l} (\#) [-consonantal] \\ \# \end{array} \right\}$$

Since the instances of r affected by (50a) will always be preceded by a vowel, and since there is no reason not to order (50a) contiguous to (51), (50a) and (51) would collapse as (52), provided that the x in (52) could be specified:

$$(52) \quad \left[\begin{array}{l} \alpha consonantal \\ \alpha vocalic \\ -lateral \end{array} \right] \rightarrow \underline{x} / V _ \left\{ \begin{array}{l} (\#) [\alpha consonantal] \\ \# \end{array} \right\}$$

But the coincidence doesn't end here: (50b) is matched by the Allegretto version of (51); that is, the second case of (51). Even further, (37c), which we repeat here as (53a) is paralleled by the first case of (48), which we repeat as (53b):

$$(53) \quad \begin{array}{l} \text{a.} \quad [y, w] \rightarrow [-consonantal] / \left[\begin{array}{l} -seg \\ -FB \end{array} \right] _ \\ \text{b.} \quad r \rightarrow R / \left[\begin{array}{l} -seg \\ -FB \end{array} \right] _ \end{array}$$

again (53a) and (53b) would collapse as (54):

$$(54) \quad \left[\begin{array}{l} \alpha consonantal \\ \alpha vocalic \\ -lateral \end{array} \right] \rightarrow \underline{x} / \left[\begin{array}{l} -seg \\ -FB \end{array} \right] _$$

In approaching the problem of specifying the features of x, the following must be kept in mind. In the original formulation of (51) and (53a), the

single feature [+consonantal] appears to the right of the arrow, which would seem to be roughly correct for just these rules. In other words, it seems that some or all of the features other than [+consonantal] which are necessary to specify the changes $y \rightarrow \underline{Y}_1$ and $w \rightarrow \underline{Y}^W$, namely [-sonorant, +delayed release, -strident, -tense, +voice, etc.], should be supplied by convention.³² Whether some or all of these features are supplied by convention or whether they must be stated in the rule itself, the point is that more features change than just [+consonantal]. Thus the complete specification of (51) and (53a) would include at least all the features mentioned in (55):

$$(55) \quad \left[\begin{array}{l} \text{-consonantal} \\ \text{-vocalic} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{-sonorant} \\ \text{+consonantal} \\ \text{+delayed release} \\ \text{-tense} \\ \cdot \\ \cdot \\ \cdot \end{array} \right] / \dots$$

Now, if (55) is to be combined with $r \rightarrow \underline{R}/\dots$ as in (52) and (54), as it clearly must, one plausible and particularly simple way of specifying \underline{X} would be $\underline{X} = [\alpha\text{sonorant}, \alpha\text{tense}]$ where presumably other features would be supplied by convention. This being the case, for [y, w], (52) and (54) would obviously give [\underline{Y}_1] and [\underline{Y}^W] as intended; for [r], (52) and (54) would give the tense sonorant segment $\underline{S}^* = [(-\text{vocalic?}), +\text{consonantal}, +\text{sonorant}, +\text{anterior}, +\text{coronal}, -\text{distributed}, -\text{high}, +\text{continuant}, +\text{tense}, +\text{voice}, -\text{strident}, -\text{lateral}]$, which is clearly distinct from all other segments of Spanish. Now note that \underline{S}^* has the same features postulated for [\underline{R}] in (45), with the possible exception of [vocalic]. This is a remarkable convergence: the features of [\underline{R}] in (45) were chosen solely on the basis of

acoustico-articulatory data. The features of S^* were arrived at solely on the basis of rule simplicity. Thus we may state with some confidence that $[R]$ is either a tense liquid, or a tense sonorant consonant. At this point one could make an arbitrary choice, but I prefer to leave the question open.

Let us return to the question of rule (48). We have transferred the first case of (48) to rule (54); we are thus left with what may be stated as (56):

$$(56) \quad r \rightarrow \left[\begin{array}{l} +\text{tense} \\ (-\text{vocalic}) \end{array} \right] / \left[\begin{array}{l} +\text{coronal} \\ -\text{distributed} \end{array} \right] \text{ ---}$$

I do not know how to order rule (56). On the one hand, I foresee no disastrous consequences of combining it with (54); yet it does not seem intuitively plausible that a rule so far from the end of the grammar should refer to the feature [distributed] in its environment. On the other hand, it seems that a case could be made for somehow combining (56) with rule (39-40), Spirantization. Note that for dental \underline{d} , Spirantization applies after segments other than \underline{l} and \underline{n} , while (56) should apply after \underline{l} , \underline{n} , and \underline{s} . In these environments, \underline{d} (and \underline{b} , \underline{g} in the corresponding environments) and \underline{r} seem to undergo some sort of "strengthening of articulation" (cf. comments at the end of Section 2.6). At our present stage of knowledge, however, there seems to be no principled way of stating this generalization, if in fact it is a significant generalization.

Let us now tie up what loose ends we can.

Since intervocalic /rr/ ends up as $[R]$, indistinguishable from the $[R]$ which derives from single \underline{r} by (52) or (54), we apparently need a rule with

the effect of (57), which must be ordered before (56):

$$(57) \quad rr \Rightarrow R$$

Since [R] is optionally realized in Allegretto as [ʀ], and in some environments [ʁ], we apparently need a rule with the effect of (58):

$$(58) \quad \text{Allegretto:} \quad R \rightarrow \begin{bmatrix} \text{-sonorant} \\ \text{-anterior} \end{bmatrix} \quad \text{OPTIONAL}$$

Presumably the feature [+strident] will be supplied by some convention. The [ʀ] resulting from (58) will be correctly devoiced in the environment ___# by rule (44).

6. Summary of Rules and Further Observations

6.1 I now collect all the rules proposed so far, renumbering them as (59), and placing them in the proper order. In most cases the reason for the ordering is obvious; in a few cases the ordering depends on considerations to be taken up in Chapters III and IV.

$$(59) \text{ a. (25)} \quad g^N \rightarrow w / \# _$$

$$\text{b. (24a)} \quad \begin{Bmatrix} \acute{E} \\ \acute{O} \end{Bmatrix} \rightarrow \begin{Bmatrix} y\acute{e} \\ w\acute{e} \end{Bmatrix} \quad (\text{under certain conditions})$$

$$\text{c. (57)} \quad rr \Rightarrow R$$

$$\text{d. (54)} \quad \begin{bmatrix} \text{<consonantal} \\ \text{<vocalic} \\ \text{-lateral} \end{bmatrix} \rightarrow \begin{bmatrix} \text{<sonorant} \\ \text{<tense} \end{bmatrix} / \begin{bmatrix} \text{-seg} \\ \text{-FB} \end{bmatrix} _$$

$$\text{e. (56)} \quad r \rightarrow \begin{bmatrix} \text{+tense} \\ \text{(-vocalic)} \end{bmatrix} / \begin{bmatrix} \text{+coronal} \\ \text{-distributed} \end{bmatrix} _$$

f. (24b) $\left[\begin{array}{l} -\text{consonantal} \\ +\text{high} \\ -\text{stress} \end{array} \right] \rightarrow [-\text{vocalic}] / \left\{ \begin{array}{l} \underline{\quad} \text{V} \\ \text{V} \underline{\quad} \end{array} \right\}$

g. Andante (15) $\left[+\text{nasal} \right] \rightarrow \left[\begin{array}{l} \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{array} \right] / \underline{\quad} \left[\begin{array}{l} +\text{consonantal} \\ \alpha\text{anterior} \\ \beta\text{coronal} \\ \gamma\text{high} \\ \delta\text{back} \\ \theta\text{distributed} \end{array} \right]$

Allegretto (16) $\left[+\text{nasal} \right] \rightarrow [\quad] / \underline{\quad} ([-\text{seg}]) [\quad]$

h. Andante (17) $l \rightarrow \left[+\text{distributed} \right] / \underline{\quad} \left[\begin{array}{l} +\text{consonantal} \\ +\text{anterior} \\ +\text{coronal} \\ +\text{distributed} \end{array} \right]$

Allegretto $l \rightarrow \left[+\text{distributed} \right] / \underline{\quad} ([-\text{seg}]) [\quad]$

i. Andante (39) $\left[\begin{array}{l} -\text{sonorant} \\ -\text{tense} \end{array} \right] \rightarrow \left[\begin{array}{l} +\text{continuant} \\ -\text{strident} \end{array} \right] / \left\{ \begin{array}{l} [+ \text{continuant}] \\ [-\alpha\text{coronal}] \end{array} \right\} \left[\text{coronal} \right]$

Allegretto (40) $[\quad] [\quad] / \left\{ \begin{array}{l} \text{"} \end{array} \right\} ([-\text{seg}]) [\quad]$

j. Andante (52) $\left[\begin{array}{l} \alpha\text{consonantal} \\ \alpha\text{vocalic} \\ -\text{lateral} \end{array} \right] \rightarrow \left[\begin{array}{l} \alpha\text{sonorant} \\ \alpha\text{tense} \end{array} \right] / \text{V} \underline{\quad} \left\{ \begin{array}{l} (\#) [\alpha\text{consonantal}] \\ \# \end{array} \right\}$

Allegretto (52) $[\quad] \rightarrow [\quad] / \text{V} \underline{\quad} \#$

k. Allegretto (58) $R \rightarrow \begin{bmatrix} -\text{sonorant} \\ -\text{tense} \end{bmatrix}$ OPTIONAL

l. (43) $\begin{bmatrix} -\text{continuant} \\ +\text{tense} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{voice} \\ +\text{HSPress} \\ +\text{GConstr} \end{bmatrix} / ___ (\begin{bmatrix} -\text{seg} \\ -\text{FB} \end{bmatrix}) \begin{bmatrix} +\text{sonorant} \\ -\text{nasal} \end{bmatrix}$

m. (44) $\begin{bmatrix} -\text{sonorant} \\ -\text{HSPress} \end{bmatrix} \left\{ \begin{array}{l} [\alpha\text{voice}] / ___ (\begin{bmatrix} -\text{seg} \\ -\text{FB} \end{bmatrix}) \\ [-\text{voice}] / ___ \#\# \end{array} \right. \begin{bmatrix} +\text{consonantal} \\ \alpha\text{voice} \end{bmatrix}$

n. Allegretto (29) $\begin{Bmatrix} \gamma_1 \\ \gamma^w \\ \text{'} \end{Bmatrix} \rightarrow \begin{Bmatrix} y \\ w \\ \text{'} \end{Bmatrix}$

6.2 The ad hoc symbol $\#\#$, which represents silence, lack of phonation, appears at two distinct points in (59). The phonological theory of Chomsky and Halle (1968), however, makes no provision for the incorporation of such a symbol. The purpose of this section is to present evidence which suggests that some such provision must be made.

Note first that it would be possible to avoid mention of $\#\#$ by the artifice of substituting rules of the form of (60) by sequences of rules of the form of (61), but the incorrectness of resorting to such an artifice is obvious, and merely underscores the theoretical inadequacy under discussion:

(60) a. $A \rightarrow B / ___ \#\#$
 b. $A \rightarrow B / \#\# ___$

(61) a. $A \rightarrow B$
 b. $B \rightarrow A / ___ [+segment]$

- b. A → B
 B → A / [+segment]___

It might be thought that the symbol $\#\#\#$ is equivalent to the \underline{J} (uncture) \underline{P} (oint) proposed in Stockwell (1960), which marks the end point of intonational contours, or the boundary symbol $\underline{O}\#$ proposed by Bierwisch (1966). This, however, is not the case: $\#\#$ refers literally to silence, nonphonation, while \underline{JP} and $\underline{O}\#$ are associated with intonational phenomena such as retardation in tempo, rapid rise or fall in pitch, etc. For example, a two-sentence utterance such as ...los dos. Dámelos, "...both of them. Give them to me," may have either of the pronunciations illustrated in (62).

- (62) a. ...los dos. Dámelos. [lozδósz↓dámelos↓]
 b. ...los dos.##Dámelos. [lozδósz↓dámelos↓]

The symbol \downarrow subsumes all the phonetic properties of the (falling) intonational contours of both sentences of ...los dos. Dámelos; (62a) and (62b) are to be interpreted as having identical contours. Thus $\#\#\#$ may or may not accompany a terminal intonation. The voicing assimilation of \underline{s} is broken only by the intervention of total absence of phonational activity, as in (62b), although the Spirantization of \underline{d} may be blocked by the occurrence of (inaudible) $\#$ or $\underline{=}$ (Cf. Section 4.1). One might speculate that the phonational activity which accounts for the voicing of \underline{s} in (62a) is the onset of vocal vibration which precedes the release of \underline{d} (Cf. Section 4.2, discussion of findings of Lisker and Abramson). In any event, (62) shows clearly that the domain of phonological processes such as voicing assimilation is not limited to the boundaries of "phonological phrases" or "Phrasierungseinheiten," as has generally been believed.

5.3 Observe that the sequence of rules (59) has the following properties:

- a. (59) may be divided into three blocks: rules a-f are shared by Andante and Allegretto; rules g-j have nearly identical formulations in Andante and Allegretto; rules k-n are either shared by Andante and Allegretto (l and m) or exist only in Allegretto (k and n).
- b. Rules g - i are identical in Andante and Allegretto except for the optional occurrence of $\begin{bmatrix} -seg \\ -FB \end{bmatrix}$ in the environment of the Allegretto version of each.
- c. In Andante, i is the last rule for which the presence of $\begin{bmatrix} -seg \\ -FB \end{bmatrix}$ in a string of units blocks application of the rule: that is, after i, all rules allow for the optional occurrence of $\begin{bmatrix} -seg \\ -FB \end{bmatrix}$ in the environment.
- d. In Allegretto, f is the last rule for which the presence of $\begin{bmatrix} -seg \\ -FB \end{bmatrix}$ blocks application of a rule:³³ that is, after f, all rules either allow for the optional occurrence of $\begin{bmatrix} -seg \\ -FB \end{bmatrix}$ in the environment, or apply in all environments.

Thus after rule f in Allegretto and rule i in Andante, the presence of boundaries (other than ~~###~~) in strings of phonological units is simply irrelevant to the applicability of phonological rules. Clearly the formulations of the rules in (59) does not properly reflect this fact: if we write rules with parenthesized boundaries, neither do we recognize the fact that the boundaries are irrelevant (since we must mention them in the rules) nor does their irrelevance give us simpler rules. What all of this suggests is that one of the formal correlates of the stylistic distinction Andante/

Allegretto is not the appearance of optional boundary elements in the rules of one style but not of the other, but rather that boundary elements are deleted in phonological representations at a higher level of derivation in Allegretto than in Andante. Specifically, boundary elements are deleted after application of rule f (or e - see note 33) in Allegretto, and rule i in Andante, and no rule need specify optional boundary elements in its environment.

Chomsky and Halle (1968, Appendix to Chapter 3) have proposed that the features of boundary elements be deleted from phonological representations by convention at the end of a sequence of phonological rules. The observations made in this section suggest that this proposal must be refined in some way.

FOOTNOTES TO CHAPTER II

1. Forms like inmenso and innato should probably be roughly /in=menso/ and /in=nato/. For discussion of the boundary =, which would block the application of rule (4), see Chomsky and Halle (1968, Chapter 3, Section 10).
2. Fuller discussion is presented in Chapter IV, Section 4.2.
3. See Chomsky and Halle (1968, Chapter 4, Section 2.2 and Chapter 8, Section 7).
4. This is automatically accomplished by the convention that # blocks a rule unless it is explicitly mentioned in the rule. For discussion see Chomsky and Halle (1968, Chapter 3, Section 1.3.1).
5. See footnote 1.
6. For discussion of the feature composition of boundaries see Chomsky and Halle (1968, Chapter 3, Section 1.3.1).
7. See, for example, the interesting recent article by Fudge (1967).
8. It is not clear what King means here. In fact, [gɨ] and [w] are "in contrast" only because of King's decision to phonemicize them a certain way. The last two examples also occur as /sónwántes, sónguápos/, which, by King's own analysis, shows exactly the oppo-

site of what he seems to be saying, that is, that [gʏ] and [w] contrast only stylistically, not phoemically. We return to this below.

9. Diphthongization will be treated more fully in Chapter 3, Section 13. For expository purposes, we will henceforth use the ad hoc device of representing as upper case E those e's which diphthongize when stressed.
10. For further discussion of rounded velars, see Chapter IV, Section 8.
11. There are other instances of VV versus GV contrasts which have other explanations. For example, dueto, [dueto], "duet," versus duelo [ɔwelo], "mourning." For these, the representations /du = eto/ and /dOlo/ account for the contrast. For a different kind of examples, see Chapter III, Section 9.1.
12. See, however, Chomsky and Halle (1968, Chapter 8, Section 4), where a feature system is discussed in which obstruents, nonsyllabic liquids and nasals, and glides share the feature [-syllabic] while vowels and syllabic liquids and nasals are [+syllabic].
13. The havoc caused by such data is a ~~matter~~ of history: Bowen and Stockwell (1955), Saporta (1956g), Bowen and Stockwell (1956), Stockwell, Bowen, and Silva-Fuenzalida (1956). Stockwell et al. (1956) made the extraordinary statement about the glides that "the language really is not very neat at this point" (p. 411). No amount of fiddling with "plus juncture" did any good. For example, ayuna, "fast (not eating),"

- and hay una, "there is one," are both [ay₁una] in Andante and [ayuna] in Allegretto. Stockwell et al. observe with consternation that if [ayuna] is phonemicized as /ay+una/, the plus is in the right place for hay una, but in an embarrassing place for ayuna, and so on.
14. Aullido is [awɣ₁iðo] in Andante, but there is strong reason to believe that the representation is not awyido at the time (24c) applies.
 15. Incidentally, it is extremely hard to find relevant examples. The reader will note that the examples in (34a) contain only aw and ew. Aside from a handful of exceptions, some unique, there are no instances of ey, ow, iw, uw, iy, uy in the language. Rules will be given in Chapter 3 which account for the absence of these sequences.
 16. B versus v is an orthographic, not a phonetic, distinction. For example, hierba, "herb, grass," and hierva, "boil (present subjunctive)," are both [yérβa]. There is no [v] in native Spanish words, however, in Afganistán, afgano, the f becomes voiced before the following voiced consonant. Similarly un chef bueno, "a good chef," may be pronounced with a voiced f. The voicing of f is of infinitesimal importance per se, but it will fall out automatically from an independently motivated extension of the s-voicing rule (37h) to be given in Section 4.2.
 17. The symbols ɸ, δ^θ, and ɣ^x represent partially or completely voiceless segments. We will ignore these segments until Section 4.2.
 18. We postpone justification of $\left[\begin{array}{l} \text{-sonorant} \\ \text{-tense} \end{array} \right]$ rather than $\left[\begin{array}{l} \text{-sonorant} \\ \text{+voice} \end{array} \right]$ until Section 4.2.

19. The features [-seg, -FB] seem to have vanished in the transition to (39). This is due to the convention that the presence of # or = in a string of units blocks the application of a phonological rule to that string unless # or = is mentioned in the rule. For discussion see Chomsky and Halle (1968, Chapter 3, Section 1.3.1).
20. Although club and Agfa are not of native origin, they are in common use. I have cited them in order to illustrate assimilations of b and g not otherwise found because of limitations on the distribution of b and g in native words. Incidentally, in the dialect under study the plural of club is clubs [klus^ɸs], not the expected *clubes.
21. The reader is also advised that not all dialects share every detail of the data presented here.
22. Lisker and Abramson distinguish only three categories, collapsing (c) and (d). The reason for the four-way distinction will be apparent below.
23. On the other hand, initial English t falls into category (d), while English d falls into category (b). Thus Spanish t and English d are in the same category. This would help to account for the fact that English speakers learning Spanish experience extreme difficulty in distinguishing (in isolation) pairs like tos/dos, tía/día, Tezcoco/descoco. For many years I have found it pedagogically helpful to call students' attention to the prevoicing of Spanish d.

24. Cho_{sky} and Halle have proposed that the distinctive feature [voice], as opposed to the impressionistic terms "voiced" and "voiceless," be restricted such that [-voice] characterizes sounds produced with a glottal opening that is so wide that it prevents vocal vibration when air flows through the opening. The feature [+voice] characterizes sounds produced with an aperture not so wide to prevent vibration. In these terms, sounds which are [+voice] may or may not be "voiced": vocal cord vibration will not result although the glottis is in [+voice] position if there is (a) closure in the supraglottal tract, and (b) sufficient tension in the supraglottal musculature to prevent expansion of the supraglottal cavity, such that the flow of air through the glottis is impeded --without air flow through the glottis there can be no vocal cord vibration.
25. In some dialects, perhaps most, atleta is at-le-ta. I have not investigated the range of data presented here in these dialects. It is an intriguing question what influence the many indigenous words with initial and final tl clusters in Mexican Spanish (tlaco, tlapalería, atlatl, Popocatépetl) may have had on the syllabification of words of European origin.
26. The graph rr is used only intervocalically; r is used for [R] in other positions, e.g. initially where no contrast with [r] is possible: [Roto] is spelled roto. Thus the spelling system is both unambiguous and economical in this respect.
27. Amancio Bolaño e Islas, professor of phonetics at the Universidad Nacional Autónoma de México, once claimed to be able to distinguish no less than 37 varieties of [R] in the Valley of Mexico alone (personal communication).

28. I disregard obvious cases of composition like mal=rotar.
29. The occurrence of both [árma] and [áRma], and so on, provides the basis for a devastating, though hardly unique, argument against the (taxonomic) phoneme as a perceptual unit. Since [r] and [R] contrast intervocalically, they must be phonemically distinct: /r/ and /R/ or /rr/. (The familiar and rather idle controversy over whether [R] should be phonemicized as geminate /rr/ or as a unit phoneme /R/ has no bearing on the issue at hand.) Now if the phoneme is a perceptual unit, native speakers should be able to perceive immediately the difference between [árma] and [áRma], since these are phonemically /árma/ and /áRma/ (or /árrma/ --these transcriptions are copied from the literature, not invented.) In casual but often repeated experiments that I have made, however, phonetically untrained native speakers consistently fail to perceive any difference, even under optimal acoustic conditions and after the difference has been specifically pointed out. On the other hand, native speakers of English usually hear the difference at once, even though this sort of phonetic contrast obviously plays no role in English at all. If one took such facts seriously, one would be forced to the conclusion that, far from being alert to phonemic distinctions in their own language, Spanish speakers are actually deafened by the sound system they have acquired.
30. It will be seen in Chapter III that the forms in question derive ultimately from representations which can be stated slightly more accurately as /kEr+rE+a+y/, /kEr+rE+a+s/, /kEr+rE+a+Ø/. It would take us intolerably far from the present discussion to justify these representations

here. The conditional forms querría, querrías, etc., are analogous to the future forms in that a suffix with initial r is attached to the stem with final r, giving /...r+r.../, which becomes phonetic [R].

31. If it could be shown that honRa and honorable are related synchronically, and therefore share the formative which can be represented roughly as /honor/, this alone would be decisive evidence in favor of the first alternative. More specifically, the derivation of honRa would of necessity contain the following steps: honort+a → honrt+a → honRt+a. The converse situation is clearly impossible: honorr+table → honort+table. However, the relationship between honRa and honorable is not clear enough to count as evidence for or against either alternative. Some additional evidence against the second alternative is provided by the fact that geminate consonant clusters apparently occur only after vowels in lexical items. It would be odd if rr were the only exception to this generalization.
32. It would be pointless to state how the marking conventions proposed by Chomsky and Halle (1968, Chapter 9, Section 2.1) would affect these rules, since these marking conventions are undergoing substantial revision at this writing.
33. Further investigation would probably show that e rather than f is the last such rule, and that f should be included in the block of rules which are identical in Andante and Allegretto except for the optional occurrence of $\begin{bmatrix} -\text{seg} \\ -\text{FB} \end{bmatrix}$ in the environment of the Allegretto version. I have not gone into this since the cyclical assignment of stress to stretches larger than a word seems to be involved.

CHAPTER THREE - VERB FORMS

1. Introductory Remarks

The discussion in Chapter II centered around certain well known and widely studied phenomena, which, in some intuitively clear sense, are essentially "phonetic" rather than "morphophonemic." We now turn to a study of the morphophonology of Spanish verb forms. These have been chosen for study in this chapter because they present a rich body of clear data. This material is "rich" in two senses. First, in that the Spanish verb is highly inflected, with many phonological alternations in the various forms. There are inflections for an infinitive, two participles, "formal" and "familiar" imperatives, present indicative and subjunctive, two past indicative forms (traditionally called "imperfect" and "preterit"), two past subjunctives, a future and a conditional. All of these are in current use in the spoken language; that is, none is a "literary" form like the passé simple and past subjunctive in French. All but the infinitive, the participles, and the imperatives are inflected for three persons, singular and plural.¹ The second sense in which the data is rich is that while it is readily available in any school grammar, it has so far resisted insightful analysis in any linguistic theory.²

This data is "clear" in that vexing questions of morphological "relatedness" simply do not arise: members of inflectional paradigm sets are "related" by definition.

2. Present Indicative

2.1 First Conjugation

(1)	"love"	<u>singular</u>	<u>plural</u>
	1st person	ámo	amámos
	2nd person	ámas	
	3rd person	áma	áman

The root is am; the vowel which follows the root in all forms except ámo is traditionally called the "theme vowel," which, for the first conjugation is a. We may regularize the paradigm by postulating for ámo the underlying representation amta+o, and deleting thematic a with rule (2).

$$(2) \quad V \rightarrow \emptyset / + \underline{\quad} + V$$

Thus all forms consist of the root, followed by the theme vowel, followed by one of the person-number endings o, s, o, mos, n.³ Since all the forms of (1) are stressed on the penultimate vowel, we may state, as a first approximation, the rule for assigning stress in verbs as (3):

$$(3) \quad V \rightarrow [1\text{stress}] / \underline{\quad} C_0 VC_0 \#]_V$$

Stress assignment will be ordered after rule (2).

2.2 Second Conjugation

(4)	"eat"	cómo	comémos
		cómes	
		cóme	cómen

The root is com; the theme vowel of the second conjugation is e. Everything else is accounted for as in the first conjugation.

Note that throughout (7), the person-number marker for [1person, -plural] is Ø, rather than o as in the present indicative. It seems then that while there is a rule roughly of the form [1person, -plural, +indicative] → o, there is no corresponding rule with [-indicative].

Before attempting to account for what appears to be thematic e rather than a for the first conjugation, and a rather than e and i for the second and third conjugations, consider the consonantal alternations illustrated in (8):

(8)

- a. opako, "opaque"; opaaidad, "opacity"
 sweko, "Swedish"; swesya, "Sweden"
 místiko, "mystic(al)"; místigismo, "mysticism"
 indikar, "indicate"; índige, "index"
- b. belga, "Belgium"; bélxico, "Belgian"
 análogo "analogous"; analoxía, "analogy"
 conyugal, "conjugal"; cónyuga, "spouse"

The examples in (8) show that Spanish must have rules with the effect of (9):⁵

$$(9) \quad \left\{ \begin{array}{c} k \\ g \end{array} \right\} \rightarrow \left\{ \begin{array}{c} s \\ x \end{array} \right\} / \text{---} \left[\begin{array}{l} \text{-consonantal} \\ \text{-back} \end{array} \right]$$

Now notice that the alternations illustrated in (8) do not occur in regular verbs. For example, the present subjunctive of first conjugation saka- is

sake- not *sase-; second conjugation protexe- has the subjunctive protexa- (as well as first person singular indicative protexo); third conjugation dirixi- has the subjunctive dirixa- (as well as first person singular indicative dirixo). Now, since we already have the independently motivated rule (2), we propose that the subjunctive forms be derived as illustrated in (10) with first person plural forms:

<u>First Conj.</u>		<u>Second Conj.</u>		<u>Third Conj.</u>	
<u>Indic.</u>	<u>Subjunc.</u>	<u>Indic.</u>	<u>Subjunc.</u>	<u>Indic.</u>	<u>Subjunc.</u>
sak+a+mos	sak+a+e+mos	protex+e+mos	protex+e+a+mos	dirig+i+mos	dirig+i+a+mos
-	-	x	x	x	x (9)
	∅		∅		∅ (2)
<u>sakamos</u>	<u>sakemos</u>	<u>protexemos</u>	<u>protexamos</u>	<u>diriximos</u>	<u>dirixamos</u>

Thus we see by these consonant alternations that the vowel following the root in the present subjunctive is not an "altered" theme vowel, but rather, in imprecise terms, the "subjunctive formative." Were it not for these (and other) consonantal alternations, one might entertain the possibility of simply spelling out the theme vowel differently in the subjunctive than in the indicative and having no "subjunctive formative." For the sake of simplicity one would like to have one single shape for the subjunctive marker in all three conjugations. But given the three different theme vowels for the three conjugations, it is hardly surprising that there should be more than one shape for the subjunctive marker. Given the independent motivation for rule (2), it is unlikely that a solution will be found simpler than the one presented.

4. Participles and Infinitives

4.1 The Past Participle.

The term "past participle" is traditionally used in Spanish just as in English, namely, for the verb form which co-occurs in the perfect tenses with the auxiliary "have," haber in Spanish. Unlike French and Italian, Spanish never has gender and number agreement between the subject and a past participle in the perfect tenses.

The past participles of the three conjugations are amádo, comído, and unído. Note that the theme vowel e of the second conjugation appears as i. We will account for this with rule (10), which in Section 7 will be shown to be somewhat less ad hoc than it now seems:

$$(10) \quad \begin{bmatrix} V \\ -low \end{bmatrix} \rightarrow [+high] / ___ [\text{past participle}]$$

The past participle ending itself seems to be -do. However, there are a few irregular verbs in which the participial ending is attached directly to the root, without an intervening theme vowel. In these forms, the participial ending appears as -to: abierto, cubierto, muerto, vuelto, visto, puesto. We will say then that the participial ending is always -to, and that the d which occurs in regular forms is a result of rule (11):⁶

$$(11) \quad [-sonorant] \rightarrow [-tense] / V___ [+vocalic] \text{ (under certain conditions)}$$

4.2 The Present Participle

What has traditionally been called the "present participle" in Spanish corresponds morphologically (and in part syntactically) to the "present

participle," or "-ing form," in English.⁷ The forms for the three conjugations are amándo, comyéndo, unyéndo. These forms are invariable: there is never any number or gender agreement of any sort. The ending of the present participle itself is -ndo; we must pick up a few loose ends in order to account for the vowels which appear between the root and this ending.

At several points in Chapter 2 we referred to a rule, (59b), which diphthongizes é and ó to yé and wé under certain conditions. We used the notational device of representing as upper case E and O those instances of e and o which diphthongize under stress (reserving lower case e and o for those which do not diphthongize when stressed). For expository purposes, let us hypothesize an ad hoc feature [D], mnemonic for "diphthongization," such that [e, +D] = E and [o, +D] = O, and so on.⁸

Now note that the theme vowel of the second conjugation must be e, rather than E, since it does not diphthongize when stressed; comémos, not *comyémos (and, incidentally, that the first conjugation subjunctive e is also not E: amémos, not *amyémos). Finally, since the present participles of the second and third conjugations are comyéndo and unyéndo, we must postulate rule (12), which applies before the diphthongization rule, (59b):

$$(12) \quad \acute{v} \rightarrow \begin{bmatrix} \text{-high} \\ \text{+D} \end{bmatrix} / \text{ ____+ndo}$$

Note that (12), stated in its most general form will also assign the feature [+D] to the thematic a of the first conjugation, but this will have no phonetic effect. Thus the derivation of the present participles will be as in (13):

(13)	am+at+ndo	com+te+ndo	un+i+ndo	
	á	é	í	(3)
	Á	É	É	(12)
		yé	yé	(59 $\frac{1}{2}$)
	<u>amándo</u>	<u>comyéndo</u>	<u>unyéndo</u>	

4.3 The Infinitive

(14)	amar	comer	unir
------	------	-------	------

Note the final stressed syllable, an apparent exception to penultimate stress for verbs. But recall a rule, alluded to in Chapter 2, Section 5.23, which deletes e in the environment ___#. We provisionally give this rule as (15):

$$(15) \quad \begin{bmatrix} e \\ +D \end{bmatrix} \rightarrow \emptyset / V \begin{bmatrix} +coronal \\ +anterior \end{bmatrix} \begin{matrix} 1 \\ 0 \end{matrix} \text{ ---}\#$$

That is, E is deleted in final position after a vowel followed by zero or one dental consonant. We specify E, that is [e, +D] rather than e, since the second conjugation theme vowel, which has been shown to be e rather than E does not delete in the environment of (15), nor does the first conjugation subjunctive e. Literally hundreds of singular/plural pairs of nouns like red/redes, horror/horrores, francés/franceses, fusil/fusiles, pan/panes provide ample justification for this rule.⁹

5. Imperfect Indicative

The "imperfect" is one of the simple past tenses of Spanish; the "preterit" is the other. The difference between the imperfect and the pre-

terit is one of "aspect," in the familiar sense; the imperfect is past tense, imperfective aspect; the preterit is past tense, perfective aspect. We assume that the phonological segments of the imperfect and preterit endings are supplied by "spell-out" rules of feature bundles which contain the features [+past] and [\pm perfective].

5.1 Imperfect, First Conjugation

- (16)
- | | |
|--------|----------|
| amába | amábamos |
| amábas | |
| amába | amában |

With the phonological representations amta+ba, amta+ba+s, amta+ba, amta+ba+mos, amta+ba+n, where ba is the realization of the feature complex [+past, -perfective], the only thing which requires comment is the antepenultimate rather than penultimate stress of amábamos. To accommodate this form (and the rest of (16)), we will provisionally replace (3) by (17):¹⁰

- (17) $V \rightarrow [lstress] / ___([-perfective]C_0VC_0\#)_V$

5.2 Imperfect, Second and Third Conjugation

- (18)
- | | | | |
|--------|----------|-------|---------|
| comía | comíamos | unía | uníamos |
| comías | | unías | |
| comía | comían | unía | unían |

The examples in (18) present two problems: the theme vowel of the second conjugation, and the form of the imperfect marker. We may handle the

former by replacing rule (10) by (19):

$$(19) \quad \begin{bmatrix} V \\ -low \end{bmatrix} \rightarrow [+high] \quad / \quad \text{---} \quad \left\{ \begin{array}{l} \text{[past participle]} \\ \text{[+past, -perfective]} \end{array} \right\}$$

This rule will be further generalized in Section 7.

In the first conjugation, the imperfect marker is ba; in the second and third conjugations it seems to be just a. Let us assume ba for all three conjugations, and postulate the following rule, which deletes the b in the second and third conjugation:

$$(20) \quad b \rightarrow \emptyset \quad / \quad i + \text{---}$$

The motivation for (20) is admittedly rather slim. Although there are many instances of historical loss of intervocalic b, I am not aware of any clear synchronic evidence aside from that of the imperfects of second and third conjugation verbs. It seems to me, however, that the available evidence is convincing. Consider the following: (a) if rule (20) were not ordered after rule (2), then would have to find some other way to account for the fact that rule (2) does not delete the theme vowel in com+ita, com+ita+s, etc., (b) iba, rather than *ia, the imperfect of ir, could be accounted for quite naturally by simply making ir an exception to rule (20). The same is true of a few substandard forms like creiba for standard creía, the imperfect of creer, and (c) ceteris paribus, the "spell-out" rule for the imperfect marker will be simpler if it can be given simply as [+past, -perfective] \rightarrow ba for all three conjugations.

6. Imperfect Subjunctive

There are two sets of forms of the imperfect subjunctive, which have

The only comment necessary here concerns the theme vowels. We already have rule (12) which lowers high vowels and assigns to them the feature [+D]. Accordingly, we will replace (12) by (23), which will convert thematic e and i to E in the imperfect subjunctives, so that these theme vowels will end up as ye.

$$(23) \quad \acute{v} \rightarrow \begin{bmatrix} -\text{high} \\ +\text{D} \end{bmatrix} / \text{---} + \begin{Bmatrix} \text{ndo} \\ \text{ra} \end{Bmatrix}$$

This rule will be further motivated and generalized below.

7. Preterit

(24)	amé	amámos	comí	comímos	uní	unímos
	amáste		comíste		uníste	
	amó	amáron	comyó	comyéron	unyó	unyéron

Obviously the preterit presents a number of complexities not found in the forms surveyed up to this point.¹² The first person plural forms are the only ones which present no difficulty at all. Second conjugation thematic i in comímos (as opposed to present indicative comémos) is readily accounted for by a simplification of (19), which is given as (25):¹³

$$(25) \quad \begin{bmatrix} \text{V} \\ -\text{low} \end{bmatrix} \rightarrow [+high] / \text{---} \left\{ \begin{array}{l} [\text{past participle}] \\ [+past] \end{array} \right\}$$

Note that preterit amámos and unímos are identical to the corresponding present indicative forms.

I see no alternative to postulating different person-number markers than in the other tenses, with the exception of first person plural mos. If we assume for the preterit, second personal singular ste, and third

person plural ron, then the second person singular and third person plural forms of all conjugations can be accounted for by (a slight simplification of) rules we already have. Of the second person singular forms, only comiste requires mention, and here thematic i rather than e is accounted for by rule (25). For the third person plurals, the diphthongs in comieron and unieron by the second case of (23) (and subsequent diphthongization, if this is simplified from ___+ra to ___+rV. We therefore replace (23) with (26):

$$(26) \quad \acute{V} \rightarrow \begin{bmatrix} \text{-high} \\ \text{+D} \end{bmatrix} / \text{---} + \left\{ \begin{array}{l} \text{ndo} \\ \text{rV} \end{array} \right\}$$

Note that (26) must not apply to second and third conjugation infinitives, which at an early level of derivation are comere and unire: the phonetic forms are comér and unír, not *comyér and *unyer. This can be handled by ordering (15), which deletes final E, before (26), so that the thematic e and i of the infinitives is no longer in the environment ___rV at the time (26) applies.

We give a few sample derivations in (27) to illustrate some of the forms that have been discussed.

(27)

comte+ste	comte+mos	comte+ron	unite+ste	unite+ron	unite+rE	
i	i	i				(25)
í	í	í	í	í	í	(17)
						∅ (15)
		é		é		(26)
		yé		yé		(59b)
<u>comiste</u>	<u>comimos</u>	<u>comieron</u>	<u>uniste</u>	<u>unieron</u>	<u>unír</u>	

We must now account for the various vowels and the final stress in all the first and third person singular forms. In comyó and unyó it is obvious that the y comes from i, but it is not so obvious what the o comes from. We need some vowel V* such that com+i+V* and un+i+V* can be stressed com+i+V* and un+i+V* by (17), such that the stress will be shifted to the right, and such that V* may be converted to o. We must also prevent (2) from deleting the theme vowels before they can be turned into y. Re-viewing the cases where (2) must apply, we notice that in the present subjunctive of the first conjugation, (2) applies in the environment ___+[V, -D]. That is, (2) applies to am+at+..., not *am+a+E+..., giving amte.... Let us assume then that (2) must be replaced by (28).

$$(28) \quad V \rightarrow \emptyset / +___+ \begin{bmatrix} V \\ -D \end{bmatrix}$$

Now, since (28) does not apply to com+i+V* and un+i+V*, the vowel V* must be some vowel with the feature [+D].

At this point we may observe that with the unique exception muy, there are no instances of *uy or *iw at all, although the sequences wi and yu are common. Now, since we have independent motivation for rule (59f) which turns unstressed high vowels into glides immediately preceding and immediately following a vowel, we may give the following extremely general rule (whose correct formulation need not concern us now):

$$(29) \quad \begin{array}{ccc} \begin{bmatrix} V \\ +high \\ +stress \end{bmatrix} & \begin{bmatrix} V \\ +high \end{bmatrix} & \Rightarrow \begin{bmatrix} -stress \end{bmatrix} \begin{bmatrix} +stress \end{bmatrix} \\ 1 & 2 & 1 \quad 2 \end{array}$$

Given (29) and given that the stress in com+i+V* and un+i+V* (assigned by (17)) shifts to com+i+V* and un+i+V*, then V* must be some high vowel.

We have established now that V* is some vowel with the features [+high, +D]. Since V* is ultimately realized as o, the simplest assumption is that V* is also [+back], that is U. This assumption is supported by first conjugation first and third persons singular amé and amó: if comyó and unyó are phonologically comte+U and un+i+U, then amó must be amra+U, and there must be rules with the effect of (30):

$$(30) \quad aU \Rightarrow o$$

Before refining (30), let us examine the first person singular forms amé, comí, and uní. The apparently final stress and the e of amé will be accounted for if we find some vowel V' such that the underlying forms in question are amra+V', comte+V', and un+i+V', that aV' \Rightarrow e, and that V' will be deleted in the second and third conjugation forms. Since the theme vowels are apparently not deleted by (28), V' must have the feature [+D]. Now if V' is I, that is, [i, +D], we can expand (30) to (31):

$$(31) \quad \left\{ \begin{array}{c} aU \\ aI \end{array} \right\} \Rightarrow \left\{ \begin{array}{c} o \\ e \end{array} \right\}$$

We can capture the symmetry of (31), and achieve part of the desired effect with (32):

$$(32) \quad \left[\begin{array}{c} V \\ +low \end{array} \right] \rightarrow \left[\begin{array}{c} -low \\ oback \end{array} \right] / \text{---} \left[\begin{array}{c} -consonantal \\ +high \\ oback \end{array} \right] \quad (\text{under certain conditions})$$

Since there are in fact aw and ay sequences in Spanish, (32) must be restricted in some way. This will be discussed below in Section 9.3. In any event, (32) will produce sequences which will ultimately be realized as ow and ey. But such sequences do not occur phonetically outside a few exceptions. In fact, there are no sequences consisting of a nonlow vowel followed by an unstressed high vowel (or glide) which agrees with the first vowel in backness: *iy, *ey, *uw, *ow. Therefore we may give the completely general rule (33):

$$(33) \quad \left[\begin{array}{l} \text{-consonantal} \\ \text{-stress} \\ \text{+high} \\ \text{+back} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{l} \text{V} \\ \text{-low} \\ \text{+back} \end{array} \right] \text{ —}$$

Thus the derivations of amé, amó, comí, and uní are as shown in (34):

(34)	am+ <u>a</u> +I	am+ <u>a</u> +U	com+ <u>e</u> +I	un+ <u>i</u> +I	
			i		(25)
	-	-	-	-	(28) fails
	á	á	í	í	(17)
	é	ó			(32)
	∅	∅	∅	∅	(33)
	<u>amé</u>	<u>amó</u>	<u>comí</u>	<u>uní</u>	

We still have to account for the final o of comyó and unyó. With the rules proposed so far, these forms will be left incorrectly as comyú and unyú. Since the final vowel of these forms has been shown to be /U/, we obviously need a rule with the effect of (35).

$$(35) \quad U \rightarrow o$$

Since we already have rule (6), which lowers high vowels under certain conditions, we may collapse (6) and (35) into (36):

$$(36) \quad V \rightarrow [-\text{high}] / \left\{ \begin{array}{l} [-\text{stress}] \text{ C}_0\# \\ [+D] \end{array} \right. \quad \begin{array}{l} (a) \\ (b) \end{array}$$

Rule (36), particularly case (b), will be discussed further in Section 9.3. The complete derivation of the third person singular preterit forms is given in (37):

(37)	amta+U	comte+U	unt+U	
		i		(25)
	-	-	-	(28) fails
	á	í	í	(17)
	ó			(32)
	∅			(33)
		i <u>ú</u>	i <u>ú</u>	(29)
		ó	ó	(36b)
		y	y	(59f)
	<u>amó</u>	<u>comyó</u>	<u>unyó</u>	

Our survey of the preterit forms is now complete. For the convenience of the reader, we now summarize the derivations of these forms, by conjugation.

First Conjugation

amta+I	amta+ste	amta+U	amta+mos	amta+ron	
á	á	á	á	á	(17)
		ó			(32)
		∅			(33)
<u>amé</u>	<u>amáste</u>	<u>amó</u>	<u>amámos</u>	<u>amáron</u>	

Second Conjugation

comte+I	comte+ste	comte+U	comte+mos	comte+ron	
i	i	i	i	i	(25)
í	í	í	í	í	(17)
ø					(33)
				é	(26)
				yé	(59b)
		i ú			(29)
		ó			(36b)
		y			(59f)
<u>comí</u>	<u>comíste</u>	<u>comyó</u>	<u>comímos</u>	<u>comyéron</u>	

Third Conjugation

un+i+I	un+i+ste	un+i+U	un+i+mos	un+i+ron	
í	í	í	í	í	(17)
ø					(33)
				é	(26)
				yé	(59b)
		i ú			(29)
		ó			(36b)
		y			(59f)
<u>uní</u>	<u>uníste</u>	<u>unyó</u>	<u>unímos</u>	<u>unyéron</u>	

3. Summary of Rules

We now collect and give, in the proper order (to the extent that this can be determined by the data presented up to this point), as (38) all the rules discussed so far in this chapter. (There is some duplication of rules discussed in Chapter 2.) It must be stressed that several of the rules in (38) are not yet in final form.

(38)

$$a. (10, 19-25) \quad \begin{bmatrix} V \\ -low \end{bmatrix} \rightarrow \begin{bmatrix} +high \\ -D \end{bmatrix} \quad / ___ [+past]$$

$$b. (9) \quad \begin{Bmatrix} k \\ g \end{Bmatrix} \rightarrow \begin{Bmatrix} s \\ x \end{Bmatrix} \quad / ___ \begin{bmatrix} -consonantal \\ -back \end{bmatrix}$$

$$c. (2, 28) \quad V \rightarrow \emptyset \quad / \ + ___ + \begin{bmatrix} V \\ -D \end{bmatrix}$$

$$d. (3, 17) \quad V \rightarrow [lstress] \quad / ___ ([-perfective]) C_0 V C_0 \#]_V$$

$$e. (20) \quad b \rightarrow \emptyset \quad / \ i + ___$$

$$f. (32) \quad \begin{bmatrix} V \\ +low \end{bmatrix} \rightarrow \begin{bmatrix} -low \\ \emptyset back \end{bmatrix} \quad / ___ \begin{bmatrix} -consonantal \\ +high \\ \emptyset back \end{bmatrix} \quad (\text{under certain conditions})$$

$$g. (33) \quad \begin{bmatrix} -consonantal \\ -stress \\ +high \\ \emptyset back \end{bmatrix} \rightarrow \emptyset \quad / \quad \begin{bmatrix} V \\ -low \\ \emptyset back \end{bmatrix} ___$$

$$h. (11) \quad [-sonorant] \rightarrow [-tense] \quad / V ___ [+vocalic] \quad (\text{under certain conditions})$$

$$i. (15) \quad \begin{bmatrix} e \\ +D \end{bmatrix} \rightarrow \emptyset / V \begin{bmatrix} +coronal \\ +anterior \end{bmatrix}_0 _ \#$$

$$j. (12, 23, 26) \quad \begin{bmatrix} v \\ +stress \end{bmatrix} \rightarrow \begin{bmatrix} -high \\ +D \end{bmatrix} / _ _ + \begin{Bmatrix} ndo \\ rV \end{Bmatrix}$$

$$k. (II-59b) \quad \begin{Bmatrix} \acute{e} \\ \acute{o} \end{Bmatrix} \rightarrow \begin{Bmatrix} ye \\ we \end{Bmatrix} \quad (\text{under certain conditions})$$

$$l. (29) \quad \begin{bmatrix} v \\ +high \\ +stress \end{bmatrix}_1 \quad \begin{bmatrix} v \\ +high \end{bmatrix}_2 \Rightarrow \begin{bmatrix} -stress \end{bmatrix}_1 \quad \begin{bmatrix} +stress \end{bmatrix}_2$$

$$m. (6, 36) \quad v \rightarrow [-high] / \left\{ \begin{array}{l} \boxed{[-stress] C_0 \#} \\ \boxed{[+D]} \end{array} \right\}$$

$$n. (II-59f) \quad \begin{bmatrix} -consonantal \\ +high \\ -stress \end{bmatrix} \rightarrow [-vocalic] / \left\{ \begin{array}{l} _ v \\ v _ \end{array} \right\}$$

9. Tense and Lax Vowels

We have postulated the *ad hoc* feature [D] which distinguishes otherwise identical vowels. Anyone familiar with the history of Spanish will have recognized that several of the rules presented here are similar to historical rules, and that, given this similarity, [+D] corresponds to [-tense]. For example, the vowels which diphthongize are reflexes of Latin lax vowels, and it is in the reflex of lax e which is deleted finally after a single dental consonant, etc. I have not taken the step, however, of identifying [+D] as [-tense] and [-D] as [+tense], because I do not believe

that this step can be justified on the basis of the data alone, although it may be justified by extrapolating from the data to general theoretical considerations.

The only careful discussion known to me of the distribution of tense and lax vowels in phonetic representations is that of Navarro Tomás (1965, p. 35ff) for Castilian.¹⁴ Navarro's description, however, does not carry over to any Latin American dialect I have ever heard. In particular, King (1952), whose data is essentially identical to mine, states, in effect, that phonetically tense and lax vowels are in free variation, and he takes some pains to press the point (perhaps because his statements are at variance with Navarro's well known and highly respected work). King has oversimplified slightly, but in any event it seems to me that a detailed study of phonetically tense and lax vowels in Mexican Spanish would be most unrewarding. This is apparently the position taken in Stockwell, Bowen, and Silva-Fuenzalida's (1956) extremely detailed study of another dialect, where discussion of tense and lax vowels is limited to the single statement that "we have been unable to classify the distribution of lax [E] and tense [e] and similar data well enough to include them here, except to assert that they exist..." (p. 408). It is clear that there is absolutely no correlation between tense and lax vowels in systematic phonemic representations and tense and lax vowels in phonetic representations. Therefore, without general theoretical constraints, the choice of a feature in terms of which distinctions are made which are necessary to capture significant generalizations is wholly arbitrary.

We have mentioned at several points that the familiar Latin stress rule seems to play a role in predicting stress in Spanish (cf. Chapter 2,

Section 3.11.3). It is perhaps from this rule that the most cogent theoretical argument can be adduced for the identification of [α D] as [- α tense], since "vowel quantity" (and the derivative notions "strong" and "weak" syllable) figures crucially in this rule.

For the sake of argument, let us accept the correctness of the Latin rule for assigning stress to categories other than verbs.¹⁵ Recall now that rule (38d), the only rule we have proposed so far to assign stress, is quite unlike the Latin stress rule. In particular, (38d) assigns stress only to verbs, and it assigns stress in fixed positions without taking into account vowel quantity.¹⁶ I will present evidence now that this is the correct way to assign stress to verb forms (although (38d) itself may need to be altered).

Consider the paired examples in (39), which show antepenultimate stress in nouns and adjectives but penultimate stress in (synonymous) verbs:

(39)

<u>Noun, Adjective</u>	<u>Verb</u>	<u>Noun, Adjective</u>	<u>Verb</u>
continuo	continúo	práctica	practíca
naufrago	naufrágo	trámite	tramíte
trafago	trafágo	tránsito	transíto
ánimo	anímo	catálogo	catalogógo
fábrica	fabríca	plática	platíca
válido	valído	triángulo	triangúlo
lágrima	lagríma	cálculo	calcúlo
lástima	lastíma	coágulo	coagúlo
página	pagína	intérprete	interpréte
círculo	circúlo	doméstico	domestíco
crédito	(a)crédíto	(in)édito	edíto
íntegra	intégra	réplica	replíca
legítima	legítíma	crítica	crítíca
solicito	colicítto	líquido	liquído
recíproco	recipróco	partícipe	participé
estímulo	estimúlo	equivoco	equivóco
vínculo	vincúlo	síncope	sincópe
próspero	prospéro	título	(en)titúlo
próximo	(a)proxímo	óvalo	oválo
óxido	oxído	pródigo	prodígo

(39) continued

vómito	vomíto	depósito	deposíto
fórmula	formúla	oxígeno	oxigéno
cómputo	compúto	cómodo	(a)comódo
público	publíco	rotulo	rotúlo
júbilo	jubílo	número	numéro
súplica	suplíca	cárcel	(er.)carcélo

The list in (39) can be extended considerably. It is abundantly clear that in order for the Latin rule to assign stress to the antepenultimate vowel in a noun or adjective, the penultimate vowel must be lax, but this same lax antepenultimate vowel is stressed in the related verb; therefore either (a) verbs cannot be stressed by the same rule as nouns and adjectives, or (b) the stressed vowel in verbs is antepenultimate at the time stress is assigned. I know of no reason to suppose that (b) is correct. Let us assume that (a) the identification of [αD] as [-αtense] is theoretically justifiable, (b) stress is assigned to nouns and adjectives by the Latin stress rule (ignoring the problems mentioned in note 15), and (c) stress is assigned to verbs by rule (38d). Then the first case of (40) is just the Latin stress rule, and the second case is (38d):

$$(40) \quad V \rightarrow [1\text{stress}] / \left. \begin{array}{l} \left((C_0(\check{V}C_0^1(L))V)C_0\# \right)_{N,A} \\ \left(([-\text{perfective}]C_0V)C_0\# \right)_V \end{array} \right\} \begin{array}{l} (a) \\ (b) \end{array}$$

There are a number of unclarities in (40), but the following observations will suffice for the moment: first, the outermost set of parentheses in both cases is to allow stress to be assigned to monosyllabic nouns and verbs like té and va; second, the parenthesized L in the first case is intended to express the fact that a consonant plus liquid cluster is "weak," as is shown by íntegro, múltiple, and many other clear examples. I will allow other unclarities to remain.

One might entertain the idea of attempting to achieve somewhat greater generality in the assignment of stress, which would be reflected in a simplification of (40), along the following lines: let us assume that the vowel in the [-perfective] markers ba and ra is in fact lax ǎ. Then we might try to collapse the two cases of (40) by somehow letting the ǎ in case (a) and the imperfective ǎ fall together, eliminating case (b). This will not work, however: consider pairs like náufrágo (noun) vs. naufrágo (verb) and tráfágo (noun) vs. trafágo (verb). Thus, although (40) clearly can be cleaned up a bit, I see no alternative to assigning stress to fixed positions in verbs without regard for vowel quantity.

9.1 The "Cambiar Class" Versus the "Ampliar Class"

We have hypothesized that verbs are always stressed penultimately, except for the first person plural of the imperfect indicative and subjunctive. Henceforth, when "penultimate verb stress" is mentioned, the exceptions just made will be assumed to be understood. Now, there are clearly no verb forms with unstressed penultimate a, e, o. There is, however, a large set of verbs, at least 150, which might at first glance seem to have unstressed penultimate i. We will take cambiar as representative of this class.¹⁷ The phonetic representation of the present indicative and subjunctive and nonfinite forms of cambiar are given in (41):

(41)	<u>Indicative</u>		<u>Subjunctive</u>	
	kámbyo	kambyámos	kámbye	kambyémos
	kámbyas		kámbyes	
	kámbya	kámbyan	kámbye	kámbyen
	<u>Infinitive</u>		<u>Past Participle</u>	<u>Present Participle</u>
	kambyár		kambyádo	kambyándo

If e.g. kámbyo, kámbyas, were /kambio, kambias/ before stress is assigned, they would be incorrectly stressed as *kambío, *kambías, etc. The simplest assumption is that there is no penultimate i at the time stress is assigned: phonetic y is also underlying y, the root being kamby.

The "cambiar class" of verbs may be contrasted with another large class. We will take ampliar as illustrative of this second class.¹⁸ The forms of ampliar relevant to the present discussion are given in (42).

(42)	<u>Indicative</u>	<u>Subjunctive</u>	
	amplío amplyámos	amplíe amplyémos	
	amplías	amplíes	
	amplía amplían	amplíe amplíen	
	<u>Infinitive</u>	<u>Past Participle</u>	<u>Present Participle</u>
	amplýár	amplýádo	amplýándo

Thus the final segment of stems of verbs of the ampliar class must be a vowel, not y. The following sample derivations illustrate the crucial difference between the cambiar class and the ampliar class:

(43)	kamby+atmos	ampli+atmos	kamby+ta	ampli+ta	
	á	á	á	í	(40b)
		y			(38n)
	<u>kambyámos</u>	<u>amplyámos</u>	<u>kámbya</u>	<u>amplía</u>	

Further supporting evidence for this treatment is provided by the following: verbs of the ampliar class may have related nouns or adjectives with (a) penultimate stress; rociar, rocío (verb) and rocío (noun), vaciár,

vacío (verb) and vacío (noun or adjective). Thus the stem has final tense i, and (b) antepenultimate stress; ampliar, amplío (verb) but ámplio (adjective); variar, varío (verb) but váryo (adjective). Thus the stem has final lax I.

Most of the verbs in the cambiar class also have clearly related nouns or adjectives, e.g. cambio [kámbyo] (noun). In contrast to the ampliar class, there are no antepenultimately stressed nouns or adjectives related to verbs of the cambiar class, e.g. *cambio. Complete lack of counterexamples in the 150 or so examples I have collected, which is quite a large sample, is rather strong support for the hypothesis that these verbs have stem final y.

There is still another (marginal) contrast to be accounted for. Consider the (so far as I know unique) verb piar, in which the i is always syllabic, never y. Thus we have such contrasts as bisyllabic piar [piár] versus monosyllabic guiar [gyár] (infinitives), trisyllabic piado [piádo] versus bisyllabic guiado [gyádo] (past participles), and even the completely minimal pair of trisyllabic piara [piára] (imperfect subjunctive of piar) versus bisyllabic piara [pyára] ("herd of animals, especially pigs"). Now if verbs like cambiar have stem final y, verbs like vaciar have stem final tense i, and verbs like ampliar have stem final lax I, it is not immediately obvious what to do about the stem vowel of piar. There is also a synonymous noun pío. I therefore propose an internal noun cycle for piar, roughly as follows:

(44)	$\left[\begin{array}{c} \# \\ \text{V} \end{array} \left[\begin{array}{c} \# \text{pi} \# \\ \text{N} \end{array} \right] \begin{array}{c} \text{a} + \text{rE} \# \\ \text{N} \end{array} \right] \begin{array}{c} \\ \text{V} \end{array}$	Noun cycle:
	<hr style="width: 50%; margin: 0 auto;"/> $\begin{array}{c} \text{í} \\ \text{á} \\ \emptyset \\ * \end{array}$	(40a) Verb cycle: (40b) (38i) (38n) fails

The derivation (44) stops with the incorrect form *piár. In order to get the correct piár we must apparently have a rule ordered after (38n) with the effect of (45):

(45) Erase all stresses but the rightmost in a word

This is a lot of apparatus for one set of verb forms, which might as well be called exceptional and forgotten about. However, I have used this example as an introduction to further data which provide clear independent motivation for cycles internal to verbs and for (45), and piar will be seen not to be exceptional at all. Consider the following examples:

(46) mwéble, "(piece of) furniture"; mobláje, "(set of) furniture, furnishings"
vyéjo, "old"; vejéz, "old age"
dyéstro, "skillful, dexterous"; destréza, "skill, dexterity"

All the stems in (46) obviously have lax vowels which diphthongize when stressed. Now consider the following infinitives:

(47) amweblár, "to furnish (a house, apartment, etc.)"
avyejár, "to get old"
adyestrár, "to make skillful"

Clearly the verbs in (47) have the same stems as the corresponding nouns and adjectives in (46), yet the verbs show unstressed diphthongs. This can be accounted for with an internal cycle. I illustrate with adiestrar:

(48)	$\left[\begin{array}{c} \#a \\ V \end{array} \left[\begin{array}{c} \#dEstr\# \\ A \end{array} \right] \begin{array}{c} a + rE\# \\ A \end{array} \right] \begin{array}{c} \\ V \end{array}$	Adjective cycle:
	$\begin{array}{c} \acute{e} \\ \hline \end{array}$	(40a) Verb cycle:
	\acute{a}	(40b)
	\emptyset	(38i)
	$y\acute{e}$	(38k)
	ye	(45)
	<u>adyestrár</u>	

Stress cycles internal to a word are also needed for categories other than verbs, for example, for superlatives of adjectives: bwénísimo, superlative of bwéno, "good" (cf. bondád, "goodness"); fwertísimo, superlative of fwérte, "strong" (cf. fortaléza, "strength"); and for diminutives of nouns and adjectives: vyejíto, diminutive of vyéjo (cf. vejéz); pweblíto, diminutive of pwéblo, "town" (cf. población, "town, populated area").

9.2 The "Continuar Class" Versus the "Fraguar Class"

In section 9.1 we discussed two classes of verbs whose stems end in a high front nonconsonantal segment. We now consider two classes of verbs whose stems apparently end in a high back nonconsonantal segment. There is a set of 20 or so verbs, of which we take continuar as representative.¹⁹ The phonetic representation of illustrative forms of continuar are given in (49):

(49)	<u>Indicative</u>	<u>Subjunctive</u>	
	kontinúo	kontinwámos	kontinúe
			kontinwémos
	kontinúas		kontinúes
	kontinúa	kontinúan	kontinúe
			kontinúen

It is clear, because of the stress contours illustrated in (49), that verbs of the continuar class have a stem final high back vowel. This vowel is lax U in the stems of obviously related nouns and adjectives which are stressed on the antepenultimate syllable, e.g. continuar, continúo (verb), contínuo (adjective); perpetuar, perpetúo (verb), perpétuo (adjective); individuuar, individúo (verb), indivídúo (noun). The vowel in question is tense u in the stems of obviously related nouns and adjectives which are stressed on the penultimate syllable, e.g. (des)virtuar, (des)virtúo (verb), virtúd(É) (which is the only example I have been able to find).

Verbs of the continuar class may be contrasted with those of the fraguar class, of which I have been able to find only the following examples: fraguar, averiguar, santiguar, amortiguar, apaciguar, atestiguar, atreguar. Forms of fraguar, slightly simplified, are illustrated in (50):

(50)	<u>Indicative</u>		<u>Subjunctive</u>	
	frágwo	fragwámos	frágwe	fragwémos
	frágwas		frágwes	
	frágwa	frágwan	frágwe	frágwen

It is clear that the stems of this class do not end in a vowel, for if they did the stress contour would be *fragúo, *fragúas, etc. Further, there are no related nouns or adjectives like *fragús, while there are related nouns like frágua and trégua. Now observe that the final consonantal segment in every stem is g. Thus, fraguar could have either /fragw-/ or /frag^w-/. At this point in the exposition we have not accumulated sufficient data to discuss these stems further, and we return to a discussion of rounded velar consonants in Chapter 4, Section 3. In any event it is clear that the stems of the fraguar class cannot end in a vowel.

9.3 Let us now return to certain facts which were glossed over in the discussion following the examples of (39). First, we postulated that since stress is assigned to the antepenultimate syllable in e.g. the adjective contínuo and the noun ánimo, the penultimate high vowels must be lax. But we have a rule, the second case of (38_m) which lowers lax high vowels. Yet we do not get *contínuo or *ánimo. Secondly, the penultimate vowels in the nouns intérprete and catálogo must be lax. Yet when these vowels are stressed in the verbs interpreté and catalogó, they do not diphthongize: *interpryéte, *catálwégo.

Having reached a point in the exposition where it will be meaningful to do so, we present the following hypotheses:

(51)

- a. All formatives are subcategorized with respect to the feature [Q].
- b. Items in the lexicon are either unmarked or marked for [Q]. A formative is assumed to be unmarked until one is forced to the conclusion that it is marked. The vast bulk of the lexicon will be unmarked. By convention, [U(nmarked) Q] → [-Q], and [M(arked) Q] → [+Q].
- c. Inflectional formatives (=feature complexes) are automatically assigned the feature [+Q]. (N.B. that [±Q] are features of formatives, not words; [+Q] affixes may be attached to [-Q] stems.)
- d. [+Q] formatives are subject to all phonological rules which [-Q] formatives are subject to. [+Q] formatives are also subject to an additional designated subset of rules which [-Q] formatives

are not subject to. Rules which apply only to [+Q] formatives are not all contiguously ordered; they are interspersed among other rules. Until there is evidence that it is incorrect to do so, rules which apply only to [+Q] formatives will be so designated by mentioning [+Q] in the feature specification of the unit to the left of the arrow, i.e. such rules will be of the form $\left[\begin{array}{c} A \\ +Q \end{array} \right] \rightarrow B/X \underline{\quad} Y$, or, equivalently, $A \rightarrow B/X \left[\begin{array}{c} \overline{+Q} \\ Y \end{array} \right]$.²⁰

There is no need to hide the fact that the distinctions made with the help of the feature [Q] coincide in part with the distinction traditionally made in historical studies among "erudite," "semierudite," and "vulgar" words (cf. Menéndez Pidal (1962, Chapter I), Lapesa (1959, p. 75ff)). To some extent, [+Q] formatives are historically "vulgar," while [-Q] formatives are historically "erudite." I have chosen the neutral terminology "Q," however, since the terms "erudite" and "vulgar" are well established to Romance philology, and the feature [Q] is hypothesized and used entirely without regard for historical data.²¹ Furthermore, the correspondence is actually quite bad: many formatives known to have undergone "vulgar" historical processes are not marked [+Q] for the simple reason that they are not involved in any synchronic alternations which would require that these formatives be marked [+Q].

Returning to the examples with which this section opened, we may now say that the stems continú, anim, interpret, and catalog are not among the small set of lexical items marked for [Q]. That is, none of these stems is assigned the feature [+Q]. Further, we restrict, in the way described in (51d), the second case of rule (38m) and rule (38k) to apply only to segments with the feature [+Q].

We have stated that rule (38h) is applicable "under certain conditions." We may now make the clarification that (38h) applies only to [+Q] segments. (This rule will be discussed further in Chapter 4, Section 3.) Also rule (38f) must be restricted to [+Q] segments, since it does not apply to words like causa, laurel, auditorio, naípe, bails, gaita. As the exposition proceeds, other rules with the same restriction will be discussed.

We close the present discussion of [Q] with the observation that (51) is by no means an empty trick. In particular, (51), with the associated conventions concerning features which are distributed over all segments of a morpheme, makes the empirically falsifiable claim that there are no lexical entries in which one segment is subject to some [+Q] rule while another segment is not subject to the same or another [+Q] rule. (This can be interpreted to mean that there is no synchronic analog to historically "semi-erudite" words.)

10. Vowel Alternations in Third Conjugation Verbs

The only vowel alternations that occur in stems of otherwise regular first and second conjugation verbs are E-ye and O-we. In third conjugation verbs, however, there are other stem vowel alternations, which we will examine in this section. We will not be concerned with verbs with consonantal alternations that are traditionally considered to be irregular.

10.1 Stems with Back Vowels.

There are a few third conjugation verbs whose stem vowel is a, e.g. abrir, partir. This stem a never alternates with any other vowel, hence these verbs will not be considered further.

It is a striking fact that, with the exception of dormir and morir, which we examine immediately below, all other third conjugation verbs with back stem vowels have just the vowel u.²² The list in (52) is as exhaustive as I have been able to make it:

(52)

huir	aducir	bruñir	cumplir	deglutir
enfurtir	reducir	hundir	luir	muñir
infurtir	conducir	bullir	tullir	sufrir
cundir	producir	ungir	fundir	aludir
retundir	traducir	cubrir	infundir	eludir
incumbir	sumir	descubrir	difundir	coludir
sucumbir	asumir	encubrir	confundir	curtir
fluir	resumir	tupir	percutir	encurtir
influir	presumir	entupir	acudir	escurrir
interrumpir	consumir	pungir	recudir	incurrir
prorrumpir	cundir	compungir	sacudir	ocurrir
fruncir	embutir	escupir	mullir	recurrir
nutrir	uncir	subir	surtir	concurrir
urdir	aburrir	crujir	esculpir	gruir
rugir	zurrrir	urgir	aturdir	derruir
lucir	engullir	gruñir	suplir	zurcir
unir				

No vowel other than u ever occurs as the stem vowel in any inflected form in any of the verbs in (52). In other words, all these verbs are inflected exactly as illustrated with unir in Sections 2 through 8.

There are, however, some cases of alternations in these stems in categories other than verbs. For example, the root of mullir, "to soften," occurs with the diphthong we in the adjective mwelle, "soft." This suggests underlying lax Q which is raised and tensed in the verb, but not in the adjective. Hundir, "to sink, submerge," may share a formative with the adjective hondo, "deep." This suggests underlying U or o, raised and tensed in the verb, but not in the adjective. Although there are few

alternations of this sort (and even fewer crystal clear ones), it is surely no accident that only u appears in these verbs. If this is true, then we need a rule with the effect of (53):

$$(53) \quad \begin{bmatrix} V \\ +back \\ -low \end{bmatrix} \rightarrow \begin{bmatrix} +high \\ +tense \end{bmatrix} \quad \text{in 3rd conjugation verb stems}$$

If such a rule is in the grammar nothing further must be added to handle the examples in (52).

We now turn to dormir and morir. The same alternations occur in both verbs, so I will illustrate only dormir (also because all the forms of dormir are "regular"; while the past participle of morir is irregular: muerto).

(54)	<u>Infinitive</u>	<u>Past Participle</u>	<u>Present Participle</u>	
	dormír	dormído	durmiéndo	
	<u>Present</u>			
	<u>Indicative</u>		<u>Subjunctive</u>	
	dwérmo	dormímos	dwérma	durmámos
	dwérmes		dwérmas	
	dwérme	dwérmen	dwérma	dwérman
	<u>Imperfect</u>			
	<u>Indicative</u>		<u>Subjunctive</u>	
	dormía	dormíamos	durmiéera	durmiéramos
	dormías		durmiéeras	
	dormía	dormían	durmiéera	durmiéeran

(54) continued

Preterit

dormí dormímos
 dormíste
 durmíó durmíéron

The distribution of u, o, and we can be stated as follows: only we occurs under stress; both u and o occur unstressed, but only o occurs in the environment ...í. Since we must have a rule with the effect of (53) in any event, let us suppose that this rule is quite general and applies to all forms of dormir (and morir) as well as to forms of the verbs of (52). Then, for the occurrence of we we need some rule with the effect of (55), which precedes (38k), diphthongization.

(55) ú → ó in some environment

Then, to account for the occurrences of unstressed o, we would need a rule with the effect of (56):

(56) u → o / Coí

Since (56) applies to none of the verbs in (52) it must be restricted in some way.²³ We will clarify this, as well as state (53) and (55) properly when we examine the vowel alternations in third conjugation verbs whose stem final vowel is non-back.

10.2 Third Conjugation Verbs With Front Vowels.

These fall into several classes.

10.2.1 We will consider first those verbs which are traditionally considered

to be "regular." These may be divided into two subclasses, the first consisting of stems whose final vowel is i in all verbal forms (including infinitives and participles) and also in clearly related nominalizations, if such exist. (57) is an exhaustive list of this subclass, as far as I know..

(57)

e-	}	scribir (inscrip <u>ci</u> ón)	a-	}	fligir (infl <u>ic</u> ión)	
in-			in-			
sub-			}	o-	}	mitir (om <u>i</u> sión)
des-				de-		
trans-				di-		
pro-	re-					
pre-	ex-	}	per-			
ex-	pro		trans-			
in-	}	hibir (exhib <u>i</u> ción)	ad-	}	cidir (dec <u>i</u> sión)	
co-			de-			
ex-	}	igir	coin-	}	stringir (constr <u>i</u> cción)	
trans-			a-			
pre-	}	sidir	re-	}		
re-			con-			

(57) continued

a-	}	s <u>i</u> stir	dis-	}	tinguir (dist <u>i</u> nción)
per-			ex-		
in-			pre-	}	sc <u>i</u> ndir
re-			re-		
sub-			refr <u>i</u> ngir		
ex-			f <u>i</u> ngir		
de-			el <u>i</u> dir (el <u>i</u> sión)		
con-			div <u>i</u> dir (div <u>i</u> sión)		
esgr <u>i</u> mir	v <u>i</u> vir				
defin <u>i</u> r	(defin <u>i</u> ción)				

Stems of verbs in the second subclass have i in all verbal forms, but e in clearly related adjectives, nominalizations, agentive nouns, etc. This subclass is given in (58).

(58)

re-	}	c <u>i</u> bir (re <u>e</u> cpción, re <u>e</u> ptor)	o-	}	pr <u>i</u> mir (op <u>r</u> esión, op <u>r</u> esor)
per-			im-		
aper-			com-		
red <u>i</u> mir	(red <u>e</u> nción, red <u>e</u> ntor)	de-			
ex <u>i</u> mir	(ex <u>e</u> nción, ex <u>e</u> nto)	re-			
dir <u>i</u> gir	(dir <u>e</u> cción, dir <u>e</u> ctor)	su-			
er <u>i</u> gir	(er <u>e</u> cción, er <u>e</u> ctor)				

Because of contrasts like inscribir-inscripción (57) but recibir-recepción (58), afligir-aflicción (57) but dirigir-dirección (58), I hypothesize that the stems in (57), which always exhibit i, have underlying /i/, but those

in (58), which exhibit i in verbs and e in other categories, have underlying /e/, which is raised and tensed in verbs, but not in nouns and adjectives. Thus rule (53) may be simplified to apply to all non-low vowels, as in (59), which replaces (53).

(59) $\begin{bmatrix} \text{v} \\ \text{-low} \end{bmatrix} \rightarrow \begin{bmatrix} \text{+high} \\ \text{+tense} \end{bmatrix}$ in 3rd conjugation verb stems

10.2.2 We now examine the third conjugation verbs with front vowel alternations which are generally classified as "irregular" in reference and school grammars. Like the verbs discussed in Section 10.2.1, these verbs also fall into subclasses.

10.2.2.1 For convenience, let us refer to the first subclass as the "pedir class." The verbs in the pedir class are listed in (60):

(60)

im-	} pedir	com-	} pedir	e-	} legir	con-	} seguir	son-	} reír
des-		re-		co-		pro-		Ø-	
Ø-		derr <u>e</u> tir		gemir		per-		cor-	
u <u>e</u> dir		con <u>e</u> bir		fr <u>e</u> ír		Ø-		Ø-	

I illustrate this class with pedir in (61):

(61)

	<u>Infinitive</u>	<u>Past Participle</u>	<u>Present Participle</u>
	pedir	pedido	pidiendo

(61) continued

Present

<u>Indicative</u>		<u>Subjunctive</u>	
p <u>í</u> do	ped <u>í</u> mos	p <u>í</u> da	pid <u>á</u> mos
p <u>í</u> des		p <u>í</u> das	
p <u>í</u> de	pid <u>en</u>	p <u>í</u> da	pid <u>án</u>

Imperfect

<u>Indicative</u>		<u>Subjunctive</u>	
ped <u>í</u> a	ped <u>í</u> amos	pid <u>í</u> era	pid <u>í</u> eramos
ped <u>í</u> as		pid <u>í</u> eras	
ped <u>í</u> a	pid <u>ían</u>	pid <u>í</u> era	pid <u>í</u> eran

Preterit

ped <u>í</u>	ped <u>í</u> mos
ped <u>í</u> ste	
pid <u>í</u> ó	pid <u>í</u> eron

The distribution of stem e and i is the following: e occurs when there is a stressed i in the following syllable, i occurs otherwise. Thus it is seen that (56) must be extended (simplified) to apply to both front and back vowels. We replace (56) with (62).

(62) $V \rightarrow [-\text{high}] / \text{ ___ } C_0 \acute{}$

Rule (62) still must be restricted in some way so that it does not apply to the verbs of (57) and (58) -- nor to those of (52). Contrasts like (con)cebir versus (re)cibir, (cor)regir versus (di)rigir, and gemir versus

oprimir indicate that the applicability of (62) must be determined by some lexical subcategorization. We go into this further below.

Given the existence of (59), which raises and tenses all non-low stem vowels in third conjugation verbs, the underlying stem vowel of the verbs in (60) could be any non-low front vowel. There are, however, the following alternations: concibo (verb), concepción, concepto (noun); corrijo (verb), corrección (noun), correcto (adjective); elijo (verb), elección (noun), electo (adjective), elector (noun); consigo (verb), consecución (noun). We hypothesize, then, that stems with such alternations have underlying stem e or E, which is raised and tensed by (59) in verbal forms but not in other categories. For the stems in (60) which show no such alternations, we make the simplest assumption, namely, that the underlying stem vowel is i.

10.2.2.2 We consider now the "servir class," whose members are listed in (63):

(63)

servir

in-	}	vestir	a-	}	embestir	rendir	henchir	
re-			con-		streñir	teñir	heñir	ceñir
∅			a-				reñir	

Verbs of the servir class have exactly the same vowel alternations as those of the pedir class. I have, however, separated the two classes on the following basis, the reason for which will be apparent later: verbs in the

pedir class have at most a single consonant following the stem vowel; verbs in the servir class have a stem-final consonant cluster (...vestir, servir, embestir, rendir, henchir) or ñ, which may derive from a consonant cluster at an earlier level of derivation.

There are few alternations in these stems in categories other than verbs, which would indicate clearly what the underlying stem vowels should be. We may, however, mention the following possibilities. The verb servir, with sírvo, sírvamos, sírviera, etc., which means "to serve," may be related to the noun syérvo, which means "slave," or in a highly specialized religious sense, "servant." If this is correct, then the stem is /sErv/, the vowel being raised and tensed by (59) and in some forms dissimilated back to e by (62) in verbal forms, but not in the noun. For clarity, I illustrate in (64):

(64)	<u>Noun</u>	<u>Verb</u>	<u>Verb</u>	
	sErvt+o	sErvt+i+o	sErvt+i+mos	
		i	i	(59)
		ø		(38c)
	é	í	í	(38d)
	yé			(38k)
			e	(62)
	<u>syérvo</u>	<u>sírvo</u>	<u>servímos</u>	

The verb reñir, "to quarrel, wrangle" seems clearly to be related to the noun riña, "quarrel, wrangle." In this case the simplest assumption is that the underlying stem vowel is i, and the derivation of both noun and verb forms is straightforward except for the question of the underlying

representation of phonetic \tilde{n} .

In short, stems of both the pedir and servir classes of verbs may have either high or mid front underlying vowels. In the absence of any alternations which indicate the contrary, we assume that the vowel in question is i, since this is the simplest assumption.

10.2.2.3 Members of the "herir class" are listed in (65):

(65)

ad-	} <u>herir</u>	con-	} <u>ferir</u>
Ø-		de-	
su-	} <u>zerir</u>	di-	
di-		in-	
in-		pro-	
requerir		trans-	
		re-	
		pre-	

I illustrate with herir:

(66)

<u>Infinitive</u>	<u>Past Participle</u>	<u>Present Participle</u>
<u>herir</u>	<u>herido</u>	<u>hiriendo</u>
	<u>Present</u>	
<u>Indicative</u>	<u>Subjunctive</u>	
<u>hyéro</u> <u>herimos</u>	<u>hyéra</u>	<u>hirámos</u>
<u>hyéres</u>	<u>hyéras</u>	
<u>hyére</u> <u>hyéren</u>	<u>hyéra</u>	<u>hyéran</u>

		<u>Imperfect</u>		
<u>Indicative</u>			<u>Subjunctive</u>	
hería	heríamos		h <u>ir</u> iera	h <u>ir</u> iéramos
herías			h <u>ir</u> ieras	
hería	herían		h <u>ir</u> iera	h <u>ir</u> iéran

<u>Preterit</u>	
herí	herimos
heríste	
h <u>ir</u> ió	h <u>ir</u> ieron

Thus the distribution of y, e, and i exactly parallels that of we, o, and u illustrated in (54). That is, only y occurs under stress; both i and e occur unstressed, but only e occurs in the environment ____...i. Accordingly, (55) is replaced by (67):

(67) $\acute{v} \rightarrow \begin{bmatrix} \text{-high} \\ \text{-tense} \end{bmatrix}$ in some environment

Rule (67), like (55), is ordered before (38₁), diphthongization. We will not be able to specify the environment of (67) until we have completed the survey of third conjugation verb subclasses. For clarity I give sample derivations of some forms of herir in (68), where i stands for some non-low front vowel.

(68)	hír+i	hír+i+mos	hír+i+a+mos	
	i	i	i	(59)
			∅	(38c)
	í	í	á	(38d)
	é			(67)
	yé			(38k)
	e			(38m)
		e		(62)
	<u>nyére</u>	<u>nerímos</u>	<u>hirámos</u>	

10.2.2.4 Members of the "sentir class" are listed in (67):

(67)			
con-	} <u>sentir</u>	in-	} <u>vertir</u>
pre-		ad-	
re-		con-	
a-		di-	
di-		contro-	
∅-		per-	
mentir		arrepentir	
hervir			

Verbs of the sentir class have exactly the same vowel alternations as those of the herir class. I have separated the two classes on the basis of the fact that the stems in the herir class end in a single consonant, namely r, while those of the sentir class end in a consonant cluster.

With the exception of a few idiosyncratic (defective, etc.) verbs to be mentioned below, this completes the survey of subclasses of third conjugation verbs with front stem vowels.

10.3 We have seen that just three rules, (59), (67), and (62) -- in this order -- must be added to an independently motivated grammar in order to account for all the vowel alternations in the stems of third conjugation verbs. These three rules must now be refined, and made to work properly. We postpone further discussion of (59) until after the treatment of the constituent structure of verbs in Section 11.

Let us now look more closely at (67). This rule must apply to just the following verbs (and the classes they represent): morir, dormir, herir, sentir. This means that (67) applies to stressed vowels in the following environments:

- (70) a. ___rV
 b. ___rm, ___rv, ___rt ($\stackrel{?}{=} \text{___r} \begin{bmatrix} +\text{consonantal} \\ +\text{anterior} \end{bmatrix}$),
 c. ___nc

But (67) does not apply to all stressed vowels in the environments of (70). We find counterinstances in forms of the following verbs:

- (71) a. ___rV: none
 b. ___r $\begin{bmatrix} +\text{consonantal} \\ +\text{anterior} \end{bmatrix}$: -furtir, urdir, aburrir, currir, surcir, aturdir, -curtir, -currir, curcir, servir
 c. ___nc: none

But consider the following: all the verbs which undergo (67) also undergo (38k), diphthongization. We know that (38k) is a [+Q] rule. Let us assume then that (67) is also [+Q], and, of course, that all the verbs affected by (67) are [+Q]. Now, there is no reason to assign the feature [+Q] to any of the verbs in (71), so we may replace (67) with (72):

$$(72) \quad \begin{bmatrix} v \\ +\text{stress} \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -\text{high} \\ -\text{tense} \end{bmatrix} / \left. \begin{array}{l} rV \\ r \begin{bmatrix} +\text{consonantal} \\ +\text{anterior} \end{bmatrix} \\ nt \end{array} \right\}$$

We now note that (72) is strikingly similar to (38j), which, for the convenience of the reader, we repeat (with trivial notational changes) as (73):

$$(73): \quad \begin{bmatrix} v \\ +\text{stress} \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -\text{high} \\ -\text{tense} \end{bmatrix} / \text{---} + \left\{ \begin{array}{l} ndo \\ rV \end{array} \right\}$$

Since both (72) and (73) must be ordered before (38k), let us investigate the consequences of collapsing the two former rules as (74):

$$(74) \quad \begin{bmatrix} v \\ +\text{stress} \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -\text{high} \\ -\text{tense} \end{bmatrix} / \text{---} \left\{ \begin{array}{l} rV \\ \begin{bmatrix} +\text{consonantal} \\ +\text{sonorant} \end{bmatrix} \quad \begin{bmatrix} +\text{consonantal} \\ +\text{anterior} \end{bmatrix} \end{array} \right\}$$

If (74) is correct, not only are the third conjugation vowel alternations accounted for, but they are also predicted, since every feature in (74), which is simply a generalization of (73), was proposed on the basis of data which did not include the alternations in question. In spite of its great generality, no arguments against (74) come immediately to mind, although such a strong hypothesis should be easy to disconfirm. It is quite possible that I have overlooked examples which would require some modification of

Let us now examine rule (62). We have already observed that the applicability of (62) must be determined by some lexical subcategorization. One would hope that this subcategorization could be in terms of the feature [Q], but this seems not to be the case. Rather, each lexical item must be specially marked with respect to this rule. Compare [+Q] heruir with [-Q] servir, both of which undergo (62); [-Q] residir with [+Q] recibir, neither of which undergoes (62); presumably the same stem in both [-Q] (di)rigir and [-Q] (cor)regir. The only plausible conclusion is that (62) is a minor rule which applies only to certain specially marked lexical items.²⁵

10.4 Idiosyncratic Verbs

To conclude this discussion, I make the following comments about highly idiosyncratic third conjugation verbs.

Divergir and sumergir have no alternations at all; the stem vowel is e in all forms. Apparently these verbs are [-Q], and their real irregularity is that they are exceptions to rule (59).

Discernir and concernir are defective, and I have not been able to find a single native speaker who knows what the forms are. According to the Vox dictionary the only forms of concernir in use are the infinitive, third person singular present indicative concierno and imperfect indicative concernía, and the present participle concerniendo. The last form shown this verb to be an exception to (59) (*concerniendo).

Agredir and aguerrir are defective, and there is no consensus concerning which forms are in use.

Erguir, about which speakers are uncertain, has, according to the authorities, two sets of forms, one set belonging to the herir class (yergo, yergues, etc.), the other belonging to the pedir class (irgo, irgues, etc.). Presumably the first set is [+Q], and the second [-Q].

The stem -quirir, occurring only in adquirir and inquirir (cf. requerir in the herir class) is unique in that it undergoes (74) but not (62): adquiero, adquieres, adquieran, etc., but adquirimos, adquiría, adquiriste, etc.

In short, we see that the third conjugation vowel alternations, which have long puzzled scholars, can be handled quite naturally by sub-categorizing formatives with respect to whether or not they undergo just three ordered rules, even in highly idiosyncratic and even unique cases. Of these three rules, only one is a minor rule, that is, a rule which applies only to specially marked exceptional cases. One could scarcely hope for better (or even as much) in a domain in which historical change is known to have wrought havoc (cf. Malkiel (1966)).

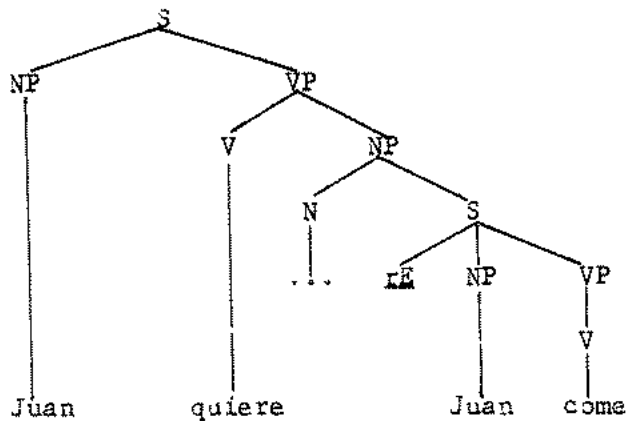
11. Syntactic Excursus

This is a study of the phonology of a particular dialect of Mexican Spanish. It is not intended as a contribution to syntactic theory in any sense. There are, however, points which have been glossed over in the exposition thus far, as well as matters to be examined below, whose clarification depends crucially on a certain amount of discussion of syntax. Given (a) the scope of this study, and (b) the extremely unsettled state of syntactic theory at this writing, I will try to be as neutral as possible on controversial points; i.e., I will present a few facts relevant to the

phonology of verb forms which any descriptively adequate syntax of Spanish must have the machinery to handle, and remain silent about the exact nature of this machinery. Familiarity with recent work in syntax of Chomsky, Lakoff, Postal, Rosenbaum, and Ross is assumed.

There can be no doubt that the principles of "noun phrase complementation" and "verb phrase complementation," in the sense of Rosenbaum (1965, 1967), are quite similar in Spanish and English. Thus we may say that the -rE infinitival ending in Spanish is syntactically analogous to the to in "for-to" complements in English. For example, the sentence Juan quiere comer, "John wants to eat," has, at an early stage of derivation, roughly the following structure (where -rE stands for a bundle of syntactic features):

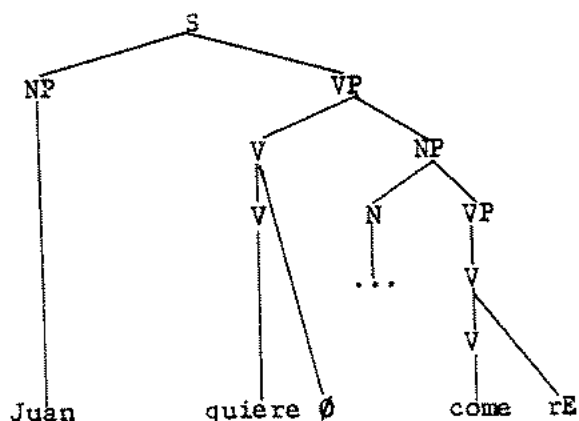
(75)



several transformations, among them "Equi-NP deletion" (which deletes one of the instances of Juan), "Complementizer placement" (which places the infinitival complementizer rE to the right of the verb stem come), and "person-number agreement" (which attaches the person and number features of the subject Juan onto the main verb quiere), map (75) onto the derived tree (76). (I hold no brief for any particular detail of this derived

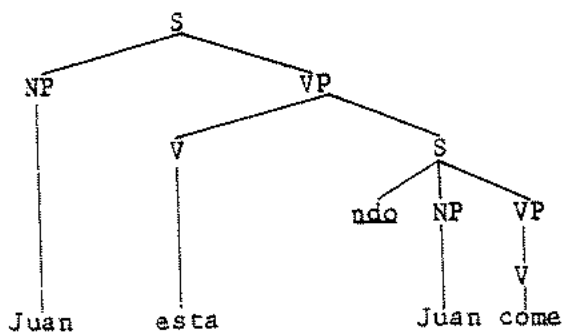
structure.)

(76)

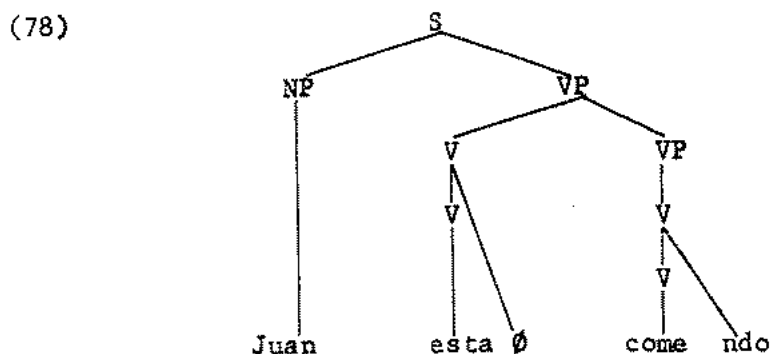


English "-ing" complements are matched, roughly, by -ndo complements in Spanish. For example Juan sigue comiendo, "John keeps on eating, John continues to eat." I know of no reason to treat Spanish esta- -ndo ("be -ing") complement structures differently from any other -ndo complement: estar does not behave differently from other verbs that take -ndo complements with respect to negation, interrogative formation, or anything else that might be considered motivation for treating "be -ing" differently from, say, "insist on -ing" in English. I assume then, that all verbs, including estar, which take -ndo complements are main verbs in some underlying sentence, just as are all verbs which take infinitival complements. The sentence Juan está comiendo, "John is eating," has, then, at an early stage of derivation, roughly the structure shown in (77), where ndo, like rE, stands for a bundle of syntactic features.

(77)



The structure (78) is derived from (77) in essentially the same way (76) is derived from (75): (Again, it is irrelevant to the present discussion whether the details of (78) are correct or not.)



There seems to be no motivation in Spanish for distinguishing a class of "modals." There simply is no class of verbs in Spanish which, like the class of "modals" in English or German, has inflectional peculiarities, cannot occur in the perfect tenses, behaves differently in negation, interrogative formation, imperatives, and whose members exclude one another. If there are no modals, and if it is correct to treat estar always as a full verb, then we are left with, at most, haber, "have," as an auxiliary verb in Spanish.²⁶ We will not argue at this point that even haber should be a main verb in deep structures, the past participial ending -to falling in with -re and -ndo as a complementizer. Note, however, that the "perfect auxiliary" haber is a verb, and must be categorized as such, since (a) haber takes the full gamut of verbal inflections, and (b) if it does not belong to the category V, then an unknown but presumably large number of transformation must be complicated to the extent of mentioning haber (and only haber) in the same term of their structural descriptions as V.

(81) [# [# [#amta#] ba#] mos#]
 V V V V V V

Since we have found motivation for word-internal phonological cycles in only a few denominal or deadjectival verbs like piar, amueblar, and aviejar, the set of "readjustment rules" must apparently also contain devices which simplify structures like (80) or (81) to representations like (82):

(82) [#amta+ba+mos#]
 V V

Now suppose that, rather than being Chomsky-adjoined, inflectional features and features of complementizers are added to the complex symbol of the verb stem. In this case, after application of the relevant agreement and/or affix transformations there will be "segmentalization rules" which map the expanded complex symbol dominated by V into a sequence of formatives like that of (79)-(81). This and other alternatives to the previous discussion of the constituent structure of verb forms will not be discussed further, because of lack of empirical evidence, syntactic or phonological, which might have a bearing on the issues involved. The immediate relevance of this discussion of syntax will become obvious in Section 12.

12. The Future²⁸

12.1 The Future Endings

All verbs, without exception, take the same future endings. These endings are illustrated in (83).

(83)	<u>First Conjugation</u>	<u>Second Conjugation</u>	<u>Third Conjugation</u>			
	amaré	amarémos	comeré	comerémos	uniré	unirémos
	amarás		comerás		unirás	
	amará	amarán	comerá	comerán	unirá	unirán

It has long been noted, and is stated in every school grammar, that the future endings have the same phonetic shape as the present indicative of the highly (irregular) "auxiliary" haber,²⁹ whose forms are given in

(84):

(84)	he	[é]	hemos	[émos]
	has	[ás]		
	ha	[á]	han	[án]

The traditional statement is that the future is formed by adding the present indicative forms of haber to the infinitive. This is obviously a good mnemonic device, but, to my knowledge, not a scintilla of synchronic evidence has ever been presented in a serious study to show that the stem is actually the infinitive and the endings are actually forms of haber -- not even the argument that it is unlikely that the identical irregularities of the future endings and of haber are due to chance.³⁰ It is indeed unlikely that these forms are identical by sheer chance, and further, in suppletive verbs, e.g. ir (present indicative voy, vas, va, etc., preterit fui, fuiсте, fue, etc.), the same form appears in both the infinitive and the stem of the future (iré, irás, etc.), which stretches the long arm of coincidence even further.

There is, I believe, substantial synchronic syntactic evidence for the traditional analysis of future forms, in addition to the suggestive

coincidences just mentioned. Consider the following sentences, in which haber is rather clearly a main verb (obviously not the perfect auxiliary), and in which the construction haber de verbar (verbar = an arbitrary infinitive) expresses a plausible conjecture.

(85) a. Ha de estar aquí ahora

be here now = "He's probably here now"

b. Ha de tener como 40 años

have like years = "He must be about 40 years old"

Now it is also common in Spanish for a future verb form to be used to express a conjecture about the present:

(86) a. Estará aquí ahora

will-be here now = "He's probably here now"

b. ¿Estará aquí ahora? = { "I wonder if he's here now"
"Do you suppose he's here now?" }

c. Tendrá como 40 años

will-have = "He's probably about 40 years old"

In (85) and (86) ha (he, has, etc.) de verbar is entirely synonymous with verbará (verbaré, verharás, etc.). It should be noted, however, that there are instances of these two expressions which do not seem to be entirely synonymous. Consider (87):

(87) a. Juan ha de cantar mañana "John is to sing tomorrow"

b. Juan cantará mañana "John will sing tomorrow"

There seems to be the same difference between Spanish ha de verbar and verbará in sentences like (87) as there is between English "is to verb" and "will verb," whatever this difference is.

However one feels about (87), the following are unblinking facts:

- (88) a. The future endings are phonetically identical to the present indicative forms of haber, a wild coincidence of idiosyncratic forms.
- b. In cases of suppletion the infinitive and the future stem are the same.
- c. The final stressed syllables in the future forms are anomalous.
- d. Haber is a main verb in some sentences.
- e. Haber can take an -rE (infinitival) complementizer.
- f. In conjectural sentences, ha (he, etc.) de verbar = verbará (verbaré, etc.).

The conjunction of these six facts makes a very strong case for saying that verbará is simply ha de verbar with the forms of haber permuted to the right of the infinitive, and the de deleted.

Let us pause to compare the merits of this vaguely stated proposal with those of two plausible alternatives.

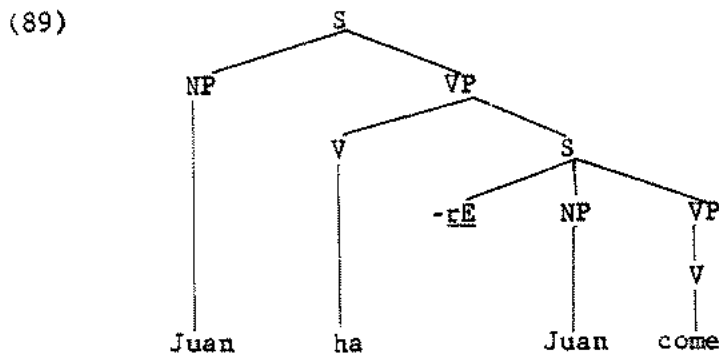
The first alternative is that the future has nothing to do with haber. The future endings ré, rás, rá, remos, rán are simply the phonological shapes given to the syntactic feature [+future] plus the person-number features. These endings are attached to the same base the other inflectional endings are. Even without looking closely at syntax, it is easily seen that this alternative poses several problems:

1. Ad hoc phonological rules are required to derive the correct phonetic shape of the endings. In other words, one cannot take advantage of the fact that the grammar must handle (somehow) the irregularities of haber once in any event.
2. One claims, in effect, that in cases of suppletion it is fortuitous that the infinitive and the future have identical stems.
3. One must resort to some ad hoc device to assign stress to the final syllable of four of the five future forms.
4. One must claim that in conjectural sentences the synonymy of ha de verbar and verbará is due to lexical synonymy or that it is fortuitous.

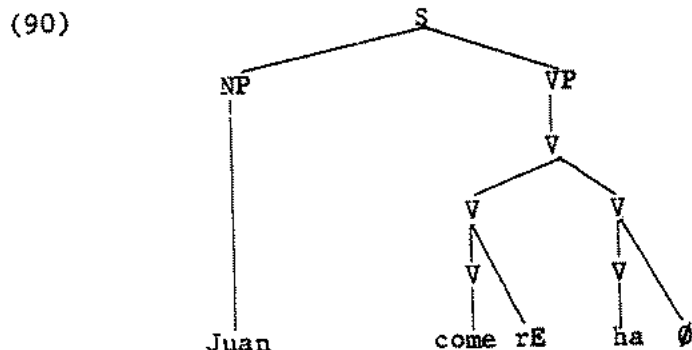
The second alternative is that of Stockwell, Bowen, and Martin (1965, Chapter 6).³¹ They propose that the future endings are in fact the present indicative forms of haber, which is dominated by Aux (rather than by V), and which is permuted to the right of the main verb in the future forms.

What Stockwell et al. fail to account for is that the future endings (= haber) must be attached to the infinitive, not to the stem that the other tense-mode-aspect formatives are attached to. Thus, in this analysis, either one must introduce ad hoc phonological rules to insert /r/ in the correct position of the future forms or one must introduce as an expansion of Aux not only (haber - PastPart) but also (haber - rE), and then somehow get everything in the right place. But this is an otiose duplication of machinery: haber as a main verb must be allowed in any event, and -rE complementizers must be in the grammar in any event, for an enormous class of verbs, not just haber.

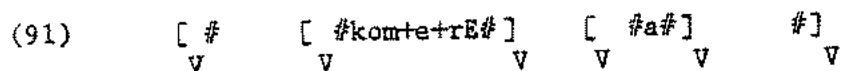
I will now be slightly more precise about my proposal to take account of the facts listed in (88), and at the same time avoid the difficulties which beset the alternatives which have been sketched. I propose that the derivation of a sentence such as Juan comerá, "John will eat," will include the structure which can be represented roughly as (89). For simplicity I disregard the origin and subsequent deletion of de, which poses no problem in principle.



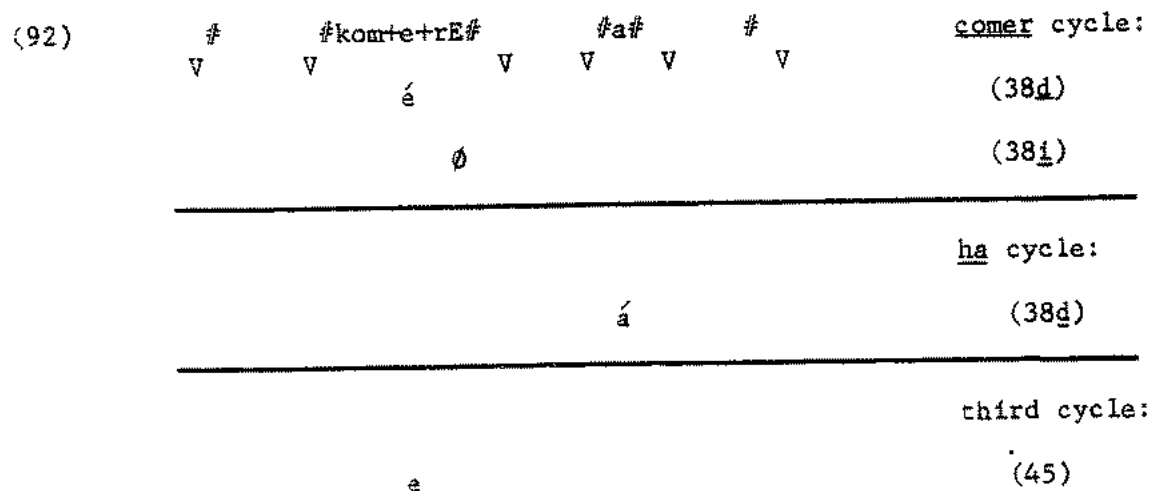
The derivation of Juan comerá must apparently yield the surface structure which can be represented roughly as (90):



Insertion of # and the application of "readjustment rules" of the sort referred to on p. 127f convert the configuration dominated by the uppermost V node in (90) into the configuration which can be represented as (91):



With such a representation as (91) the apparently anomalous stress contour of comerá will be assigned by independently motivated rules which we already have in the grammar. This is illustrated in (92).



(94)	<u>Infinitive</u>	<u>Future Stem</u>
a.	poder	podr-
	saber	sabr-
	caber	cabr-
	querer	querr-
	haber	habr-
b.	salir	saldr-
	tener	tendr-
	poner	pondr-
	venir	vendr-
	valer	valdr-
c.	hacer	har-
	decir	dir-

The stems in (94) can be characterized as follows: those under a consist of the infinitive minus the theme vowel; those under b have a d inserted in the place of the theme vowel of the infinitive; those under c consist of the infinitive minus the theme vowel and also minus the final root consonant (the g in the infinitive decir is the result of rule (62)). In short, to handle these forms, we apparently need rules which (a) delete the theme vowel in all three groups, (b) insert d in the second group, and (c) delete the final root consonant in idiosyncratic hacer and decir.

It is an interesting fact that all the verbs in (94) have some other irregularity in addition to the future stem. For example poder has the irregular preterit pude, puviste, pudo, etc.; saber has the irregular

first person singular present indicative sé and the irregular preterit supe, supiste, supo, etc.; haber is completely idiosyncratic; all the verbs in groups (b) and (c) have irregular imperatives, and irregular first person singular present indicative forms (cf. valer: valgo versus regular moler: muelo; hacer: hago versus regular mecer [mesér]: mezo [méso]). One would like to find some general property, say the feature [+Q], which these verbs share in terms of which their several irregularities might at least be in part accounted for. It does not seem, however, that this expectation can be fulfilled at the present state of our knowledge. In particular, the feature [Q] does not make the proper distinctions, as can be seen from one of the examples just given - molar, muelo - where the diphthong in the latter form indicates that the stem is [+Q]. It seems then that the rule which deletes the theme vowels in these twelve irregular future stems must be a "minor" rule, i.e. one which applies only to specially marked formatives. Let us state this rule as in (95), as a first approximation:

(95)
$$V \rightarrow \emptyset / +___+rE\#[+future]$$

There seems to be no reason why (95) cannot be amalgamated with (38c), although the motivation for doing so is not overwhelming.

A more satisfactory rule can be given for the insertion of d in the stems of group b. The final root consonants in this group are n and l, which class is characterized by [+consonantal, -obstruent, -continuant]. None of the verbs in groups a and c have root final n or l. Thus we may order rule (96) after (95):

$$(96) \quad \emptyset \rightarrow d / \left[\begin{array}{l} +\text{consonantal} \\ -\text{obstruent} \\ -\text{continuant} \end{array} \right] \text{---}^r$$

We are now left with hacer and decir. These verbs are so wildly idiosyncratic throughout their paradigms that little purpose would be served by examining them further at this point.

13. Further Clarifications and Summary of Rules

13.1 Conjugational Classes and Theme Vowels

The conjugational class of a verb is unpredictable, i.e. a lexical property of each verb stem in the dictionary. Therefore it is reasonable to assume that one of the features [1conj], [2conj], [3conj] is a lexical feature of every verb stem. These features also play a role in derivational morphology: first conjugation tolerar, "tolerate," tolerancia, "tolerance," tolerable, "tolerable," tolerante, "tolerant"; second conjugation creer, "believe," creencia, "belief," creible, "credible," creyente, "believer."

It has been assumed all along in this study (cf. in particular the discussion of "readjustment rules" at the end of Section 11) that theme vowels do not appear as such in the lexicon. Rather, they are "spelled out" by a readjustment rule with the effect of (97):

$$(97) \quad \emptyset \rightarrow \left\{ \begin{array}{l} a/[1\text{conj}] \\ e/[2\text{conj}] \\ i/[3\text{conj}] \end{array} \right\} + \text{---}^{\#} \text{---}^v$$

The effects of (97) are illustrated in (98):

$$(98) \quad \left[\begin{array}{c} \# \\ \text{/am/} \\ \text{[1conj]} \\ \text{V} \end{array} \right] \rightarrow \left[\begin{array}{c} \# \text{am} \text{a} \# \\ \text{V} \quad \text{V} \end{array} \right]$$

$$\left[\begin{array}{c} \# \\ \text{/kom/} \\ \text{[2conj]} \\ \text{V} \end{array} \right] \rightarrow \left[\begin{array}{c} \# \text{kom} \text{te} \# \\ \text{V} \quad \text{V} \end{array} \right]$$

The formulation of (97) leaves something to be desired. For instance, it is interesting that a, the least marked vowel, is the theme vowel of the least marked conjugational class, namely the first, (which is the largest by far, the most regular, and the only productive one -- when a new verb is coined it is invariably assigned to the first conjugation). One has no clear intuition about which of the two remaining conjugations is the more heavily marked. Possibly, then, a hierarchy among the conjugations exists which can be stated as [+V] → [+1conj], [-1conj] → [+3conj], where the new [-3conj] corresponds to the old [2conj]. In terms of markedness, each verb stem could be listed in the lexicon with one of the features [uconj], [+3conj], [-3conj], where [uconj] means no mark at all. By marking convention, stems unmarked for conjugational class would be assigned the features [+1conj, -3conj], verbs marked [+3conj] and [-3conj] would be assigned also [-1conj]. Thus the vast bulk of verb stems in the lexicon would require no mention of conjugational class features in their lexical entry. Then (97) could be replaced by (99):

$$(99) \quad \emptyset \rightarrow \left[\begin{array}{c} +\text{vocalic} \\ \alpha \text{low} \\ \beta \text{high} \end{array} \right] / \left[\begin{array}{c} \alpha \text{1conj} \\ \beta \text{3conj} \end{array} \right] + \text{---} \# \text{V}$$

Of course the preceding paragraph is sheer speculation, and (99) is phonological legerdemain. There are, however, substantive issues involved: it is clear at least that theme vowels must be supplied by rule, rather than being fully specified in the lexicon. To support this assertion, one can give, in addition to questionable arguments involving some notion of "simplicity," the following argument: there are in fact just three conjugational classes and hence three different theme vowels. If each theme vowel is fully specified in the lexicon, this fact is not captured. That is, if theme vowels are fully specified in the lexicon, then it is a lexical idiosyncrasy of each verb stem that its theme vowel isn't u or o, and this is simply wrong.

13.2 Rule (59), which is repeated here as (100) for the convenience of the reader, seems to require mention of the conjugational class feature [3conj]:

$$(100) \quad \begin{bmatrix} \text{V} \\ -\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{tense} \end{bmatrix} \quad \text{in 3rd conjugation verb stems}$$

If this rule were ordered before (97) or (99), it could be reformulated with some gain in explicitness as (101):

$$(101) \quad \begin{bmatrix} \text{V} \\ -\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{tense} \end{bmatrix} / \left[\frac{\text{+3conj}}{\text{C}_0\#} \right]_{\text{V}}$$

On the other hand, if (100) were ordered after (97) or (99), the environment could be stated as (102):

$$(102) \quad / \text{---C}_0\text{i\#}]_{\text{V}}$$

While there is no a priori reason to prefer the environment of (101) over that of (102), or conversely, if this rule is ordered after (97) or (99) it can be combined with (38a), which must be ordered after (97) or (99), to give (104):

$$(104) \quad \begin{bmatrix} \text{v} \\ -\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{tense} \end{bmatrix} / \text{---} \begin{cases} \text{C}_0 \text{i\#}]_{\text{v}} \\ [+past] \end{cases} \quad \begin{matrix} \text{(a)} \\ \text{(b)} \end{matrix}$$

The ordering of cases (a) and (b) is crucial: if the second conjugation theme vowel e were changed to i in the environment of case (b) before case (a) applied, then nonlow vowels in second conjugation stems would be incorrectly raised in some environments by case (a).³³

13.3 I now collect and renumber as (105) all the rules proposed in this chapter, as well as those proposed in Chapter 2. Some of these rules will be modified in Chapter 4.

$$(105)$$

a. (97, 99) $\emptyset \rightarrow \begin{bmatrix} +\text{vocalic} \\ \alpha\text{low} \\ \beta\text{high} \end{bmatrix} / \begin{bmatrix} \alpha\text{conj} \\ \beta\text{conj} \end{bmatrix} + \text{---}\#]_{\text{v}}$

b. (38a, 53, 59, 104) $\begin{bmatrix} \text{v} \\ -\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{tense} \end{bmatrix} / \text{---} \begin{cases} \text{C}_0 \text{i\#}]_{\text{v}} \\ [+past] \end{cases}$

c. (38b) $\begin{bmatrix} \text{k} \\ \text{g} \end{bmatrix} \rightarrow \begin{bmatrix} \text{s} \\ \text{x} \end{bmatrix} / \text{---} \begin{bmatrix} -\text{consonantal} \\ -\text{back} \end{bmatrix}$

d. (38c, 95) $\text{v} \rightarrow \emptyset / + \text{---} + \begin{bmatrix} \begin{bmatrix} \text{v} \\ +\text{tense} \end{bmatrix} \\ \text{rE}\#[+\text{future}] \end{bmatrix}$ MINOR

$$e. (38d, 40) \quad V \rightarrow [lstress] / _ \left\{ \begin{array}{l} (C_0 (\check{V} C_0^1 (L)) V) C_0^\#]_{N,A} \\ (([-perfective]) C_0 V) C_0^\#]_V \end{array} \right\}$$

$$f. (II-59a) \quad g^w \rightarrow w / \# _$$

$$g. (38e) \quad b \rightarrow \emptyset / i+ _$$

$$h. (38f) \quad \begin{bmatrix} V \\ +low \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -low \\ \emptyset back \end{bmatrix} / _ \begin{bmatrix} -consonantal \\ +high \\ \emptyset back \end{bmatrix}$$

$$i. (38g) \quad \begin{bmatrix} -consonantal \\ -stress \\ +high \\ \emptyset back \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} V \\ -low \\ \emptyset back \end{bmatrix} _$$

$$j. (38h) \quad \begin{bmatrix} -sonorant \\ +Q \end{bmatrix} \rightarrow [-tense] / V _ [+vocalic]$$

$$k. (38i) \quad \begin{bmatrix} e \\ -tense \end{bmatrix} \rightarrow \emptyset / V \begin{bmatrix} +coronal \\ +anterior \end{bmatrix}^1 _ \#$$

$$l. (38j, 55, 67, 72, 73, 74) \quad \begin{bmatrix} V \\ +stress \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -high \\ -tense \end{bmatrix} / _ \left\{ \begin{array}{l} rV \\ \begin{bmatrix} +consonantal \\ +sonorant \end{bmatrix} \quad \begin{bmatrix} +consonantal \\ +anterior \end{bmatrix} \end{array} \right\}$$

$$m. (38k) \quad \left\{ \begin{array}{l} e \\ o \end{array} \right\} \quad \left\{ \begin{array}{l} ye \\ we \end{array} \right\} / \begin{bmatrix} +stress \\ -tense \\ +Q \end{bmatrix}$$

$$n. (38l) \quad \begin{bmatrix} V \\ +high \\ -stress \end{bmatrix} \quad \begin{bmatrix} V \\ +high \end{bmatrix} \Rightarrow \begin{bmatrix} -stress \\ +stress \end{bmatrix}$$

1 2 1 2

$$o. (38\underline{m}, 56, 62) \quad v \rightarrow [-\text{high}] / \left\{ \begin{array}{l} \left[\begin{array}{l} \text{---} \\ -\text{tense} \\ +Q \end{array} \right] \\ \left[\begin{array}{l} \text{---} \\ -\text{stress} \end{array} \right] C_0 \left\{ \begin{array}{l} \# \\ f \end{array} \right\} \end{array} \right\} \underline{\text{MINOR}}$$

$$p. (96) \quad \emptyset \rightarrow d / \left[\begin{array}{l} +\text{consonantal} \\ +\text{sonorant} \\ -\text{continuant} \end{array} \right] \text{---} +r$$

$$q. (\text{II-59}\underline{c}) \quad rr \Rightarrow R$$

$$r. (\text{II-59}\underline{d}) \quad \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \\ -\text{lateral} \end{array} \right] \rightarrow \left[\begin{array}{l} +\text{sonorant} \\ +\text{tense} \end{array} \right] / \left[\begin{array}{l} -\text{seg} \\ -\text{FB} \end{array} \right] \text{---}$$

$$s. (\text{II-59}\underline{e}) \quad r \rightarrow \left[\begin{array}{l} +\text{tense} \\ -\text{vocalic} \end{array} \right] / \left[\begin{array}{l} +\text{coronal} \\ -\text{distributed} \end{array} \right] \text{---}$$

$$t. (\text{II-59}\underline{f}) \quad \left[\begin{array}{l} -\text{consonantal} \\ +\text{high} \\ -\text{stress} \end{array} \right] \rightarrow [-\text{vocalic}] / \left\{ \begin{array}{l} \text{---}v \\ v\text{---} \end{array} \right\}$$

$$u. (45) \quad \text{Erase nonrightmost stresses in a word}$$

Rules (105\underline{v}, \underline{w}, \underline{x}, \underline{y}, \underline{z}, \underline{a}', \underline{b}', \underline{c}') are (II-59\underline{g}, \underline{h}, \underline{i}, \underline{j}, \underline{k}, \underline{l}, \underline{m}, \underline{n}), respectively, with no change.

FOOTNOTES TO CHAPTER III

1. Second person plural (vosotros) forms occur only marginally in the dialect under investigation: educated speakers learn them in school, encounter them in literature, and occasionally use them - often incorrectly - in religious and other types of stylized discourse. Thus these forms have in Mexican Spanish roughly the same status as that of "thou" and "ye" forms in Standard American English. I see no reason to include them in this study, although to do so would entail no major revision of the rules to be presented, as far as I can see.

2. Cf. Bull (1949, 1960), Hall (1945), Hockett (1947), Nida (1948), Saporta (1956b, 1959a,b), Stockwell, Bowen, and Martin (1965), Foley (undated, 1965).

3. I assume, without justification here, that these phonological segments will be supplied by rules which can be stated roughly as [1person, -plural] → o, [2person, -plural] → s, [1person, +plural] → nos, [3person, +plural] → n. There is no rule to give phonological realization to the feature bundle [3person, -plural]. It seems to me that any theory is doomed to failure which countenances a person morpheme and a separate number morpheme. Not only is this "string-of-morphemes" approach contraindicated on syntactic grounds, but also an elaborate reductio ad absurdum counterargument on phonological grounds has been provided by Foley (undated).

4. The exceptions include the clitics su, tu, mi, words of Greek origin like énfasis, dosis, the three Latin words espíritu, tribu, ímpetu, affective words like mami, papi, and a few miscellaneous others like casi (which probably should be treated as a clitic).
5. Rule (9) has only illustrative value for the present discussion. It will be revised in Chapter 4, Section 8.
6. Further discussion of this rule will be found in Section 9.3 and Chapter 4.
7. For further discussion see Section 11.
8. The identification of [D] is discussed in Section 9.
9. As is to be expected, there are some exceptions and complications which will not be dealt with now.
10. The familiar Latin stress rule has already been alluded to on page 37f, and will be further discussed in Section 9. In the present connection it is interesting to note that the imperfect (penultimate) a was long (tense) in Latin amabāmus, and the stress continued to be amabámos in Spanish until it shifted to amábamos for no discernible reason (cf. Menéndez Pidal (1962, p. 276). I can see no reason to believe that this stress shift is to be accounted for by an unexplained laxing of the penultimate a rather than by an equally unexplained change in the stress rule itself.
11. The history of the stress in amáramos is parallel to that of amábamos (cf. note 10).

12. This is hardly surprising in view of the history of the preterit forms. They are the reflexes of the forms of the Latin perfect, whose paradigm was already quite different from the other Latin tenses. Further, the historical development of these forms contain many points which are not understood by philologists. (cf. Menéndez Pidal (1962, p. 308ff) García de Diego (1961, p. 229f)).
13. Both the traditional terminology "past participle" and rule (25) suggest that the feature bundle which represents the ending of the past participle contain the feature [+past]. I am convinced that this suggestion can be corroborated by syntactic considerations, which, however, fall far outside the domain of this study. If the suggested analysis of past participles is correct, then the environment of (25) is simply ___ [+past].
14. Navarro explicitly points out, and gives examples, that "las diferencias de timbre que hoy se advierten en la pronunciación de cada una de las vocales españolas, no tienen valor significativo ni obedecen a motivos de carácter histórico o etimológico, sino simplemente a circunstancias fonéticas" (p. 41).
15. There are, however, a number of difficulties. For example, consider the o - we alternation in Venezuéla, venezoláno, where the apparently "lax" o diphthongizes when stressed. But it is not clear how the Latin rule can assign stress to the penultimate lax vowel followed by only one consonant in venezolos. The same difficulty appears in many other nouns, e.g. abuélo, aguéro (cf. agorár), tropiézo, (cf. tropezár), etc.

16. The situation described here arose historically in two steps. The first step took place some time after the 13th century. Menéndez Pidal (1962) states that "los verbos cultos dislocaron el acento latino para hacer llanas [penultimately stressed] las formas latinas esdrújulas [antepenultimately stressed]: así [Spanish] recupéro, colóco, vigíla y otros muchos; compárense las formas españolas de [Latin] súpllico, imáginó, detérmino, hábito, árrogo, ágrego, élevo, íntimo, fructí-, amplí-, notí-fico [which are suplíco, imagíno, determíno, etc. in Spanish]. El cambio de acento latino no lo hacían aún los cultismos del siglo XIII; Berceo pronunciaba signífica, sacrífica. El italiano conserva siempre la acentuación clásica: sacrífico, vivífica, cólloca, stérmino, consídero, etc." (p. 274). The second step was the retraction of stress in the imperfect indicative and subjunctive, which was mentioned above in note 10. At that time, as will be recalled, e.g. amabámos and amarámos became amábamos and amáramos, thus destroying the last vestige of relationship between verb stress and etymological vowel quantity. These are the facts, not an explanation of the facts. A true explanation for these stress shifts would be, it seems to me, an accomplishment of the highest order of interest in historical linguistics, but I have nothing to contribute.
17. A few other examples: limpiar, aliviar, anunciar, remediar, rabiar, principiar, premiar, odiar, obsequiar, negociar, ensuciar, entibiar, envidiar, estudiar, fastidiar, incendiar, iniuriar, lidiar, asediar, calumniar, codiciar, columpiar, contagiar, desperdiciar, diferenciar, divorciar, elogiar, beneficiar.

18. There are about 30 or 40 verbs in this class, including vigiar, vaciar, rociar, resfriar, pipiar, liar, expiar, estriar, enriar, enlejar, variar, hastiar, criar, ciar, ataviar, descarriar, adiar, cuantiar, enviar.
19. This class includes actuar, exceptuar, habituat, insinuar, situat, anticuar, desvirtuar, evacuar, fluctuar, graduar, individuar, menstruar, oblicuar, perpetuar, puntuar, usufructuar.
20. See Chomsky and Halle (1968, Chapter 4, Section 2.2 and Chapter 8, Section 7) for further discussion of diacritic features, like [Q], which are a property of entire formatives rather than of single segments.
21. Although the point is often misunderstood, I take it to be self evident that language learners do not have access to historical data as such. Therefore, it is not clear what claims can be made for grammars which make use of data which is not available to human beings who learn the language. It is entirely another matter when grammars based entirely on synchronic data happen to reflect certain historical processes.
22. There are a few oddities which cannot be used as data since neither I nor my informants know how to conjugate them. For example, abolir, which is defective. Native speakers disagree with prescriptive authorities and with one another about which forms are in use and about the shape of the forms they use. Also, for some speakers, podrir has u in all finite forms, podrido and puerido in free variation for the past participle, podrir and puerir in free variation for the infinitive.

23. It is an interesting historical fact that at an earlier stage of the language, many of the verbs in (52) had phonetic o rather than u. Menéndez Pidal (1962, p. 273) mentions older ordir, complir, cobrir, sofrir, somir, and adocir for modern urdir, cumplir, cubrir, sufrir, sumir, and aducir. In the light of these examples it seems that the forms of pVdirir with o are simply archaisms.
24. The following argument against (74) has some initial plausibility, but is incorrect: it is fairly clear that at least some instances of ñ are reflexes of nn in [+Q] formatives (cf. /ann/ in [+Q] año, "year," and [-Q] anual, "annual"). Now certain verbs contain ñ (gruñir, bruñir, muñir, -streñir, teñir, heñir, reñir, ceñir), yet they do not undergo (74), as they should if they are [+Q] and have underlying nn. This argument fails because there is no reason whatsoever to suppose that all instances of ñ derive from nn, or even that the verbs in question contain nn at any stage of derivation.
25. See Lakoff (1965) for a discussion of minor rules. Note further that some of the verbs that do not undergo (62) had, at an earlier stage of the language, phonetic e in the stem, e.g. older escrebir and vevir for modern escribir and vivir (cf. note 23).
26. Haber never means "have" in the sense of "possess, own"; this is tener. Spanish is thus excluded from the large number of languages in which "have" and the perfect auxiliary are the same (cf. Allen (1964)).

27. For discussion see Chomsky and Halle (1968, Chapter 1, Section 5.1).
28. The entire discussion of the future which follows carries over with only trivial modifications to the verb forms traditionally called "conditional," which will not be discussed separately.
29. This is not quite true for the dialects that use the second person plural. This form of haber is habéis, but the corresponding form of the future is e.g. amaréis, not *amarabéis.
30. It is of course well known that the traditional explanation is correct historically: until the 17th century the future was expressed by the infinitive followed by the present of haber. These were written as two separate words, and object pronouns could come between them (as is still the case in modern Portuguese). For example, 17th century dar me lo has for modern me lo darás, "you will give it to me." But these historical facts do not constitute synchronic evidence.
31. The purpose of this work was pedagogical, and thus it must be judged on the basis of its pedagogical value, which, in my opinion, is outstanding. Still, the theoretical apparatus within which the pedagogical exposition is framed is quite clear, and its correctness can also be judged.
32. The range of relevant data is wider than what has been presented here. For example, the rules which govern the placement of clitic object pronouns in surface structures are relevant to the correctness of struc-

tures such as (90). These rules are presently being studied by David M. Perlmutter and E. Wayles Browne, whose work so far seems to indicate that rules are involved which cannot be formulated in current syntactic theory.

33. It seem that further investigation would reveal that other cases should be added to (104). For example, second conjugation thematic e appears as i before the derivational affixes -ble and -miento: mover, "move," movible, "movable," movimiento, "movement," (cf. first conjugation tratar, "treat," tratable, "treatable," tratamiento, "treatment").

CHAPTER IV - ADDITIONAL CONSONANTAL ALTERNATIONS

1. Introductory Remarks

We now consider certain consonantal - and, marginally, vowel - alternations that occur at formative boundaries when certain suffixes are attached to certain stems. The suffixes with which we will be principally concerned are the following:

- a. the nominalizing suffix -ión
- b. the agentive noun suffix which appears as -tor, -dor, -sor, and -or
- c. the suffix -(t)ivo, which corresponds to English "-ive" and which forms adjectives which we will call "performative," for want of a better term
- d. miscellaneous adjective - and noun-forming suffixes.

A small sample of the kind of data to follow is given in (1).¹

(1)

<u>Verb (infinitive)</u>	<u>Nominalization</u>	<u>Agentive Noun</u>	<u>"Performative" Adjective</u>	<u>Miscel- laneous</u>
administrar	administración	administrador	administrativo	
succionar	succión			
unir	unión	unidor	unitivo	
	punición		punitivo	
	inmersión			
	erudición			erudito(adj.)
adaptar	adaptación			
adoptar	adopción	adoptador	adoptivo	
atender	atención	atendedor		atento(adj.)
extender	extensión	extensor	extensivo	extenso(adj.)
abortar			abortivo	aborto (noun)

I will ignore the question of hypothetical but non-occurring forms, e.g., the non-occurring verb *punir, "to punish," corresponding to occurring punición, "punishment," and punitivo, "punitive." Interesting questions are involved here, but it would be a mistake to pursue them in an exploratory phonological study.

Also I will have nothing further to say about sets like succión, "suction," succionar, "to suck," in which the verbal affixes, e.g., -ar, are added to a base which already contains the nominalizing element -ión. There is a sizeable class of such sets - to give only a few examples, confección-confeccionar, congestión-congestionar, contorsión-contorsionar, decepción-decepcionar, evolución-evolucionar, selección-seleccionar. It is of some interest that these sets are unlike their English counterparts, but we exclude them from consideration since there are no consonantal alternations in the environments we are investigating, namely, at the boundary indicated by † in e.g. succion†ar.²

There is a large mass of data to be considered. We will proceed by presenting the examples in small sets, sometimes with a tentative analysis accompanying a set. Although statements will be given in these analyses as though they were statements of established fact, final judgement must be reserved until all the data have been given.

2. Athematic Nominalizations

There is a small class of examples in which the nominalization affix -ión is attached directly to a stem, with no intervening segments:

- | | | | | | |
|-----|----------|-----------|---------|----------|----------------|
| (2) | un-ir | un-ión | un-idor | un-itivo | |
| | rebel-ar | rebel-ión | | | rebel-de(noun) |
| | opin-ar | opin-ión | | | |

The apparently final stress of -ion' (like that of the infinitives) is accounted for by final E, which is deleted by rule (105k), and which actually occurs in plurals, e.g., uniones, rebeliones, opiniones, where the environment of this rule is not met. It could well be that this formative should have the underlying representation /yonE/ rather than /ionE/, since +GVCG+ is presumably less marked than +VVCV+.³ We will not pursue this matter here, and for the sake of readability we will write simply -ion' henceforth.

In the agentive unidor and the adjective unitivo we observe that the theme vowel occurs after the stem, although it does not in the -ion' nominalizations nor in the noun rebelde.

3. Productive Patterns

The following is a small sample of the hundreds of sets formed on the most productive pattern:

(3)	administrar	administración	administrador	administrativo
	generar	generación	generador	generativo
	formar	formación	formador	formativo
	afirmar	afirmación	afirmador	afirmativo
	coordinar	coordinación	coordinador	coordinativo
	acumular	acumulación	acumulador	acumulativo
	comparar	comparación		comparativo
	acelerar	aceleración	acelerador	
	ventilar	ventilación	ventilador	
	radiar	radiación	radiador	
	explotar	explotación	explotador	
	fundar	fundación	fundador	
	obligar	obligación		
	eructar	eructación		eructo(noun)

This pattern is "productive" in two senses. First, the verbs belong to the first conjugation, the class to which the vast bulk of all the verbs in the lexicon belong, and the one to which new words and nonce inventions are assigned. Second, the arrangement of formatives illustrated in (4) is the "productive" one, regardless of conjugational class.

(4) stem + theme vowel + $\left. \begin{array}{l} \text{ción} \\ \text{dor} \\ \text{tivo} \end{array} \right\}$

There are also a good many third conjugation examples which are constructed on the pattern of (4). I give examples in (5).

(5)

abolir	abolición		
fruir	fruición		fruitivo
cohibir	cohibición		
definir	definición	definidor	definitivo
exhibir	exhibición		
expedir	expedición	expedidor	
prohibir	prohibición		prohibitivo

This class is "not productive" only in the sense that the third conjugation is not productive, since the pattern is the same as for the examples in (3).

There are only a few clear examples from the second conjugation:

(6)

perder	perdición	perdedor
demoler	demolición	

There are a few examples with alternations between voiced and voiceless consonants in the stem:

(7)

nadar	nata <u>ción</u>	nada <u>dor</u>
saludar	saluta <u>ción</u>	
pedir	peti <u>ción</u>	pedi <u>dor</u>

We have already in the grammar a rule to account for this alternation, namely rule (105j), which laxes obstruents which follow a vowel in [+Q] formatives. Thus the stems /nat/, /salut/, and /pet/ are marked [+Q] in verbs and in agentive nouns, but [-Q] in -ión nominalizations. We might speculate that these stems are lexically marked [+Q], and some sort of redundancy rule changes this to [-Q] (or simply erases the feature) in the -ión nominalizations.

4. Other Nominalizations in -ción

We now turn to sets of examples in which -ción, not -ión, occurs directly after the stem, without an intervening theme vowel. The examples are subdivided according to the final consonant or consonant cluster of the stem. There seems to be no reason to separate the three conjugations.

4.1 The final stem consonant is n. The only examples I have found are compounds of the highly irregular tener and venir:

(8)	detener	deten <u>ción</u>	detene <u>dor</u>	
	obtener	obten <u>ción</u>	obtentor	
	retener	reten <u>ción</u>	retene <u>dor</u>	retentivo
	contener	conten <u>ción</u>	contene <u>dor</u>	contentivo
	intervenir	interven <u>ción</u>	interventor	
	contravenir	contraven <u>ción</u>	contraventor	
	convenir	convenc <u>ción</u>		

Note that although -ción is always added directly to the stem without the theme vowel, the agentive suffix may or may not be separated from the stem by the theme vowel: detenedor versus obtentor. Thus the appearance or not of the theme vowel is apparently an idiosyncratic property of each compound, not of the stem. The agentive suffix must be /torE/, with the property [+Q]. The final E appears in plurals, e.g., detenedores, obtentores, but is deleted in the singular forms by rule (105k). Initial t is changed to d by rule (105j) when preceded by a vowel.

4.2 The final stem consonant is m:

(9)	redimir	redención	redentor		
	presumir	presunción		presuntivo	presunto
	consumir	{consunción consumición}	consumidor		consunto

Note the variants consunción and consumición, which the Vox dictionary gives as synonyms. Thus it is clear that the presence or absence of the theme vowel in -ción nominalizations, as well as in the agentive nouns, is lexically, rather than phonologically, determined, and in some cases optional. The nasal assimilation rule (II-59g) handles the m↔n alternations.

4.3 The final stem consonant alternates between [s] and [k] (the letter c stands for [s] before a front non-consonantal segment, [k] in all other environments).

(10)

sedu[s]ir	sedu[ks]ión	sedu[k]tor	sedu[k]tivo	
producir	producción	productor	productivo	producto(noun)
conducir	conducción	conductor	conductivo	conducto(noun)
deducir	deducción		deductivo	
traducir	traducción	traductor		
contradecir	contradicción	contradictor		
predecir	predicción			
satisfacer	satisfacción			
cocer	cocción			

The s-k alternation is handled by a rule we have already stated in vague form, namely (105c), which changes k to s before a front non-consonantal segment. Thus these stems are /...duk/, /...dik/, /...fak/, and /kOk/ (with lax o because of present indicative [kwáso], etc.). K is not changed to s in other than verb forms since the environment of (105c) is not met.

4.4 The final stem consonant alternates between [x] and [k] (the letter g stands for [x] before a front nonconsonantal segment):

(11)	prote [x]er	prote[ks]ión	prote[k]tor	prote[k]tivo	
	corregir	corrección	corrector	correctivo	correcto(adj.)
	eregir	erección	erector		erecto(adj.)
	dirigir	dirección	director	directivo	
	elegir	elección	elector	electivo	electo(adj.)
	colegir	colección	colector		colecta(noun)
	afligir	aflicción		aflictivo	aflicto(adj.)

Since we have an independently motivated rule, namely (105c), second case, which changes g to x before a front nonconsonantal segment, we assume that all the stems in (11) have final /g/. This /g/ is changed to k in the non-verb forms by the following familiar rule:

$$(12) \quad [-\text{sonorant}] \rightarrow [+tense] / ___ \begin{bmatrix} -\text{sonorant} \\ +tense \end{bmatrix}$$

4.5 The final stem consonant alternates between b (actually [β] after spirantization) and p:

(13)

recibir	recepción	$\left\{ \begin{array}{l} \text{receptor} \\ \text{recibidor} \end{array} \right\}$	receptivo	
percibir	percepción	perceptor	perceptivo	
concebir	concepción		conceptivo	concepto(noun)
describir	descripción	descriptor	descriptivo	$\left\{ \begin{array}{l} \text{descripto} \\ \text{descrito} \end{array} \right\}$ (adj.)
proscribir	proscripción	proscriptor		$\left\{ \begin{array}{l} \text{proscripto} \\ \text{proscrito} \end{array} \right\}$ (adj.)
prescribir	prescripción		prescriptivo	$\left\{ \begin{array}{l} \text{proscripto} \\ \text{prescrito} \end{array} \right\}$ (adj.)

At first glance we seem to be faced with an indeterminacy: the final stem consonant could be /b/, which is tensed to p in some environments by (12), or it could be /p/, which is laxed to be by rule (105j) in some environments. In the case of recibir, "to receive," the choice is decided by recipiente, "recipient," formed with the common suffix -(i)ente. In recipiente the p could not have come from /b/ by (12). Thus the consonant in question must be /p/ which is laxed by (105j), and recibir must be [+Q]. The other cases are not so clear. One might take the position that percibir and concebir also contain the formative /cep/, "-ceive." This is not implausible, but it clearly begs the question of the identity of the putatively shared formative /cep/, since recibir, percibir, concebir do not behave

alike in all respects. In particular, concebir, but not recibir or percibir, undergoes the last case of (105g); *concebir. Having recorded this caveat, and in the absence of negative evidence, we will, however, make the tentative assumption that all three examples have underlying /p/, and, concomitantly, that they are [+Q].

In the case of describir, proscribir, and prescribir, however, there isn't a scrap of evidence for /p/. We therefore make the simplest assumptions, namely that the underlying stem final consonant is /b/, which is tensed in the appropriate environments by (12), and that these verbs are [-Q].

This leaves the variants descripto/descrito, proscripto/proscrito, and prescripto/prescrito to account for. (Not all speakers have the first member of each pair.) On the basis of examples like séptimo, "seventh," siéte, "seven," and seténta, "seventy," I take it that the forms without the cluster are [+Q], and that there is a rule with the effect of (14):

$$(14) \quad \begin{bmatrix} p \\ +Q \end{bmatrix} \rightarrow t / _ t$$

and that the resulting tt cluster is simplified by a rule with the effect of (15):⁴

$$(15) \quad C_i C_j \Rightarrow C_k \quad \text{where} \quad C_i = C_j = C_k$$

4.6 There is a small class of examples like the following:

(16)

destruir	destru[ks]ión	{destru[k]tor destruidor}	destru[k]tivo
instruir	instrucción	instructor	instructivo
obstruir	obstrucción	obstructor	
leer		lector	lectura(noun)
contraer	contracción		contractivo contrato(adj.)
detraer	detracción	detractor	
abstraer	abstracción		abstracto(adj.)

These stems must end in some consonant $\underline{C^*}$ such that

- (17) a. $\underline{C^*} \rightarrow \emptyset / \underline{V} \underline{\quad} [V, -back]$
 b. $\underline{C^*} \rightarrow k / \underline{\quad} [-sonorant, +tense]$

It is unlikely that $\underline{C^*} = \underline{k}$, because of the examples in Section 4.3. The next simplest assumption would be that $\underline{C^*} = \underline{g}$, since (17b) is just rule (12) which we already have. The assumption that $\underline{C^*} = \underline{g}$ is strongly supported by the following: leer, "to read," lector, "reader," lectura, "reading," and, N. B., legible, "legible," leíble, "readable." Thus the stem is /leg/; the g is tensed by (12) in lector, lectura; changed to x by (105c) in legible; and deleted in leer and leíble. Thus we conclude that the stems in (16) are /...trug/, /leg/, and /...trag/. But if this is correct, these examples must be differentiated from those of (11). Let us assume that the stems in (11) are [-Q], that those of the present section are [+Q], and that (17a) should be stated as (18):

- (18) $\begin{bmatrix} g \\ +Q \end{bmatrix} \rightarrow \emptyset / \underline{V} \underline{\quad} \begin{bmatrix} V \\ -back \end{bmatrix}$

The difference, then, between legible and leíble is that the former is [-Q], while the latter is [+Q].

4.7 The next set of examples bears some similarity to those of (16):

(19)

instituir	institución	instituidor		instituto (noun)
restituir	restitución	restituidor		
constituir	constitución	constituidor	constitutivo	
prostituir	prostitución			prostituta (noun)
atribuir	atribución		atributivo	atributo (noun)
distribuir	distribución	distribuidor	distributivo	
contribuir	contribución	contribuidor	contributivo	
retribuir	retribución		retributivo	
disminuir	disminución			

Apparently the difference between the examples of (19) and those of (16) is that the stems of the present examples end in the vowel y, rather than g, and that there is no reason to assign the feature [+Q] to the present examples.

4.8 The reason for grouping the next set of examples together will be clear immediately below.

(20)	absorber	absorción		absorto(adj.)
	compungir	compunción	compungivo	
	fungir	función		
	ungir	unción		
	esculpir		escultor	escultura

Apparently the stems are /absorb/, /compung/, /fung/, /ung/, and /skulp/.⁵
 In the nonverbal forms, e.g., /absorb+ción/, /compung+ción/, /skulp+tor/,
 the final stem consonant is deleted by a cluster simplification rule,
 which can be stated as (21):

$$(21) \quad \begin{bmatrix} \text{-sonorant} \\ \text{-continuant} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} \text{+consonantal} \\ \text{---} \end{bmatrix} \text{---} \begin{bmatrix} \text{-sonorant} \end{bmatrix}$$

That this rule applies only to noncontinuant obstruents can be seen by
 words like monstrwo, instrumento, yukstaposisión, ekstra, eksklwir.⁶

4.9 This concludes the relatively nonproblematic examples of stem+ción.

Let us summarize:

- a. We have found examples with the following underlying stem
 final consonants: n (detener, detención)
m (redimir, redención)
k (sedu/k/ir, seducción)
g (proteger, protección; destru/g/ir; destrucción;
fungir, funcción)
p (reci/p/ir, recepción)
b (describir, descripción; absorber, absorcción)
- b. We have found examples whose stem ends in u: instituir, institución.

We saw in Section 2 that there are a few examples in which the form of
 the nominalization affix is -ión rather than -ción. This suggests that what
 we have written as -ción should be -ción, where c is some sort of augment
 which appears in some forms but not in others.

At least one example can be found in which the agentive noun affix seems to be -or rather than -t/dor, e.g., contend-er, contend-or. Again this suggests that this affix is -t+or, where t is some sort of augment.

One example has been given in which the "performative adjective" affix is -ivo rather than -tivo: compung-ir, compung-ivo (20). Other examples can be found: abus-ar, abus-ivo; in+noctuo, noctente, noc-ivo. This suggests that this suffix is -t+ivo, where the t is again an augment.

If we are dealing with the affixes c+ión, t+or, and t+ivo, then it is quite plausible, though not necessarily true, that what we have represented with orthographic c in c+ión, is the same augment /t/ which occurs in t+or and t+ivo. If this is correct, a rule is needed to change t to s in the appropriate environment. But such a rule has independent motivation. Consider the following examples:

- | | | |
|------|-----------------------------|------------------------------------|
| (22) | <u>torrente</u> , "torrent" | <u>torren[s]ial</u> , "torrential" |
| | <u>Marte</u> , "Mars" | <u>marciano</u> , "Martian" |
| | <u>Egipto</u> , "Egypt" | <u>egipcio</u> , "Egyptian" |

Thus we may say that

- (23) $t \rightarrow s / \text{---} + \left[\begin{array}{l} \text{-consonantal} \\ \text{+high} \\ \text{-back} \end{array} \right] \text{V}$

Thus it is both possible and plausible that the nominalizing suffix is t+ión, but so far we have no argument that this must be the case. It could very well be that this affix is s+ión. There are clearly other cases of

morphemic +s, for example, the plural s (la casa, las casas) and the second person singular verbal inflection (hablas, hables, hablabas, etc.). We discuss this issue further below.

More sets of examples which include words of the form stem+cion will be presented in Section 6. These additional sets of data, however, contain certain problems which are best studied after a fairly good idea is gained of what occurs in the more simple cases.

5. Nominalizations in -sión

We turn now to sets of examples in which the phonetic form of the agentives, performatives, and miscellaneous nouns and adjectives contain s rather than t/d, and in which the [s] of the nominalizing suffix is orthographically represented as s rather than as c.

5.1 The stem-final consonant is d:

(24)

dividir	división	divisor	divisivo	
disuadir	disuasión		disuasivo	
persuadir	persuasión	{persuadidor} {persuasor}	persuasivo	
conceder	concesión		concesivo	
exceder			excesivo	exceso (noun)
acceder	accesión			
evadir	evasión	evasor	evasivo	
invadir	invasión	invasor		
agredir	agresión	agresor	agresivo	
aludir	alusión		alusivo	
eludir	elusión			

(24) continued

coludir	colusión	colusor		
elidir	elisión			
decidir	decisión		decisivo	(in)deciso (adj.)
circuncidar	circuncisión			circunciso (adj.)

5.2

(25)

incluir	inclusión		inclusivo	incluso(category not clear)
excluir	exclusión	exluidor	exclusivo	
concluir	conclusión		conclusivo	(in)concluso (adj.)
recluir	reclusión			recluso (noun)
corroer	corrosión		corrosivo	
poseer	posesión	poseedor	posesivo	

The simplest assumptions about (24) and (25) seem to be that both have stem final /d/, that the verbs in (24) are [-Q] while those in (25) are [+Q], and that /d/ is deleted in the latter by a rule with the effect of (26).

$$(26) \quad \begin{bmatrix} d \\ +Q \end{bmatrix} \rightarrow \emptyset / v \text{---} \begin{bmatrix} v \\ -back \end{bmatrix}$$

Further, to account for the s in the nonverbal affixes, there must be rules with the effect of (27), which will be clarified in succeeding sections.

$$(27) \quad dt \Rightarrow s$$

5.3 The stem ends in nd.

(26)

expandir	expansión		expansivo	
suspender	suspensión	suspendedor	suspensivo	suspenso (noun)
comprender	comprensión	{comprendedor comprensor}	comprensivo	
aprehender	aprehensión	aprehensor		
ofender		{ofendedor ofensor}	ofensivo	ofensa (noun)
defender		{defendedor defensor}	defensivo	{(in)defenso (adj.) defensa (noun)}
extender	extensión	extensor	extensivo	extenso (adj.)
descender	descensión			descenso (noun)
ascender	ascensión	(ascensor, "elevator")		ascenso (noun)

5.4 The final stem consonant seems to be t:

(27)

emitir	emisión	emisor		
omitir	omisión			omiso (adj.)
remitir	remisión		remisivo	
admitir	admisión			
dimitir	dimisión			
cometer	comisión	cometedor		
discutir	discusión			
explotar	explosión		explosivo	

5.5 The final stem consonant is t, preceded by r or n:

(28)

pervertir	perversión	pervertidor		perverso (adj.)
convertir	conversión	convertidor	conversivo	converso (adj.)
invertir	inversión			{inverso (adj.) inversa (noun)}

(28) continued

divertir	diversión	
asentir		asenso (noun)
disentir	disensión	disenso (noun)

5.6 This exhausts the simple, clear examples with stem + s $\left\{ \begin{array}{l} \text{ión} \\ \text{or} \\ \text{ivo} \end{array} \right\}$. Let us summarize. We have found examples with the following underlying stem final consonants and consonant clusters:

<u>d</u>	(<u>dividir</u> , <u>división</u> ; <u>inclu/d/ir</u> , <u>inclusión</u>)
<u>nd</u>	(<u>expandir</u> , <u>expansión</u>)
<u>t</u>	(<u>emitir</u> , <u>emisión</u>)
<u>rt</u>	(<u>pervertir</u> , <u>perversión</u>)
<u>nt</u>	(<u>disentir</u> , <u>disensión</u>)

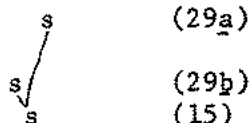
Thus all the examples with s in the affixes have stems that end with the dental obstruent d or t. Recall from Section 4.9 that none of the sets of examples with t (and c=[s]) in the affixes have stems which end in dental obstruents. Thus it would seem that there is a clear way of accounting for the s in the affixes of the examples summarized just above, a first approximation of which is given in (29):

- (29) a. $c \rightarrow s / [t, d] + \underline{\quad}$
 b. $[t, d] \rightarrow s / \underline{\quad}s$

A form like divisivo would be derived as illustrated in (30):⁷

(30)

divid+t+ivo

divisivo

We now turn to some troublesome cases.

6. Real and Apparent Anomalies

There is a class of examples with stem final nd, containing, as far as I know, only the following:

(31)

atender	atención	atendedor	atento(adj.)
contender	contención	{contendedor contendor }	contienda(noun)

Orthographic c in atención and contención is a surprise, but there is no phonological problem in these two forms. Contendor is also slightly odd, since one would have expected either *contendor or, more probably, *contensor (cf. extender, extensor; defender, defensor). Presumably the exceptionality of contendor consists in the lack of the t augment before the agentive suffix (cf. Section 4.9). The noun contienda may be simply /kon=tEnd+a/, and thus presents no problem. The adjective atento, however, is not so easy to explain away. There can be little doubt that the examples in (31), with the single stem -tend-, are the exceptional cases, as opposed to all the examples in (24), (25), and (26). To get the correct form of atento, it would suffice to make -tend- an exception to (29a), as illustrated in (32):

(32)

atend+to

$$\begin{array}{c} t \\ \vee \\ t \end{array}$$

(12)

(29a) fails

(29b) cannot apply

(15)

atento

Alternatives are certainly conceivable, but (32) is as little ad hoc as any which readily come to mind. One formative is not worth further worry, unless it would lead to greater generalization, which does not seem likely in this case.

6.1 The following set of examples, however, is quite large and must be taken into account.

(33)

editar	edición	editor	(in)édito (adj.)
dilatar	{dilatación dilación }	dilatador	dilatativo
objetar	objeción		
sujetar	sujeción	sujetador	sujeto (adj.)
ejecutar	ejecución	ejecutor	
excretar	excreción		excreto (adj.)
secretar	secreción	secretor	
redactar	redacción	redactor	
proyectar	proyección	proyector	proyecto (noun)
inyectar	inyección	inyector	
infectar	infección		infectivo infecto (adj.)
adoptar	adopción	adoptador	adoptivo
eruptar	erupción		eruptivo
optar	opción		optativo

(33) continued

desertar	deserción	desertor		
cantar	canCIÓN	(cantor, "cantor")		canto (noun)
inventar	invención	inventor	inventivo	invento (noun)
untar	unción	untador		{unto, untura untadura (nouns)}
abortar			abortivo	aborto (noun)
relatar	relación	relator		relato (noun)
detractar		detractor		
delatar	delación	delator		
consultar	consultación	consultor		consulta (noun)
adjuntar				adjunto (adj.)
pintar		pintor		pintura (noun)
raptar		raptor		rapto (noun)

Now observe the following contrasts:

(34)	(33)	(27,28)
	edit <u>a</u> r, edic <u>i</u> ón, edit <u>o</u> r	emi <u>t</u> ir, emi <u>s</u> ión, emi <u>s</u> or
	des <u>e</u> rtar, des <u>e</u> rción, des <u>e</u> rtor	con <u>v</u> ertir, con <u>v</u> ersión, con <u>v</u> erso
	in <u>v</u> entar, in <u>v</u> ención, in <u>v</u> ento	dis <u>e</u> ntir, dis <u>e</u> nsión, dis <u>e</u> nso

There is an immediately obvious way of distinguishing the t-affix cases from the s-affix cases not only in (34) but in all the examples of Section 5 and (33): all the verbs in (33) belong to the first conjugation; none of the verbs in Section 5 belongs to the first conjugation with the exception of circuncidar and explotar.⁸ Thus we could easily account for the contrasts of (34), inter alia, by simply restricting rule (29), when correctly formulated, to forms containing stems which do not have the lexi-

cal property [lConj]. This is intuitively correct: forms which belong to the nonproductive subclasses are, in some sense, "special," and undergo phonological processes which formatives belonging to the productive subclass do not undergo.

Still, a case can be made for another treatment, one which is somewhat counterintuitive. Let us now examine two apparently unrelated sets of facts.

First, consider the vowel alternation in cometer, comisión (27). Recall that we have in the grammar rule (105_o), the first case of which I repeat as (35):

$$(35) \quad v \rightarrow [-\text{high}] / \left[\begin{array}{c} -\text{tense} \\ +Q \end{array} \right]$$

We may account for the vowel alternation in cometer, comisión as follows: the stem is /comIt/, and is [+Q] in the verb but [-Q] in the nominalization (Cf. the remarks on p. 156 concerning (7)). But if we are dealing with the [+Q] stem /comIt/, we must ask why it is not affected by rule (105_j), with the incorrect result *comed-. One particularly simple way of accounting for the fact that rule (105_j) does not apply here is to assume underlying /comItt/, where neither t is laxed by rule (105_j) since neither is intervocalic. Now if (co)met is actually /...mItt/, perhaps the other stems in (27) similarly end in geminate tt.

Second, consider the fact that several of the verbs of (33) are classified by lexicographers and philologists as "back formations." For example, the verb cantar, "to sing," is said to be derived from the noun canto,

which consists of the root can, "sing," plus noun-forming to (actually t+o, since the final vowel is o in masculine nouns, a in feminine nouns). Similarly, the verb untar, "smear (with something greasy)" is said to be derived from the root ung (which also occurs in ungir, "to anoint"), the t of untar being the residue of noun-forming to. Thus the t in these forms is not an integral part of what we have called the "verb stem." Rather, following this philological argument, we would have phonological representations like the following:

(36)	can+t+a+rE	can+t+ionE	can+t+orE	can+to
	ung+t+a+rE	ung+t+ionE	ung+t+a+t+orE	ung+to

Thus we might arrive at the following generalization: affixal s is associated with stems which end in dental obstruents. The apparently stem final t of the verbs in (33) does not belong to the stem proper. We may illustrate with the following contrasts:

(37)

- a. /edi+t+a+rE/ → editar, /edi+t+ionE/ → edición, /edi+t+orE/ → editor
 /emitt+i+rE/ → emitir, /emitt+t+ionE/ → emisión, /emitt+t+ore/ → emisor
- b. /cant+t+a+rE/ → cantar, /cant+t+ionE/ → canción, /cant+t+o/ → canto
 /disent+i+rE/ → disentir, /disent+t+ionE/ → disensión, /disent+t+o/ → disenso
- c. /abort+t+a+rE/ → abortar, /abort+t+ivo/ → abortivo, /abort+t+o/ → aborto
 /convert+i+rE/ → convertir, /convert+t+ivo/ → conversivo, /convert+t+o/ → converso

We now have two proposals for accounting for the contrasts illustrated in (34). The first proposal involves mentioning the lexical property

[lConj] in a phonological rule, and considers circuncidar and explotar as exceptional. The second proposal makes no use of nonphonological features, and requires no exceptions. It is far from obvious, however, that the second proposal leads to a more highly valued grammar, ceteris paribus, than the first proposal does. On the second proposal, all the verbs of (33), which is not an exhaustive list, must be assigned a more complex lexical representation than they would on the first proposal.⁹

Worse, I can think of no independent synchronic motivation for representations like edit+t, did+t, excret+t, secret+t, adopt+t, erupt+t, and so on, for the examples of (33). The philological facts given above certainly are not synchronic evidence. Nor is it convincing to point to etymological doublets like ungir (/ung+i+rE/), "to anoint," and untar (/ung+t+a+rE/?) "to smear...", since the former (like unción) refers to a religious rite while the latter might refer to bread and butter. In short, ungir and untar have different meanings.¹⁰

I conclude that the first proposal is to be preferred over the second. Let us make this proposal more precise. We replace (29) by (38), which is ordered after (12):

(38)

- a. $t \rightarrow s / \left[\begin{array}{c} t \\ -lConj \end{array} \right] + \underline{\quad}$
- b. $t \rightarrow s / \underline{\quad}s$

If no reason is found to order (38a) and (38b) noncontiguously, they could be collapsed into a single transformation, as mentioned in Note 7.

7. Summary of Rules

As an aid to future reference, I collect and renumber as (39) the rules which play a role in the consonantal alternations discussed so far in this chapter. These rules will be refined and their order with respect to the rules of Chapter 2, (105) will be determined in subsequent sections.

(39)

- a. (note 5) $\emptyset \rightarrow e / \# _ s \left[\begin{array}{l} + \\ \text{consonantal} \end{array} \right]$
- b. (12) $\left[\begin{array}{l} - \\ \text{sonorant} \end{array} \right] \rightarrow \left[\begin{array}{l} + \\ \text{tense} \end{array} \right] / _ \left[\begin{array}{l} - \\ \text{sonorant} \\ + \\ \text{tense} \end{array} \right]$
- c. (27, 29, 38) $t \rightarrow s / \left[\begin{array}{l} t \\ - \\ \text{lconj} \end{array} \right] + _$
- d. (27, 29, 38) $t \rightarrow s / _ s$
- e. (23) $t \rightarrow s / _ + \left[\begin{array}{l} - \\ \text{consonantal} \\ + \\ \text{high} \\ - \\ \text{back} \end{array} \right] v$
- f. (21) $\left[\begin{array}{l} - \\ \text{sonorant} \\ - \\ \text{continuant} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{l} + \\ \text{consonantal} \end{array} \right] _ \left[\begin{array}{l} - \\ \text{sonorant} \end{array} \right]$
- g. (14) $\left[\begin{array}{l} p \\ + \\ Q \end{array} \right] \rightarrow t / _ t$
- h. (18) $\left[\begin{array}{l} g \\ + \\ Q \end{array} \right] \rightarrow \emptyset / v _ \left[\begin{array}{l} v \\ - \\ \text{back} \end{array} \right]$
- i. (15) $\left[\begin{array}{l} d \\ + \\ Q \end{array} \right] \rightarrow \emptyset / v _ \left[\begin{array}{l} v \\ - \\ \text{back} \end{array} \right]$
- j. (105c) $\left\{ \begin{array}{l} k \\ g \end{array} \right\} \rightarrow \left\{ \begin{array}{l} s \\ x \end{array} \right\} / _ \left[\begin{array}{l} - \\ \text{consonantal} \\ - \\ \text{back} \end{array} \right]$

(39) continued

k. (105j) $\begin{bmatrix} -\text{sonorant} \\ +Q \end{bmatrix} \rightarrow [-\text{tense}] / V ___ [+vocalic]$

l. (15) $C_i C_j \Rightarrow C_k$ where $C_i = C_j = C_k$

3. Additional Alternations

8.1 Consider the following examples (the segment [g] -- actually [ɣ] after spirantization -- is spelled g; [k] is spelled c before a back vowel).

(40)

perse [g] ir	perse [k] ución	perse [g] idor	
conseguir	consecución		
extinguir	extinción	extinguidor	extinto(adj.)
distinguir	distinción		distintivo distinto(adj.)

These examples raise several questions: (a) what is the phonological representation of [g] and [k]? (b) why is [g] not changed to [x] by rule (39j) before a front vowel? (c) what is the origin of the u in $\begin{Bmatrix} \text{per} \\ \text{con} \end{Bmatrix}$ secución? (d) why does [g], [k], or [u] not appear in extinción, distintivo, etc.?

Although alternatives are certainly conceivable, these questions can be answered as follows. Spanish has in its inventory of systematic phonemes the rounded velar obstruents /k^w/ and /g^w/; the stems in (40) are /...sek^w/ and /...ting^w/. Rule (39j) fails in perse[g]ir, etc., because at the time it applies, the segment which appears as [g] is followed by the glide w rather than by a front vowel, and it is this w which is the origin of u in ...secución. Neither [u] nor [g], etc. appears in ...inción since the

single segment g^w is deleted in ...ting^wción, ...ting^wto, and ...ting^wtivo by rule (39f). In ...seguir and perseguidor, k is laxed to g by rule (39k). Finally, w is deleted in the environment $\left\{ \begin{matrix} g \\ k \end{matrix} \right\}$ ___i since it does not appear in perse[g]ir, etc.

The justification and formulation of the rules implied by these answers is tedious, and involves inference from a wide range of data. Let us begin with the observation that the positing of /k^w/ and /g^w/, while adding to the phonemic inventory, helps to account for the otherwise inexplicably skewed distribution of w in phonetic representations. In native words there seem to be three sources of phonetic w in postconsonantal position, (a) from the diphthongization of lax stressed o, (b) from u followed by a vowel, and (c) from /k^w/ and /g^w/. Now observe that w from ó occurs after any consonant: podémos/pwédo, volámos/vwélo, forzámos/fwérzo, movémos/mwévo, torcémos/twérzo, dolía/dwéle, soltámos/swélto, llover/llwéve, pañoláta/pañwélo, etc. The w which derives from unstressed u occurs after dental as well as velar consonants: evacúa/evacwár, etc., and also fluctúa/fluctwár, individúo/indivídwo, insinúo/insinwámos, menstrúa/menstrwár, inclúyo/inclwír, etc. Otherwise, postconsonantal w follows only velar consonants: ágwa, trégwa, antígwo, cwándo, cwóta, ventrílocwo, and hundreds more. Apparently these facts are accounted for in part by the fact that Spanish has the rounded velars /k^w/ and /g^w/, but not rounded labials and dentals, */p^w/, */t^w/, etc. Thus while there are words like cwándo, cwóta, and pwédo, twérzo, llwéve, etc., there are no words like *pwádo, *twórzo, *llwáve.

The hypothesis that w is deleted in the environment $\left\{ \begin{matrix} g \\ k \end{matrix} \right\}$ ___i is supported by examples like the following, in which it is clear that the

examples in the left column share a formative with the corresponding examples in the right column:

- (41)
- | | |
|---|--|
| $k^w \left[\begin{array}{c} V \\ +back \end{array} \right]$ | $k^w \left[\begin{array}{c} V \\ -back \end{array} \right]$ |
| <u>cuál</u> [kwál], "which"
<u>cuándo</u> [kwándɔ], "when" | <u>qué</u> [ke], "what"
<u>quién</u> [kyén] (from /k ^w én/), "who" |
| <u>licuar</u> [likwár], "liquefy"
<u>licuadora</u> [likwadóra], "(Waring) blender ("liquifier")" | <u>liquidar</u> [likidár], "liquidate"
<u>líquido</u> [líkiðo], "liquid" |
| <u>igualdad</u> [iɣwaldád], "equality"
<u>ecuación</u> [ekwasyón], "equation" | <u>equidad</u> [ekidád], "equity"
<u>equivalente</u> [ekiβalénte], "equivalent" |
| <u>yegua</u> [yéɣwa], "mare" | <u>equitación</u> [ekitasyón], "horse-back riding" |

The examples in (41) show that w is deleted after a velar obstruent not only before i but also before e. We may then say that

- (42)
- $$w \rightarrow \emptyset / \left[\begin{array}{c} -\text{sonorant} \\ +\text{back} \end{array} \right] \text{ — } \left[\begin{array}{c} V \\ -\text{back} \end{array} \right]$$

We have said that w is changed to y in ...secución. The rule which accounts for this change can be stated as (43):

- (43)
- $$\left[\begin{array}{c} -\text{consonantal} \\ +\text{round} \end{array} \right] \rightarrow [+vocalic] / \left[+\text{consonantal} \right] \text{ — } \left[+\text{consonantal} \right]$$

This rule is not posited solely to handle ...secución; consider locuaz [lokwás], "loquacious," and locución [lokusyón], "locution," from lokución, where the orthographic u of locuaz cannot be phonological u. This can be seen from the stress of ventrílocuo, where if the underlined u were a

vowel, stress would be assigned incorrectly as *ventrilócuo (at best, or if the u were tense, *ventrilocúo).

Before either (42) or (43) can apply, k^w and g^w must be converted to kw and gw , respectively. This can be done with rule (44), a transformation:

$$(44) \quad \begin{array}{ccc} \left[\begin{array}{l} -\text{sonorant} \\ +\text{round} \end{array} \right] & \emptyset & \Rightarrow \quad \left[-\text{round} \right] w \\ 1 & 2 & 1 \quad 2 \end{array}$$

The motivation for this rule is that, in addition to providing the input to rules (42) and (43), the simultaneous insertion of w and unrounding of rounded obstruents has the following consequences (a) no additional rule is needed to account for unrounded $[k]$ in ...secución, locución, etc. (b) the presence of w automatically blocks the application of rule (39j), as desired, without complicating this rule by specifying that it applies to only $[-\text{round}]$ velar obstruents, and (c) provides, ultimately, for nondistinct phonetic representations of the initial clusters of $[-\text{vocalic}]$ segments of e.g. cuánto $[kwánto]$, from $/k^wanto/$, and cuento $[kwénto]$, from $/k^wónto/$, which is correct on phonetic grounds, since the two instances of $[kw]$ are not phonetically distinct, although they have distinct origins.

In (45) I give sample derivations which illustrate the rules which have just been discussed.

(45)	perse k^w ir	perse k^w ción	exting w ir	exting w ción	
				\emptyset	(39f)
	kw	kw	gw		(44)
	-		-		(39j) fails
		u			(43)
	\emptyset		\emptyset		(42)
	\exists				(39k)
	<u>perse</u> gir	<u>perse</u> cción	<u>exting</u> ir	<u>exting</u> ción	

8.2 We now consider further rule (39j). We must clarify two things: first, why there are many apparent exceptions to this rule; second, exactly what phonological processes are involved in the changes $k \rightarrow s$ and $g \rightarrow x$.

In the previous subsection we have identified the cause of the failure of (39j) in many instances, namely kw and gw sequences which derive from k^w and g^w , and in which the w is deleted before a front vowel after (39j) has been past in the sequence of rules. Thus even though k appears before a front vowel in the phonetic representation of the examples in the right-hand column of (41), these examples are only apparent exceptions to (39j). Thus words with $[g]$ before a front vowel, e.g., águila [águila] (cf. ágiles [áxiles]), guerra [géRa], guisar [gisár], etc., and with $[k]$ before a front vowel, e.g. equipo [ekípo], quitar [kitár], querer [kerér], etc., are assumed to have $/k^w/$ and $/g^w/$, when no other considerations are relevant.¹¹

The explanation of the failure of (39j) on the basis of $/k^w/$ and $/g^w/$ will not work, however for other examples. Consider, for instance, riquísimo [Rikísimo], the superlative of the adjective rico. If the stem were rik^w, which would account for rikísimo rather than *ri[s]ísimo, then there would be no explanation for rico rather than *ricuo, or the feminine form rica rather than *ricua. Moreover, this adjective occurs in the proper nouns Puerto Rico and Costa Rica, whose corresponding adjectives are puertorriqueño [pwertoRikéño] and, N.B., costarricense [kostaRiséense]. Thus (39j) applies to the stem in question before the suffix -ense, but not before the semantically identical suffix -eño, nor before the superlative suffix -ísimo, even though all begin with front vowels. Examples of

this sort can be multiplied almost indefinitely. A fuller study of derivational processes in Spanish would have to consider in detail the syntactic and phonological properties of a quite large number of affixes in order to give a fully motivated account of the contrasts illustrated in rico, riquísimo, puertorriqueño, and costarricense. The present discussion must be limited to observations concerning the directions in which further study is likely to be fruitful. The most simpleminded approach would be to merely subcategorize affixes with respect to a lexical feature which indicates whether or not stems to which a particular affix is attached undergoes rule (39j). This procedure, however, is completely ad hoc, and provides no insight into the problem. Hopefully, more can be achieved than this, although it is logically possible that it cannot. The following seems to be promising: we have seen that (39j) does not apply before the suffix -ísimo in riquísimo; in fact, this is perfectly regular: flaco/flaquísimo, loco/loquísimo, largo/larguísimo, ciego/cieguísimo, etc. Now compare ciego, "blind," and ceguera, "blindness." Thus the diphthong ie in the former is from stressed lax e. Now note the unstressed diphthong in cieguísimo, which indicates cyclical assignment of stress (cf. Chapter 3, Section 9.1). This suggests that the affix -ísimo is preceded by the boundary # at the time (39j) applies, hence this rule cannot apply to rik#ísimo, larg#ísimo, etc.¹²

Quite plausibly then, we could propose that # also appears before -eño, (cf. Caracas/caraqueño, Málaga/malagueño, Santiago/santiagoño, etc.), but not before -ense, and other freely added suffixes like -eza (rico/riqueza, flaco/flaqueza, etc.), -ito (poco/poquito, ciego/cieguito, etc.), -ía (seco/sequía, hidalgo/hidalguía, etc.), and so on.

Of particular interest are examples like the following:

(46)

- a. apical, ápice [ápice]
 apendical, apéndice
 indicar, índice
 faucal, fauce
 helical, hélice
 laringólogo, laringe [larínxe]
 conyugal, cónyuge
- b. arrancar, arranque (noun)
 achacar, achaque (noun)
 atacar, ataque (noun)
 tocar, toque (noun)
 choçar, choque (noun)
 remolçar, remolque (noun)

It is not immediately obvious why (39j) applies to words in (46a) but not in (46b). It could be, of course, that the difference is accounted for by the absence in (46a) and presence in (46b) of internal #. That is, e.g. ápice is apikte at the time (39j) applies, while e.g. arranque is arrank#e. This implies, however, a difference in derivational relationship between the verb indiktar and the noun indikte on the one hand, and the verb arranktar and the noun arrank#e on the other.¹³

It seems pointless to me to pursue these matters further at this time, since discussion is not likely to be fruitful until much more is known about syntactic, and especially derivational, processes in Spanish. I think it quite reasonable to assume, however, that the environment of rule (39j)

is correct as it stands, and that restrictions on the applicability of this rule are determined by factors extrinsic to the formulation of the rule itself. We turn now to the question of the proper formulation of the nonenvironmental part of the rule.

8.2.1 I will proceed by first stating without justification the steps in which the changes $\underline{k} \rightarrow \underline{s}$ and $\underline{g} \rightarrow \underline{x}$ are effected and then give the justification for each step. The first step may be formulated as (47):

$$(47) \quad \begin{bmatrix} \text{-sonorant} \\ \text{-anterior} \\ \text{-coronal} \\ \langle +\text{tense} \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{-back} \\ \langle +\text{anterior} \rangle \end{bmatrix} / \text{---} \begin{bmatrix} \text{-consonantal} \\ \text{-back} \end{bmatrix}$$

On the theory of rule application and marking conventions presented in Chomsky and Halle (1968, Chapter 9, Section 4), (47) will convert tense \underline{k} into the tense, strident, noncontinuant, dental \underline{c} (=ts), and lax \underline{g} into the lax, strident, noncontinuant, palato-alveolar \underline{j} . Thus (47) is essentially an assimilation rule: velar obstruents assimilate in frontness before front nonconsonantal segments.

Note that (47) must be ordered before rule (39k), which laxes intervocalic obstruents in [+Q] formatives: if (47) were ordered after (39k) then instances of intervocalic \underline{k} in [+Q] formatives would be converted to \underline{g} , and subsequently to \underline{j} in the environment of rule (47), which is incorrect. By the same token, intervocalic reflexes of \underline{k} produced by rule (47) will be laxed in [+Q] formatives by (39j). Since these reflexes of \underline{k} ultimately appear in phonetic representations as tense \underline{g} , they must be made tense again by some rule. Independent justification for these two steps - laxing and subsequent retensing - will be given below. Also, since noncontinuant \underline{c} produced by (47) appears in phonetic representations as continuant

s, there must be some rule to effect this change. Again, independent justification for this rule will be given.

Lax noncontinuant $\underset{\sim}{j}$ produced by (47) must be converted into tense continuant $\underset{\sim}{x}$. This is done in three steps. First $\underset{\sim}{j}$ is changed to continuant $\underset{\sim}{z}$ by (48):

$$(48) \quad \begin{bmatrix} +\text{strident} \\ -\text{tense} \end{bmatrix} \rightarrow [+continuant]$$

Now, since $\underset{\sim}{c}$ must also be made continuant, we may immediately replace (48) by (49):

$$(49) \quad \begin{bmatrix} +\text{strident} \\ -\text{tense} \\ +\text{anterior} \end{bmatrix} \rightarrow [+continuant]$$

That is, stridents which are also either $[-\text{tense}]$ ($\underset{\sim}{j}$) or $[\text{+anterior}]$ ($\underset{\sim}{c}$) become continuants. Note that $\underset{\sim}{c}$, which is strident but neither $[-\text{tense}]$ nor $[\text{+anterior}]$ is correctly excluded by (49). Next, lax $\underset{\sim}{z}$ is tensed to $\underset{\sim}{z}$ by the following completely general rule:

$$(50) \quad [+strident] \rightarrow [+tense]$$

Rule (50) tenses not only $\underset{\sim}{z}$ but also all the strident segments which have been laxed by rule (39 \underline{k}), which includes reflexes of \underline{k} converted into strident $\underset{\sim}{c}$ by (47) and also reflexes of underlying /s/. Thus, with (50), which must be in the grammar in any event for $\underset{\sim}{g} \rightarrow \underset{\sim}{j} \rightarrow \underset{\sim}{z}$, there is no need to complicate the formulation of (39 \underline{k}) in order to keep it from applying to /s/ and strident reflexes of \underline{k} .

Finally, $\underset{v}{\underline{s}}$ must be converted to \underline{x} . This is done with rule (51):

$$(51) \quad \begin{bmatrix} -\text{sonorant} \\ -\text{anterior} \\ +\text{continuant} \end{bmatrix} \rightarrow [+back]$$

Now let us go back and provide further motivation for each of these steps by which \underline{k} and \underline{g} are changed ultimately to \underline{s} and \underline{x} respectively. First of all note that, if, counter to fact, there were no motivation for breaking the processes summarized in (39j) into separate steps, it would be possible, in principle, in current phonological theory to formulate the changes $\underline{k} \rightarrow \underline{s}$ and $\underline{g} \rightarrow \underline{x}$ as a single rule. But this rule would be of hair-raising complexity, and, more importantly, would provide no insight whatsoever into the phonological processes involved. Presumably, in a more sophisticated phonological theory than is now available, in which phonological rules are stated in terms of processes such as "weakening", "strengthening," "assimilation," (cf. Chapter 2, Section 2.6) etc., such a rule would be disallowed in principle. But in the case of (39j) there is independent motivation for separate steps, the formulation of at least one of which, namely (47), shows clearly that we are dealing essentially with the phonological process of palatalization, which is a special case of assimilation. Furthermore, given the current theory of rule application and linking conventions, (47) is the simplest possible formulation.

Further motivation for the hypothesis of laxing and subsequent retensing of reflexes of \underline{k} in $[+Q]$ formatives can be given along the following lines. Recall rule (III-105k), which for the convenience of the reader is repeated here as (52):

$$(52) \quad \begin{bmatrix} e \\ -\text{tense} \end{bmatrix} \rightarrow \emptyset / v \begin{bmatrix} +\text{coronal} \\ +\text{anterior} \end{bmatrix} \begin{matrix} 1 \\ 0 \end{matrix} \text{---} \#$$

This rule is patently incorrect as stated. Final \check{e} is never deleted after t : combate, confite, desquite, alcahuete, tomate, chocolate, disparate, trámite, intérprete, and a large number of other examples; with the exception of a few indigenous American words like atole, mole and a few clear Latinisms and Greekisms like epipáctide, impúbere, pene, prole, final \check{e} is always deleted after l , n , d , and r : ataúd (cf. ataúdes), ágil (cf. ágiles), origen (cf. orígenes), cráter (cf. cráteres), etc. For no apparent reason, however, final \check{e} is sometimes deleted, sometimes not, after $[s]$, regardless of the origin of the $[s]$: pose, roce, ápice, índice, enlace, etc., versus voz (cf. voces), corrés (cf. correses), lápiz (cf. lápices), ciprés (cf. cipreses), res (cf. reses), lombriz (cf. lombrices), etc. In his treatment of a rule analogous to (52), Foley (1965) proposed, among other errors, that final \check{e} be deleted in $[+Q]$ ("vulgar" in Foley's terminology) formatives, but not in $[-Q]$ ("erudite") formatives. Unfortunately this proposal leads to a mass of contradictions. One example will suffice: consider ágil, ágiles. In order for ágile(s) to be stressed correctly, the penultimate i must be lax; but in $[-Q]$ ("vulgar") formatives, lax i is always lowered to e (Foley has this rule). Furthermore, intervocalic g is deleted before a front vowel in "vulgar" formatives (Foley has this rule too). Many more examples with contradictions of this sort can be found with no difficulty. Thus it is abundantly clear that final \check{e} is not deleted only in $[+Q]$ formatives. Yet there does seem to be some correlation with the deletion of \check{e} and the feature $[Q]$ (or Foley's "vulgar"/"erudite" distinction). The reason for this will become obvious if (52) is replaced by (53), which is ordered after (39k), which laxes intervocalic obstruents in $[+Q]$ formatives:

$$(53) \quad \left[\begin{array}{c} e \\ -tense \end{array} \right] \rightarrow \emptyset / V \left[\begin{array}{c} +coronal \\ +anterior \\ -tense \end{array} \right] \begin{array}{l} 1 \\ 0 \end{array} \text{---} \neq$$

Rule (53) will delete $\underset{\sim}{s}$ after all instances of $\underset{\sim}{d}$, $\underset{\sim}{l}$, $\underset{\sim}{n}$, and $\underset{\sim}{r}$, as desired, and after those dental segments in [+Q] formatives which have been laxed by (39k), although they ultimately become phonetic [s], indistinguishable from the phonetic [s] of [-Q] formatives which is not laxed by (39k), and after which, consequently, $\underset{\sim}{s}$ is not deleted. Thus, (53) reduces drastically the number of real and apparent exceptions to the incorrect formulation (52).

Now we must provide further justification for certain other details of the formulation of rules (48, 49, 50, 51), in particular, for the sequence of steps $\underset{\sim}{g} \rightarrow \underset{\sim}{j} \rightarrow \underset{\sim}{z} \rightarrow \underset{\sim}{s} \rightarrow \underset{\sim}{x}$. Consider first that there are instances of phonetic [x] which could not possibly derive from /g/. The most obvious examples are those in which [x] is not followed by a front vowel in the phonetic representation nor is there the slightest reason to suppose that these instances of [x] were followed by a front vowel at any stage of derivation. These examples include words like Japón, "Japan," japonés, "Japanese," jardín, "garden," jabalina, "javelin," jabón, "soap," jacal, "shack," jacaranda, "jacaranda (tree)," jaguar, "jaguar, tiger," Jaime, "James," Jamaica, "Jamaica," jamón, "ham," jaque (mate), "check (mate)," jazmín, "jasmine," and many others. One might of course propose that such words have underlying /x/ as well as phonetic [x]. This is highly implausible, however, given the conjunction of two sets of facts: (a) the necessity of rules to effect the change of $\underset{\sim}{g}$ to [x], presumably through $\underset{\sim}{j}$, and (b) with underlying /x/, the dialect under study would apparently have the following systematic phonemic obstruents:

(54)	p	t	č	k	k ^w
	b	d		g	g ^w
	f	s		x	

If, however, words like Japón, jardín, etc. had underlying /Y/ we would have the following more symmetrical system:

- (55)
- | | | | | |
|---|---|---|---|----------------|
| p | t | č | k | k ^w |
| b | d | ǰ | g | g ^w |
| f | s | | | |

The conjunction of these facts seems to me to provide a powerful argument against underlying x, for underlying ǰ, and for rules with the effect of (g →) ǰ → x.

Now consider the following examples:

- (56) axial [aksyál], "axial," "axile,"; eje [éxe], "axle"
anexar [aneksár], "annex (verb)"; anejo [anéxo], "annex (noun)"
reflexivo [Refleksíβo], "reflexive," "reflective"; reflejo
 [Refléxo], "reflexive (verb, pronoun,
 etc.)," "reflection, (e.g. optical),"
 "reflex (adjective, noun)"

These examples show that there is a relation between [ks] and [x]. Let us make the following first approximation to rules which would account for this:

- (57)
- a. $\left[\begin{array}{c} k \\ +Q \end{array} \right] \rightarrow y / \text{---}s$
- b. $s \rightarrow \check{s} / y\text{---}$
- c. $y \rightarrow \emptyset / \text{---}\check{s}$
- d. $\check{s} \rightarrow x$

Rule (57d) is of course the same as (51). Thus, if (57) is shown to be correct we will have shown that there is complete motivation of every step in the sequence of changes $\underline{g} \rightarrow \underline{y} \rightarrow \underline{z} \rightarrow \underline{s} \rightarrow \underline{x}$. In support of (57a, b, c), observe the following: a in axial alternates with e in eje; if (57a) applies to akse, giving ayse, then this a in the environment /___y will be changed to e by a rule we already have in the grammar, namely (III-105h). Rule (57b) is a clear case of palatalization, that is, assimilation with respect to the features [+high, -back] of a neighboring segment; thus we may restate (57b) as (58):

$$(58) \quad s \rightarrow [+high] / \left[\begin{array}{l} -vocalic \\ +high \\ -back \end{array} \right] \text{ —}$$

Even further support for the present proposals may be adduced from the following set of examples, which can be extended easily:

$$(59) \quad \text{nocturno [noktúrno], "nocturnal"; noche [nóče], "night"} \\ \text{láctico [láktiko], "lactic"; leche [léče], "milk"}$$

Thus the [ks] ~ [š (→x)] alternations of (56) are parallel by [kt] ~ [č] alternations in (58). Further, the a ~ e alternation in axial-eje is matched in láctico-leche. Therefore, we may extend (simplify) (57a) and (58) to account for kt → č as well as for ks → š. Accordingly, (57a) is replaced by (60), and (58) by (61):

$$(60) \quad \left[\begin{array}{l} -sonorant \\ +back \\ +Q \end{array} \right] \rightarrow \left[\begin{array}{l} -consonantal \\ -back \end{array} \right] / \text{ — } \left[\begin{array}{l} -sonorant \\ +coronal \end{array} \right]$$

$$(61) \quad \left[\begin{array}{l} -sonorant \\ +coronal \end{array} \right] \rightarrow [+high] / \left[\begin{array}{l} -vocalic \\ +high \\ -back \end{array} \right] \text{ —}$$

Now observe that the sequence of rules (60, 61) is unnecessarily complex: nearly every feature must be mentioned in both rules. Thus, unless there is some reason to order (60) and (61) noncontiguously, and I know of none, they would collapse into the single transformation (62):

$$(62) \quad \begin{array}{c} [-\text{sonorant}] \\ +\text{back} \\ +\text{Q} \end{array} \quad \begin{array}{c} [-\text{sonorant}] \\ +\text{coronal} \end{array} \Rightarrow \begin{array}{c} [-\text{consonantal}] \\ +\text{high} \\ -\text{back} \end{array} \quad \begin{array}{c} [+high] \end{array}$$

1 2 1 2

Further, it may be the case, although the facts are not quite clear, that there are other instances of ys and yt which do not come from ks, kt, and which are not palatalized. If this⁴ is true, then the formulation (62) is inescapable.

Since rule (III-105h) plays a role in the derivation of e.g. eje and leche, it might be thought that (III-105i), which deletes glides in certain environments, might render (57c) superfluous. This is not the case however. Rule (III-105i) deletes glides only in the environment of a preceding nonlow vowel with which the glide agrees in backness. This condition is not met in e.g. nokte noyč̣e. Thus we simply extend (57c) so that it deletes y in the environment ___č̣ as well as before č̣:

$$(63) \quad y \rightarrow \emptyset / \text{___} \begin{array}{c} [+coronal] \\ [+high] \end{array}$$

In conclusion, it must be emphasized that this entire section (including Section 3.1) contains a fair amount of speculation and unclarity, even though the rules discussed are in all cases highly motivated. Note, however,

that it is not the case that there are no easy answers to the questions raised; the problem is rather that there is a plethora of all-too-easy answers of roughly equal plausibility, but no principled way of choosing among them at this stage of the game. For example, there remain a number of exceptions to rule (53) in both directions, that is, cases where ě is not deleted although (53) predicts that it should be, and cases where ě is deleted although (53) predicts that it should not be. An example of the first sort is prole (of Latin origin). There we have open at least four possibilities:

- a. Distinguish a class of Latinisms exempt from (53).
- b. Make the ad hoc (but historically correct) claim that the final e is tense.
- c. Make the ad hoc claim that the final vowel is i rather than e at the time (53) applies. This i would then be lowered by (III-105_o) to give the correct phonetic form.
- d. Make the ad hoc claim that the representation is proile, to which (53) cannot apply. Geminate ll would then be reduced to l by rule (39_l) to give the correct phonetic form.

An example of the second sort is reloj/relojes (the only word in the dialect under study with final [x] -- there are a few others in other dialects, e.g. troj, horraj, boj, which are well-known conversation pieces among philologists). Here we have open, among others, the following possibilities:

- a. Disregard reloj altogether as an isolated oddity.
- b. Postulate, in addition to the major rule (53), a corresponding minor rule (53') which deletes final ě in certain environments in specially marked formatives.

- c. Claim that the base form is /reloʃ/, with no final vowel, the e of relojes being inserted by some rule. There is some independent motivation for such a rule, which might account for the well-known stress shifts in carácter/caractéres (cf. cadáver/cadáveres), régimen/regímenes, ínterin/intérines. Such a rule might also help account for some of the failures of (39j), e.g. the final e of the recent borrowing cheque, "check," might be added after (39j) has been past in the sequence of rules.

The issues involved here are complex, and the range of relevant data extremely wide. Therefore, rather than give facile but unmotivated answers, I prefer to leave many questions open until research permits them to be answered in a principled way.

9. Concluding Remarks and Summary of Rules

This section will contain as its final subsection an ordered list of all the rules discussed in this study, in as final a form as is possible at this stage of knowledge. A number of unclarities and loose formulations will be allowed to remain where it does not seem to me that my understanding of the available data is sufficient to warrant striving for an illusion of greater precision, which might be achieved simply by making ad hoc decisions. There are, on the other hand, several issues which will clearly profit from further discussion in the light of the total set of rules proposed in this study. To these issues we devote the remaining subsections.

9.1 In Chapter 3, Section 2.1, passim, strong motivation was given for a rule, (III-38c) which deletes vowels in the environment +___+[V, +tense]. For the convenience of the reader, the application of this rule is again illustrated in (64):

(64)

saktato	saktats	sakta+mos	saktate	saktate+s	saktate+mos	
∅			∅	∅	∅	(III-38c)
<u>sako</u>	<u>sakas</u>	<u>sakamos</u>	<u>sake</u>	<u>sakes</u>	<u>sakemos</u>	

Rule (III-38c) accounts for the absence of the theme vowel in the first person singular present indicative and in all forms of the present subjunctive of all regular verbs. Further, if (III-38c) is ordered before stress assignment in these forms, then the latter can be stated simply as "assign stress to the penultimate vowel." Thus we may take it that the order ((III-38c), stress assignment in verbs) is established.

In Chapter 3, Section 3, it was observed that the alternations of k, g before ^{back} vowels with s, x before front vowels, summarized in (III-38b), are not found in verb paradigms. For example, the first conjugation stems /sak/ and /pag/ occur as [sak] and [pag] in [sake] and [page] as well as in [saka] and [paga]. By the same token, the second conjugation stems /kok/ and /proteg/ occur as [kos] and [protex] in [kosamos] and [protexamos] as well as in [kosemos] and [protexemos]. These facts can be accounted for very simply by ordering (III-38b) before (III-38c), as illustrated in (65):

(65)

saktate	pagtate	kokteta+mos	protegteta+mos	
---	---	s	x	(III-38b)
∅	∅	∅	∅	(III-38c)
<u>sake</u>	<u>page</u>	<u>kosamos</u>	<u>protexamos</u>	

Thus we may take it to be established that (III-38b) must precede (III-38c), which must in turn precede stress assignment in verbs. Furthermore, it is clear that (IV-39h), (IV-39i), and (IV-42) must also precede (III-38c). Now observe that in the final subsection of this chapter, rule (12), which is the first of the steps summarized in (III-38b), occurs quite far down in the ordered sequence of rules. Note further that rule (23) is the first rule in the sequence in which stress plays any role at all. Therefore, any of the following alternative positions might be taken:

- a. Stress assignment for all categories is ordered after (12) but before (23).
- b. Stress assignment for categories other than verbs is ordered early, in particular, before (12). Stress assignment for verbs is ordered after (12) but before (23).
- c. Stress assignment for all categories is ordered early, in particular before (12). Position of stress in verbs is corrected by an additional rule which is ordered after (12).

Although (a) results in stress being assigned relatively late, there seems to be no obvious evidence against this alternative since stress is irrelevant before (23). On the other hand, the rule which assigns stress to verbs and the rule which assigns stress to other categories have nothing in common aside from the fact that neither assigns stress to final syllables (except in monosyllables), and, of course, the fact that both rules assign stress. Thus there is no overwhelming justification for collapsing both rules into one schema and thereby rejecting alternative (b). Alternative (c) may be rejected on the grounds that it is the most complex of the three, unless further investigation reveals that both (a) and (b) must be rejected

for some reason not apparent at present. Of (a) and (b), (a) is clearly the simpler, though by a margin of only a few features. Hence we tentatively, but somewhat arbitrarily, accept (a).

Note, however, that if it is correct that rule (12) fails in words like arrank#e because of the presence of # (as suggested near the end of Section 8.2), then the whole question of stress assignment must be re-studied in the light of the role of # in the rules which assign stress.

It is of some interest that the relatively late ordering of stress assignment proposed here (on purely synchronic grounds) may be a reflection of the historical facts presented in Chapter 3, notes 10 and 16. That is, briefly, that the position of stress in verbs has undergone two sets of shifts since the 13th century. Thus the synchronic order of stress assignment is not wildly at variance with the diachronic order of changes of which the synchronic rules which precede stress assignment are a residue. In fact, the two orders could probably be made to correspond quite closely if the chronology of certain changes were more clearly established, although the interest in doing so would be purely historical rather than synchronic.

9.2 The formulation of rule (III-105m), diphthongization, will be refined now. For the convenience of the reader, this rule is repeated here as (66):

$$(66) \quad \begin{Bmatrix} e \\ o \end{Bmatrix} \rightarrow \begin{Bmatrix} ye \\ we \end{Bmatrix} / \left[\begin{array}{l} +\text{stress} \\ -\text{tense} \\ +Q \end{array} \right]$$

At first glance it seems that the proper formulation of this rule should include two steps, the first of which inserts glides which agree in back-

9.3 Ordered list of rules:

1. $\emptyset \rightarrow \begin{bmatrix} +\text{vocalic} \\ \alpha\text{low} \\ \beta\text{high} \end{bmatrix} / \begin{bmatrix} \alpha\text{1conj} \\ \beta\text{3conj} \end{bmatrix} + __\#]_V$ (III-97, 99, 105a)
2. $\begin{bmatrix} V \\ -\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{high} \\ +\text{tense} \end{bmatrix} / __\left\{ \begin{array}{l} C_0 i\#]_V \\ [+past] \end{array} \right\}$ (III-10, 19, 25, 38a, 53, 59, 104, 105b)
3. $[-\text{sonorant}] \rightarrow [+tense] / __\begin{bmatrix} -\text{sonorant} \\ +\text{tense} \end{bmatrix}$ (IV-12, 39b)
4. $\begin{bmatrix} -\text{sonorant} \\ -\text{continuant} \end{bmatrix} \rightarrow \emptyset / [+consonantal] __\begin{bmatrix} -\text{sonorant} \end{bmatrix}$ (IV-21, 39f)
5. $t \rightarrow [+continuant] / __\begin{bmatrix} -\text{consonantal} \\ +\text{high} \\ -\text{back} \end{bmatrix} V$ (IV-23, 39e)
6. $\begin{bmatrix} -\text{lconj} \\ 1 \end{bmatrix} \begin{matrix} + \\ 2 \end{matrix} t \begin{matrix} \\ 3 \end{matrix} \Rightarrow \begin{bmatrix} [+continuant] \\ 1 \end{bmatrix} \begin{matrix} + \\ 2 \end{matrix} \begin{bmatrix} [+continuant] \\ 3 \end{bmatrix}$ (IV-27, 29, 30, 38, 39c, 39d)
7. $\begin{bmatrix} P \\ +Q \end{bmatrix} \rightarrow t / ___t$ (IV-14, 39g)
8. $\begin{bmatrix} -\text{sonorant} \\ -\text{tense} \\ \alpha\text{anterior} \\ \alpha\text{coronal} \\ +Q \end{bmatrix} \rightarrow \emptyset / V __\begin{bmatrix} V \\ -\text{back} \end{bmatrix}$ (IV-15, 18, 39h, 39i)
9. $g^w \rightarrow w / \# ___$ (II-25, 59a, III-105f)
10. $\begin{bmatrix} -\text{sonorant} \\ +\text{round} \end{bmatrix} \begin{matrix} \emptyset \\ 1 \end{matrix} \Rightarrow \begin{bmatrix} -\text{round} \\ 1 \end{bmatrix} \begin{matrix} w \\ 2 \end{matrix}$ (IV-44)

11. $\begin{bmatrix} -\text{consonantal} \\ +\text{round} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{vocalic} \\ \end{bmatrix} / \begin{bmatrix} +\text{consonantal} \\ \end{bmatrix} _ \begin{bmatrix} +\text{consonantal} \\ \end{bmatrix}$ (IV-43)
12. $\begin{bmatrix} -\text{sonorant} \\ -\text{anterior} \\ -\text{coronal} \\ \langle +\text{tense} \rangle \end{bmatrix} \rightarrow \begin{bmatrix} -\text{back} \\ \langle +\text{anterior} \rangle \end{bmatrix} / _ \begin{bmatrix} -\text{consonantal} \\ -\text{back} \end{bmatrix}$ (III-9, 38b, 105c; IV-39j, 47)
13. $w \rightarrow \emptyset / \begin{bmatrix} -\text{sonorant} \\ +\text{back} \end{bmatrix} _ \begin{bmatrix} \text{V} \\ -\text{back} \end{bmatrix}$ (IV-42)
14. $v \rightarrow \emptyset / + _ + \left\{ \begin{array}{l} \begin{bmatrix} \text{V} \\ +\text{tense} \end{bmatrix} \\ \text{rE} \# [+future] \end{array} \right\}$ minor (III-2, 28, 38c, 95, 105d)
15. Stress (III-3, 17, 38d, 40, 105d)
16. $\emptyset \rightarrow e / \# _ _ s [+consonantal]$ (IV-notes 5, 39a)
17. $b \rightarrow \emptyset / i + _ _$ (III-20, 38e, 105g)
18. $\begin{bmatrix} -\text{sonorant} \\ +\text{back} \\ +Q \end{bmatrix}_1 \begin{bmatrix} -\text{sonorant} \\ +\text{coronal} \end{bmatrix}_2 \Rightarrow \begin{bmatrix} -\text{consonantal} \\ +\text{high} \\ -\text{back} \end{bmatrix}_1 \begin{bmatrix} +\text{high} \end{bmatrix}_2$ (IV-57, 60, 61, 62)
19. $\begin{bmatrix} -\text{sonorant} \\ +Q \end{bmatrix} \rightarrow \begin{bmatrix} -\text{tense} \end{bmatrix} / \text{V} _ _ \begin{bmatrix} +\text{vocalic} \end{bmatrix}$ (III-11, 38h, 105j; IV-39k)
20. $\begin{bmatrix} -\text{tense}^e \end{bmatrix} \rightarrow \emptyset / \text{V} \begin{bmatrix} +\text{coronal} \\ +\text{anterior} \\ -\text{tense} \end{bmatrix}_0^1 _ _ \#$ (III-15, 38i, 105k; IV-52)

38.
$$\left[\begin{array}{l} \text{Andante} \\ \text{Allegretto} \end{array} \right. \begin{array}{l} l \rightarrow [+distributed] / _ \left[\begin{array}{l} +consonantal \\ +anterior \\ +coronal \\ +distributed \end{array} \right] \\ ["] \rightarrow [\quad " \quad] / _ (\begin{array}{l} [-seg] \\ [-FB] \end{array}) [\quad " \quad] \end{array} \right. \begin{array}{l} (\text{II-17, 59h}; \\ \text{III-105w}) \end{array}$$
39.
$$\left[\begin{array}{l} \text{Andante} \\ \text{Allegretto} \end{array} \right. \begin{array}{l} \left[\begin{array}{l} -sonorant \\ -tense \end{array} \right] \rightarrow \left[\begin{array}{l} +continuant \\ -strident \end{array} \right] / \left\{ \begin{array}{l} [+continuant] \\ [-\alpha coronal] \end{array} \right\} \left[\alpha coronal \right] \\ [\quad " \quad] \rightarrow [\quad " \quad] / \left\{ \quad " \quad \right\} (\begin{array}{l} [-seg] \\ [-FB] \end{array}) [\quad " \quad] \end{array} \right. \begin{array}{l} (\text{II-39, 40,} \\ \text{59i; III-105x}) \end{array}$$
40.
$$\left[\begin{array}{l} \text{Andante} \\ \text{Allegretto} \end{array} \right. \begin{array}{l} \left[\begin{array}{l} \alpha consonantal \\ \alpha vocalic \\ -lateral \end{array} \right] \rightarrow \left[\begin{array}{l} \alpha sonorant \\ \alpha tense \end{array} \right] / V _ \left\{ \begin{array}{l} (\#) [\alpha consonantal] \\ \#\# \end{array} \right\} \\ [\quad " \quad] \rightarrow [\quad " \quad] / V _ \#\# \end{array} \right. \begin{array}{l} (\text{II-52, 59j}; \\ \text{III-105y}) \end{array}$$
41.
$$\text{Allegretto} \quad R \rightarrow \left[\begin{array}{l} -sonorant \\ -tense \end{array} \right] \quad \text{OPTIONAL} \quad \begin{array}{l} (\text{II-58, 59k}; \\ \text{III-105z}) \end{array}$$
42.
$$\left[\begin{array}{l} -continuant \\ +tense \end{array} \right] \rightarrow \left[\begin{array}{l} +voice \\ +HSP \\ +GC \end{array} \right] / _ (\begin{array}{l} [-seg] \\ [-FB] \end{array}) \left[\begin{array}{l} +sonorant \\ -nasal \end{array} \right] \quad \begin{array}{l} (\text{II-43, 59l}; \\ \text{III-105a}') \end{array}$$
43.
$$\left[\begin{array}{l} -sonorant \\ -HSP \end{array} \right] \rightarrow \left\{ \begin{array}{l} \left[\begin{array}{l} \alpha voice \\ -voice \end{array} \right] / _ (\begin{array}{l} [-seg] \\ [-FB] \end{array}) \left[\begin{array}{l} +consonantal \\ \alpha voice \end{array} \right] \\ \left[\begin{array}{l} -voice \end{array} \right] / _ \#\# \end{array} \right\} \quad \begin{array}{l} (\text{II-44, 59m}; \\ \text{III-105b}') \end{array}$$
44.
$$\text{Allegretto} \quad \left\{ \begin{array}{l} \gamma^l \\ \gamma^w \end{array} \right\} \rightarrow \left\{ \begin{array}{l} y \\ w \end{array} \right\} \quad \begin{array}{l} (\text{II-29, 59n}; \\ \text{III-105c}') \end{array}$$

FOOTNOTES TO CHAPTER IV

1. I have chosen to study data of this sort in order to minimize questions of morphological "relatedness." In order to restrict the data to absolutely clear cases, I have used the Vox Diccionario general ilustrado de la lengua española as a reference to guarantee identity of stems in a given paradigm. For example, every -ión nominalization cited is defined by the Vox dictionary, on at least one reading, simply as "acción y efecto de X," where X is the corresponding verb; every agentive noun is defined simply as "que X [that which or who Xes]." Further, since the derivational processes involved are extremely productive, in many instances native speakers are not sure whether or not a given form officially exists. Again the Vox dictionary is used as the authority, and all the forms cited are officially recognized therein.

2. This is not to say that I am unaware that e.g. confección has an interesting etymology, but a synchronic phonology of Spanish cannot be based on the a priori assumption that confección and hacer must share an underlying representation. If it turns out that on the basis of clear synchronic evidence /fak/ may figure in the phonological representation of both confección and hacer, this is one thing; to make the a priori assumption that it must is to render completely without interest a putatively synchronic grammar. I apologize for these banalities, but the issues involved seem to be widely misunderstood.

3. See Chomsky and Halle (1968, Chapter 9).

4. Note that siete must be [+Q] because of the diphthong. If (105j) is ordered before (15), then the presence of intervocalic tense [t] is accounted for, since it does not meet the environment of (105j) at the time it applies.
5. The initial e of the last stem is epenthetic, and is inserted by the uninteresting rule $\emptyset \rightarrow e / \# ___ s [+consonantal]$. Thus ^{no}phonetic representation has an initial cluster consisting of s plus a consonantal segment. (The specification [+consonantal] allows the inclusion of /# ___ sl; cf. checoslovaco, but eslovaco.)
6. In the dialect under study, orthographic xc is regularly pronounced [ksC]. This may be rather surprising to those familiar with dialects (possibly an overwhelming majority) in which xc is regularly pronounced [sC].
7. Among the details glossed over in (29) and (30) are the following: We have not established the order of (12), which tenses obstruents before tense obstruents, with respect to (29). If (12) is ordered before (29a) or (29b), then either or both of the latter might specify only the segment g in place of the archisegment [t, d], since only g would remain in this position after the application of (21). If (12) is ordered after (29a) or (29b), then (30) would contain the steps

$$d+t \xrightarrow{(29a)} d+s \xrightarrow{(21)} t+s \xrightarrow{(29b)} s+s \xrightarrow{(15)} s$$

OR

$$d+t \xrightarrow{(29a)} d+s \xrightarrow{(29b)} s+s \xrightarrow{(21)} s+s \xrightarrow{(15)} s$$

Further, since every segment mentioned in (29a) is also mentioned in (29b) and conversely, if no reason is found to order (29a) and (29b) noncontiguously, then (29) might be stated as a single transformation with roughly the effect of $t+tt \rightarrow s+ts$.

Note also that neither (12) nor (29) applies to adscribir and adsorción, which are presumably /ad=skrib+i+trE/ and /ad+sorb+t+tionE/.

8. The careful reader will have noted that there is an explotar₁ in (3) and an explotar₂ in (27). Explotar₁ means "exploit," and causes no trouble. Explotar₂ means "explode," and, according to Corominas (1961) was coined in 1916 as a back-formation from explosión. This new verb was assigned to the first conjugation, as are all new verbs (cf. the remarks about the "productiveness" of the first conjugation just above (4)). Circuncidar is from Latin circumcidere; the date of its switch to the first conjugation is not documented.
9. This more complex lexical representation is furthermore highly counter-intuitive: anybody can tell you that the stem of abortar is abort, not abortt, and that the stem of cantar is cant (as in canto), and not cantt. Cf. the remarks about productiveness in the paragraph immediately below (37).
10. The same kind of argument that would insist on the "relatedness" of ungir and untar would also doubtlessly insist that a grammar of English contain rules, which clearly could be written, to account for the "relatedness" of such pairs as father-paternal, ear-hear, footstool-pedestal, serpent-herpetology, shirt-skirt, wine-vintage, and so on.

CHAPTER V - HISTORICAL EXCURSUS: Reflexes of the Medieval Stridents

1. It is well known that some dialects of Spanish, e.g., "Castilian," have a contrast between strident and nonstrident voiceless dental continuants, while other dialects, e.g., those of southern Spain and Latin America (including in particular the Mexican dialect treated in this study), have no such contrast. For example, in Castilian orthographic casa and caza are, roughly, [kása] and [káθa], respectively; in Mexico both are [kása].¹

It is generally believed that the historical development of, say, Mexican Spanish includes the sound change (1):²

(1) $\theta \rightarrow s$

Thus, presumably, caza was once pronounced [káθa] in Mexican Spanish, but after change (1) had occurred it came to be pronounced [kása], indistinguishable from casa, which had been pronounced [kása] prior to the occurrence of (1). The belief that (1) is a historical rule of Mexican Spanish seems to be based on (a) the fact that θ occurs in Modern Castilian, and (b) the fact that Spain colonized Latin America, not vice versa. Certainly no other linguistic evidence has ever been presented to show that the sound change represented by (1) ever occurred. Obviously then, belief in the existence of (1) as a historical rule is based on a non sequitur. Those who hold this belief seem not to have considered the possibility that certain instances of Latin American[s] are the reflexes not of θ but of an ancestor common to both and distinct from both.

It has also been asserted that (1) must be a rule in synchronic grammars of Latin American dialects.³ The evidence presented to support this assertion, is, however, irrelevant to the question of the identity of the segment

supposed to be θ . In other words, no reason has been given to show that the segment in question must be θ rather than some other segment.

We will examine in this chapter certain rather drastic historical developments in Spanish which took place around the 16th and 17th centuries. These developments have for Spanish an interest roughly equivalent to that of the Great Vowel Shift for English and the Consonant Shift for Germanic. Among other things, it will be seen that careful study of the available historical data raises serious questions about the existence of (1), and suggests rather than (2) is one of the steps in the evolution of some modern dialects, e.g., Castilian, but not of others, e.g., Mexican:

(2) $s \rightarrow \theta$

If this correct, then the status of arguments and conclusions which assume the existence of (1) is somewhat curious.

2. Around the beginning of the 16th century, the prestige dialect of North Central Spain, usually referred to as Castilian,⁴ had at least the following phonetic obstruents (the underlying phonological system will be of marginal concern here):

(3)

p	t	k
b	d	g
ɟ	ʃ	ʎ
f	s	ʎ
	z	ʎ
	ç	ç
	ç	j

I make the following clarifications:

1. The exact values of S and Z are not known, nor is it likely that they will ever be known with certainty. S may have been either (a) a "normal" apico-dental or apico-alveolar strident continuant, i.e., [+consonantal, -vocalic, +coronal, +anterior, +continuant, +strident, -high, etc.], (b) a retroflected apical strident continuant, i.e., [+consonantal, -vocalic, +coronal, -anterior, +continuant, +strident, -high, etc.]. Z is the voiced (lax) counterpart of S. As will be noted below, S has retroflected reflexes in modern Castilian; what is not known, and will probably always be shrouded in obscurity, is when the segments in question became retroflected. Possibly the retroflection of S dates back to Roman times, or further. For fuller discussion see Martinet (1949) and references therein.
2. For typographical reasons, ć stands for [tʃ], ź for [dʒ].
3. It is questionable that both [š] and [ǰ] existed at this time. As will be seen immediately below, this is not crucial for the present discussion.

In modern Castilian, the nonstrident stops and continuants (and f) of (3) remain unchanged. The dental and palato-alveolar stridents, however, have undergone considerable evolution, the results of which are shown in (4).

(4)

=1500:	S Z	ć ź	š ž (ǰ)	č
Modern Castilian:	$\begin{array}{c} \diagdown \quad \diagup \\ S \quad Z \\ \diagup \quad \diagdown \\ s \end{array}$	$\begin{array}{c} \diagdown \quad \diagup \\ ć \quad ź \\ \diagup \quad \diagdown \\ \theta \end{array}$	$\begin{array}{c} \diagdown \quad \diagup \\ š \quad ž \quad (ǰ) \\ \diagup \quad \diagdown \\ X \end{array}$	$\begin{array}{c} \checkmark \\ \vdots \\ č \end{array}$

The ad hoc representation $\underset{\sim}{s}$ stands for a retroflected apical strident continuant, whose timbre is striking, so much so that naive observers often erroneously report it as [ʃ]. For a competent and very careful discussion of $\underset{\sim}{s}$, see Navarro T. (1965, p. 105ff).

Upper case $\underset{\sim}{X}$ represents a strident velar or uvular voiceless continuant, notably different from the [x] of Mexican Spanish, which I take to be non-strident. For a fuller description, see Navarro T. (1965, p. 142f).

I give in (5) a resume of the steps of the evolution illustrated in (4). The actual course of this evolution is hardly what one would guess it to have been if one had no access to the relevant historical data, but the data seem to me to be sufficiently clear to warrant this discussion. The dates given below are of course only rough approximations; they are round-number averages based on the work of a number of scholars.⁵

- (5) a. (1500: recall that $\check{j} \rightarrow \check{z}$ may or may not have already taken place.)
- b. 1520: $\underset{\sim}{z}$ (but not $\underset{\sim}{c}$) becomes a continuant. The most plausible result is [z]. However, if $\underset{\sim}{Z}$ was not yet retroflected, this means merger of $\underset{\sim}{z}$ and $\underset{\sim}{Z}$ as [z]. Since the modern Castilian reflexes of $\underset{\sim}{z}$ and $\underset{\sim}{Z}$ are distinct, scholars have believed that the retroflexion of $\underset{\sim}{Z}$ (and $\underset{\sim}{S}$) occurred prior to 1520 (which is quite plausible in any event), or they have proposed various weird phonetic values for the 1520 continuant resulting from 1500 $\underset{\sim}{z}$. These proposals are extremely difficult to interpret because of the vague articulatory descriptions given, and/or because of the impossibility of determining what is intended by unexplained phonetic symbols such as $[\underset{\sim}{z}]$. I will assume henceforth

that the retroflexion of S and Z occurred before 1520 (possibly centuries before) and that [z] was in fact the result of the 1520 innovation.⁶

- c. 1570: Z, z, and ž become voiceless.
- d. 1600: č becomes a continuant. It seems clear that this was at least half a century later than the change of č' to a continuant. The exact phonetic value of the continuant resulting from č is again a matter of dispute and uncertainty in the literature. However, [θ] is completely out of the question, and has never been suggested by a serious scholar. The most plausible solution, phonetically, would be [s], and I assume that this is correct (whether or not S and Z were retroflexed in 1600, as I assume they were). The remarks in note 6 are also applicable in this case.
- e. 1650: Reflexes of 1500 č' and č' become [θ]. The exact quality is known, but the date might have been somewhat later than 1650. Thus the reflexes of č and č' were strident continuants for half a century and possibly well over a century, respectively, before becoming nonstrident [θ].
- f. 1700: Reflexes of 1500 š, ž (and perhaps ǰ) are changed to velars, either nonstrident [x] and later strident [X], or strident [X] directly. The date is quite vague, and should be interpreted as meaning simply "after 1650."

This series of innovations is summarized in (6). For simplicity I assume that S and Z were already retroflex in 1500. For future reference, š and č are included.

In any case, some marking convention will supply the feature [-coronal] to the output of (7e).

It is perhaps worth noting that after the 1600 innovation, the dialect in question had the strident obstruents given in (8):

(8)		f	s	š	ṣ̌	č
	Coronal	- *	+	+	+	+
	Anterior	+	+	*	-	-
	High	-	-	-	*	+
	Continuant	+	+	+	+	* -

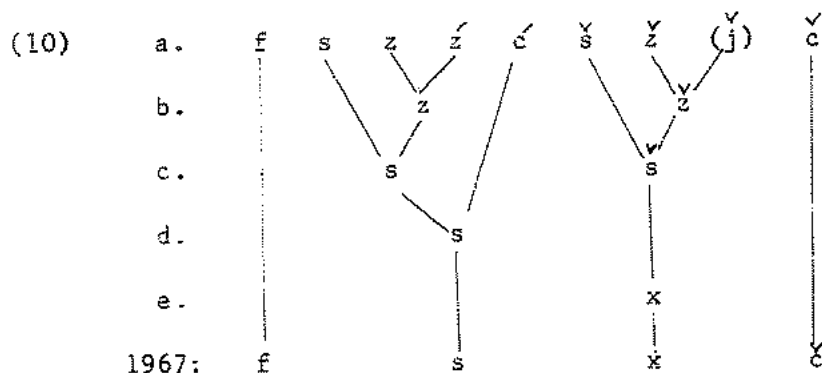
These obstruents differed pairwise in only one feature, indicated by the *. Those interested in the causality of language change would perhaps say that this situation was intolerably delicate, and could not long withstand change. However one feels about this, it is true that the succeeding innovations did increase considerably the "distance" among the segments in question. But this is only one side of the story: the increase in "phonetic distance" was bought at a substantial cost in terms of markedness.⁷ The system (8) already contained the highly marked segment ṣ̌; the innovations (7d, e) retain this segment, obliterate no contrasts, and replace s with more highly marked θ and ṣ̌ with more highly marked X. A more sophisticated theory of language change than we now have must surely take into account facts such as these, as well as notions like "symmetry" and "phonetic distance."⁸

3. The correspondences among the strident phones of the "±1500" dialect discussed above and the related phones of modern Mexican are given in (9):

(9):	±1500	f	s	z	č	z'	š	ṣ̌	(j)	č̣
	Modern Mexican	f	s				x			c

Note that [s] is not retroflected and that [x] is nonstrident.

All the available evidence indicates that the evolution of modern Mexican went through the stages shown in (10).⁹



The rules implied by (10) are given in (11):

(11) a. $\left[\begin{array}{l} +\text{strident} \\ -\text{tense} \end{array} \right] \rightarrow \left[+\text{continuant} \right]$

b. $\left[+\text{strident} \right] \rightarrow \left[-\text{voice} \right]$

c. $\left[\begin{array}{l} +\text{strident} \\ +\text{anterior} \end{array} \right] \rightarrow \left[+\text{continuant} \right]$

d. $\left[\begin{array}{l} -\text{sonorant} \\ +\text{continuant} \\ +\text{high} \end{array} \right] \rightarrow \left[+\text{back} \right]$

Comparing (11) with (7), we see that divergence begins with (7d), which produces Castilian θ. Now if it is to be claimed that rule (1) figures in the history of Mexican Spanish (whose genetic relationship to Castilian is quite vague), it must also be claimed (a) that an innovation with the effect of (7d) occurred also in Mexican Spanish, and (b) that another innovation with the effect of rule (1) followed the first innovation, with the

result that the history of modern Mexican includes the following sequence of innovations:

- (12) a. s → θ
 b. θ → s

The absurdity of (12) is compounded by the fact that not one single historical datum supports the claim that (12a) ever occurred in Mexican Spanish.

Recall that Cortés reached Tenochtitlán, now Mexico City, on November 8, 1519. Shortly thereafter, colonists from various regions of Spain began arriving in large numbers. By the time of the appearance of θ in Castilian, that is by 1650, or a century and a quarter after the conquest of Mexico, there had been several generations of native speakers of Mexican Spanish. Thus it is hardly surprising that this dialect did not share with Castilian the innovation which replaced relatively unmarked s by relatively highly marked θ.

FOOTNOTES TO CHAPTER V

1. Here and henceforth I ignore low-level voicing assimilation, e.g., luz verde, "green light," which might be represented as [lúθ^hβérse] in Castilian, and as [lús^zβérðe] in Mexican.
2. Cf. Sapir (1925), Sableski (1965), Saporta (1965), and McCawley (1967).
3. Cf. Foley (1965), Sableski (1965), Saporta (1965), McCawley (1967).
4. The term "Castilian" is slightly misleading. The dialect referred to is far from being strictly the dialect native to any particular region of Castilla la Vieja or Castilla la Nueva. It is rather an amalgam, or lingua franca, gradually constituted of quite diverse elements as political ascendancy moved from court to court during the hectic eight centuries (711 - 1492) of the Arab occupation of Spain. To appreciate the possible consequences of this occupation think of the Norman occupation of England as having last eight centuries, that is, until 1866.
5. Alarcos Ll. (1961), Alonso (1951a, 1951b, 1955, 1961), Canfield (1957), Catalán (1957), Contini (1951), Ford (1900), Martinet (1951). I rely most heavily on Alonso (1955) because of his extraordinarily rich documentation consisting of nearly 400 pages of citations from medieval and early modern grammarians and phoneticians.
6. It is possible for z to have become [z] and still not merge ultimately with unretroflexed z if the rule accounting for post-1520 retroflexion

is inserted in the grammar before the rule which reflects the change $\dot{z} \rightarrow z$. This possibility has never been considered by traditional philologists, who presumably have never had a clear conception of a synchronic grammar as a set of ordered rules into which a new rule may be inserted other than at the end.

7. For extensive discussion of markedness, see Chomsky and Halle (1968, Chapter 9).
8. One is intrigued by the fact that [-strident] appears to the right of the arrow of (7d) and [+strident] appears to the right of the arrow of the "marked" version of (7e). I have toyed with collapsing (7d, e) into one rule whose right-hand side contains, among other features, [α strident], but this has led nowhere. Note further that in some dialects of southern Spain, all of the set [S, Z, \acute{c} , \acute{z}] has been replaced by [θ]. If the retroflexion of \underline{S} and \underline{Z} had been lost earlier in these dialects, as seems to be the case (see footnote 9), then rule (7d) would apply to $\underline{s} < \underline{S}$ as well as to $\underline{s} < \acute{c}$. This seems to be the most reasonable explanation for the unusual occurrences of θ in these dialects.
9. There has been considerable dispute in the literature as to whether or not modern Mexican (and Latin American Spanish in general) is a linear descendent of the northern prestige dialect of which Castilian is the modern representative. Evidence seems to be growing which indicates that it is not; rather, that Mexican is more closely related to dialects of southern Spain. For a summary and further references, see Canfield (1962). In any event, the only possible relevant

difference between the direct ancestor of Mexican Spanish and that of modern Castilian is that in the former, S and z were not retroflex at the beginning of the 16th century (and possibly had not been retroflex for a good many centuries).

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BIOGRAPHICAL NOTE

James Wesley Harris was born on February 14, 1932, in East Point, Georgia, and received his elementary and secondary education in that city. He attended the University of Georgia (1948-1950, 1953), the Instituto Tecnológico y de Estudios Superiores of Monterrey, Nuevo León, Mexico (1950); the Universidad Nacional Autónoma de México (1951-52); Louisiana State University (1960-1962); and the Massachusetts Institute of Technology (1964-1967). He received the degree of Bachelor of Arts in Spanish from the University of Georgia in 1953, and the degree of Master of Arts in Linguistics from Louisiana State University in 1962. He has taught Spanish, Latin, Linguistics, and Language Pedagogy at the Charlotte Hall Military Academy, Louisiana State University, the University of Florida, and M.I.T. He has recently been appointed Assistant Professor of Modern Languages at M.I.T. He is coauthor of A[udio]-L[ingual]M[aterials] Spanish, Levels III and IV, published by Harcourt, Brace & World, Inc.

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