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SPANISH MORPHOLOGY
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Spanish Morphology

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This thesis comprises a description of Spanish morphology in terms of the theory of generative grammar. The emphasis is not so much on mere coverage of data as on the rules necessary to account for morphological alternations in Spanish. Thus morphological derivation which consists simply of adding suffixes to stems with no accompanying phonological change (e.g. the formation of diminutives by adding ito, etc.) is not discussed. At the other extreme, the composition of the so-called thematic vowel of the verbs and the so-called personal endings of the verbs, where the underlying forms are highly abstract and the relation between these underlying forms and the phonetic output has as yet not been satisfactorily determined, is also not discussed. Rather the discussion centers on those aspects of derivational and inflectional morphology where the underlying forms are relatively non-abstract, and where the rules operating on these underlying forms are fairly obvious and straight-forward, although the particular rules and their combination which must apply in any given derivation to produce the observed phonetic output may not be so obvious.

Chapter 1 discusses the very important division of the Spanish vocabulary into two classes, called erudite and vulgar, as well as several rules which apply only to vulgar words. The concept of a root increment is also introduced. Chapter 2 discusses the widespread phenomenon of rhotacism and several apparent exceptions, as well as the important cluster simplification, prothesis, and assimilation rules. Chapter 3 discusses the sources of the long r, and the causes of phonetic contrasts between diffuse vowels (i and u) diffuse glides (y and w), and diffuse glides with accompanying friction (y and w). Chapter 4 discusses glide increments, and how they account for many otherwise anomalous phenomena, such as the so-called irregular preterits of andar and estar, as well as the precise relationship between forms such as cinco and quince. Also discussed is the rule which relates forms such as tremulo and temblar, prostrarse and postrarse, etc. In chapter 5 is discussed the important phenomenon of apocope and the role it plays in Spanish plural formation and stress prediction. Spanish stress, although generally considered to be unpredictable, is shown to be predictable by the well-known Latin penultimate rule. The thesis concludes with a discussion of the stress on preterit forms such as amé, amó, comí, comió in third conjugation verbs as well as a discussion of the phenomenon of medial vowel raising as exemplified in alternations such as virgen/virginal, hacer/sacrificar, etc. in chapter 7.

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Introduction

I wish first to express my indebtedness to Morris Halle, my thesis advisor, for many valuable suggestions and comments both with regard to the analysis presented here as well as the actual writing of the thesis; to professors Chomsky, Halle, Klima, Matthews, and Postal for the theory of generative grammar underlying this work; to David Perlmutter, without whose assistance this thesis in its present form would not have been possible; and to Sol Saporta and Dwight Bolinger for comments on earlier versions.

The Spanish described in this thesis is the Spanish of Latin America, unless otherwise indicated. The orthography used is the standard Spanish orthography, except where confusion is likely to result, in which case the usual phonetic symbols are used. I use the standard orthography because it reflects the phonetic facts fairly well, because a transcription looks strange to those accustomed to the standard orthography, but mainly because otherwise I would have to invent my own orthography, and to one for whom a taxonomic phonemic transcription is not acceptable, the task of deciding what level of representation of Spanish words to transcribe is not only difficult, but also not very interesting.

Thus it is appropriate here to describe the standard Spanish orthography, in so far as the letters differ from the usual phonetic value. b, d, and g are spirants intervocalically, stops elsewhere: beber [beber]. y is the same as b; vivir [bibir]. c is s before front vowels and k elsewhere: cinco [sinko] clase [klase]. ch is č: mucho [mučɔ]. g is a voiceless velar spirant X before front vowels and g elsewhere: gente [Xente], pagar [pagar], gracia [grasia]. j is X: jardin [Xardin]. The digraph ll is the glide y in Latin America: caballo [kabayo] and a palatal ɭ in Castilian: [kabaɭɔ]. ñ is palatal ɲ: año [aɲo]. The digraph qu represents k before front vowels: que [ke]. The digraph rr is a multiple-tap tongue-tip trill: perro [peɾo]. Single r is a single-tap tongue-tip trill intervocalically and finally

but a multiple-tap trill initially: pero [pero] color [kolor] red [red]. x is ks before a vowel and s before a consonant: examen [eksamen] exclamar [esklamar]. z is s: cruz [krus]. i and u are glides when contiguous to other vowels: piedra [pyedra] Juan [xwan].

I also use the macron - to indicate length, the symbol ~ to indicate shortness, the acute accent mark ' to indicate stress, and the hyphen - as a generalized boundary symbol which is used when the precise boundary symbol (##, #, or +) is either not known, or not relevant to the discussion. Rules which apply only to vulgar words are designated by an asterisk* after the name.

Chapter 1

The bipartite division of the Spanish vocabulary into erudite and vulgar word classes

1.1 Contraction

Consider the conjugation of the verbs amar 'love', comer 'eat', and vivir 'live' in the present indicative:

amo	como	vivo
amas	comes	vives
ama	come	vive
amamos	comemos	vivimos
amáis	coméis	vivís
aman	comen	viven.

Note in particular the second plural forms amáis, coméis, and vivís. In amáis and coméis the forms are analyzed into the roots am and com, thematic vowels a and e, and second plural ending is. (Cf. the analysis of vivimos into viv-i-mos). That is, the underlying form of vivís is viv-i-is. The appearance of the two i's of the underlying form as a single i of the phonetic output is due to the operation of the following rule which contracts two identical segments into one long segment:

Contraction:

$$[X] [Y] \rightarrow [X_{\text{long}}] \quad \text{where } X = Y$$

Note that although in the example under discussion the two identical segments happen to be vowels, the rule is formulated to apply to any two identical segments. No long segments appear in the phonetic output of Spanish because they are shortened by the following rule:

Shortening:

$$[] \rightarrow [-\text{long}] .$$

This rule applies to all long segments, regardless of their origin.

Thus coméis and vivís have the following derivations:

com-éis	viv-i-is
"	vivís contraction
"	vivís shortening.

Notice that the contraction rule fails to apply to coméis.

1.2 The bipartite division of the Spanish vocabulary into erudite and vulgar classes

The contraction and shortening rules discussed above apply to all Spanish words. However, there are also many rules whose application must be restricted to apply only to a certain class of Spanish words. This division of the Spanish vocabulary has long been recognized, and the two classes have traditionally been distinguished by the appellations erudite and vulgar. Thus we find in the Real Academia Española, Gramática de la lengua española 130 (Madrid, 1931):

También debemos distinguir dos clases de derivación: la erudita y la vulgar. La primera añade los sufijos al vocable primitivo en su forma latina; la segunda, al vocablo castellano. Así, populacho, del latín populus, al lado del vulgar poblacho, de pueblo.

Note that in the example given the p of the erudite form has been lenited to b in the vulgar form, and the u of the erudite form has been syncopated in the vulgar form.

For further examples of this two-fold division of the Spanish vocabulary consider the following doublets where the first member of each couple is the erudite form:

- A. filamento 'filament', hilo 'thread';
fatal 'fatal', hado 'fate';
filial 'filial', hijo 'son';
fosa 'cavity', huesa 'pit';
fumar 'to smoke (tobacco)', humo 'smoke';
férreo 'ferrous', herrero 'blacksmith';
fuga 'flight', huir 'flee';
follaje 'foliage', hoja 'leaf';
- B. clamar 'clamor', llamar 'call';
flama 'flame', llama 'flame';
pleno 'full', lleno 'full';

- clave 'key'; llave 'key';
plaga 'plague'; llaga 'wound, ulcer';
plana 'plane', llana 'smooth';
pluvial 'rainy', lluvial 'rain' (adj.)
 C. somnolencia 'sleepiness', soñar 'dream';
anual 'annual', año 'year';
 D. lacteo 'milky', leche 'milk';
nocturno 'nocturnal', noche 'night';
pugnar 'struggle', puño 'fist';
signo 'sign', seña 'sign';
 E. lateral 'lateral', lado 'side';
vital 'vital', vida 'life';
palatal 'palatal', paladar 'palate';
monetario 'monetary', moneda 'money';
marital 'marital', marido 'husband';
trinitario 'Trinitarian', trinidad 'Trinity';
gótico 'Gothic', godo 'Goth';
total 'total', todo 'whole, all';
clérical 'clerical', clerigo 'clergyman';
mendicante 'mendicant', mendigante 'mendicant';
lacrimoso 'lachrymose, tearful', lágrima 'tear';
sacramento 'sacrament', sagrado 'sacred';
apertura 'aperture', abrir 'open';
caprino '(pertaining to the)goat', gabra 'goat';

1.3 Aspiration

In group A we see the common alternation of initial f followed by a vowel in the erudite form with h in the vulgar form suggesting the following rule:

Aspiration * :

$f \rightarrow h \text{ / \# ___ V. }^1$

This rule applies only to vulgar forms, thus converting e.g. underlying fumo (cf. fumar) into humo. The non-appearance of this h in the phonetic output is the result of the later application of a rule which deletes this h as well as h's from other sources:

$$h \rightarrow \emptyset$$

1.4 l assimilation and resonant palatalization

In group B we see the alternation of initial consonants followed by l in erudite words with ll (phonetic y) in vulgar words, suggesting the following rule which must be restricted to vulgar words:

l assimilation*:

$$\{-vocalic\} \rightarrow l / _l.^2$$

Although the only examples of this rule are with initial fl, pl, and cl, the rule is formulated to apply to all initial non-vocalic segments. Initial bl and gl occur, but the forms are all erudite, not vulgar. Initial tl and dl simply do not occur. Nor do initial ml or nl. Nor are there any initial clusters beginning with glides. Initial sl also does not occur.

The double ll generated by the l assimilation rule becomes long l̄ by the contraction rule discussed earlier in connection with the second plural form vivís. This long l̄ along with long l̄'s from other sources (2, 3, 2, 1) is converted to a palatal l̄ by the resonant palatalization rule:

Resonant palatalization*:

$$\begin{bmatrix} +resonant \\ -continuant \\ +long \end{bmatrix} \longrightarrow \{-diffuse\}.^3$$

This rule converts long l̄ to long palatal l̄, long n̄ to long palatal n̄ (see 1.5). It would apply to long m̄, but there are no examples. Not that it cannot apply to the continuant resonants, i.e. r, w, and y.

Long palatal \tilde{i} becomes short by the shortening rule discussed above. The derivation of say llama remains at this stage in Castilian, but in Latin America palatal \tilde{i} becomes y by the rule

$i \rightarrow y$.

Thus llama 'flame' has the following derivation:

flama (vg)

llama

\tilde{i} assimilation*

\bar{i} ama

contraction

\tilde{i} ama

resonant palatalization*

\bar{i} ama

shortening

yama

$i \rightarrow y$

1.5 Consonant nasalization and nasal assimilation

In group C we see first an mm sequence in an erudite word which appears as a palatal \tilde{n} in the related vulgar word, suggesting the following rule which must be restricted to vulgar words:

Nasal assimilation* :

$[+nasal] \rightarrow [\alpha grave] / \text{---} [\begin{smallmatrix} +nasal \\ \alpha grave \end{smallmatrix}]$

This rule converts m to n when followed by n and n to m when followed by m. It does not apply to somnolencia or inmóvil 'immovable' because they are erudite words.

Actually the root of somnolencia is not som, but rather sop which appears in the related words sopor 'sleepiness', soporífero 'soporiferous'. The p is converted to m by the following rule which is not restricted to vulgar words:

Consonant nasalization:

$[\begin{smallmatrix} +consonantal \\ -vocalic \end{smallmatrix}] \rightarrow [\begin{smallmatrix} +nasal \\ +diffuse \end{smallmatrix}] / \text{---} (+) [+nasal]$

This rule converts p, b, f, k, and g to m; and t and d to n when followed by a nasal. It thus converts not only sopnolencia to

somnolencia but also telegraf-ma to telegrama 'telegram' (through telegramma), cf. telégrafo 'telegraph' as well as flag-ma to flama 'flame' (through flamma), cf. flagrar 'blaze, flame'. It does not apply across # boundary and thus does not apply to e.g. desnudar from des#nudar. See 2.5

The fact that the palatal ñ of soñar comes from two nasals, as well as the fact that there is no rule converting simple n to palatal ñ in vulgar words (cf. e.g. tener 'have') suggests that the underlying root of anual and año must contain a double nn. This double nn becomes long n̄ which becomes a palatal ñ in the vulgar form but a simple n in the erudite form. Thus somnolencia, soñar, anual and año have the following derivations:

sopnolencia	sopnar(vg)	annual	anno(vg)	
somnolencia	sonnar	"	"	consonant nasalization
"	sonnar	"	"	nasal assimilation*
"	soñar	añual	año	contraction
"	soñar	"	año	resonant palatalization*
"	soñar	anual	año	shortening

Note that nasal assimilation and resonant palatalization apply only to vulgar words, i.e. only to soñar and año, while contraction and shortening apply to all words. Note also that once sopnar becomes sonnar the derivation of these forms uses exactly the same rules which were used in the derivation of llama once the initial f assimilated to the following l. Note further that somnolencia is not converted to sonolencia like annual to anual because the nasal assimilation rule fails to apply to this form. Had the underlying nasals been identical like they are in anual this form would have undergone contraction and shortening just like in anual.

1.6 Gravity assimilation, glide formation, palatalization, glide assimilation and glide lengthening

In group D we see velar-dental clusters in erudite words alternating with palatal consonants in vulgar words. The clusters which appear in the erudite words are the same clusters which occur in the underlying forms. The underlying roots for these words are thus lact, noct, pugn and sign. The combination of velar and dental remains in the erudite forms but is converted to a single palatal consonant in the vulgar forms by the following rules:

Gravity assimilation*:

$$\left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \\ -\text{resonant} \\ -\text{diffuse} \end{array} \right] \rightarrow [-\text{grave}] / - \left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \\ -\text{resonant} \\ \alpha\text{grave} \end{array} \right]$$

Glide formation*:

$$\left[\begin{array}{l} -\text{vocalic} \\ -\text{continuant} \end{array} \right] \rightarrow \left[\begin{array}{l} -\text{consonantal} \\ +\text{diffuse} \end{array} \right] / - \left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \end{array} \right]$$

Palatalization *:

$$\left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \\ -\text{grave} \end{array} \right] \rightarrow [-\text{diffuse}] / y -$$

Glide assimilation:

$$\left[\begin{array}{l} -\text{consonantal} \\ -\text{vocalic} \\ -\text{long} \end{array} \right] \rightarrow \left[\begin{array}{l} -\text{compact} \\ \alpha\text{grave} \end{array} \right] / - \left[\begin{array}{l} -\text{consonantal} \\ -\text{vocalic} \\ -\text{compact} \\ \alpha\text{grave} \end{array} \right]$$

Glide lengthening:

$$\left[\begin{array}{l} -\text{consonantal} \\ +\text{vocalic} \\ -\text{long} \end{array} \right] \left[\begin{array}{l} -\text{consonantal} \\ -\text{vocalic} \end{array} \right] \rightarrow [+long] \emptyset$$

The first rule converts e.g. k to palatal ĸ when followed by t, as well as g to ġ when followed by n (see below). The glide formation

rule converts a non-continuant consonant to a diffuse glide having the same gravity as the consonant when followed by another non-continuant consonant. Thus it converts kt to yt (see below), pt to wt (cf. cautivo 'captive' from captivo, cf. captar 'capture'; bautista 'Baptist', from baptista, cf. baptista 'Baptist'), bd to wd (cf. deuda 'debt' from debda, cf. débito 'debit'). See also the derivation of oigamos below, 3.3.

The palatalization rule converts dentals to palatals when preceded by y. Thus yt becomes yk̄, yn becomes yñ, etc. The glide assimilation rule raises short vowels to -compact vowels when followed by a diffuse glide, with assimilation of the gravity of that glide. Thus short a becomes e before y and o before w. The glide lengthening rule lengthens a vowel followed by a glide and drops the glide.

Thus leche, noche, and puño have the following derivations:

la k te	no k te	pugno	
la k te	no k te	pu g no	gravity assimilation*
kayte	noyte	puyno	glide formation*
lay k e	noy k e	puy n o	palatalization*
key k e	noy k e	puy n o	glide assimilation
le k e	no k e	pu n o	glide lengthening.

It remains only to make the palatal k's strident. This is done by the following rule:

Stridency:

$$\left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \\ -\text{grave} \\ +\text{compact} \end{array} \right] \longrightarrow [+ \text{strident}],$$

resulting in the final steps of the derivation:

le k e	no k e	pu n o	stridency
leče	noče	puño	shortening.

Other examples of palatalization are:

estrecho 'narrow' from estreg-to, cf. estreñir 'constipate' from estreg-nir:

despecho 'weaning' from despag-to, cf. despagar 'detach';

intachable 'faultless' from intag-ta-ble, cf. intacto 'intact';

techado 'roof' from tag-t-ado, cf. proteger 'protect' as well as

tejado 'roof' from teg-s-ado;

tronchar 'truncate' from tronc-tar, cf. tronco 'trunk';

puncha 'thorn' from pung-ta, cf. puntual 'punctual'.

pecho 'chest' from pek-to, cf. pectoral 'pectoral'

The t suffix of these forms appears unpalatalized when preceded by a labial stop as in raptar 'kidnap' from rap-t-ar, cf. rapar 'rob of everything' as well as captar 'capture' from cap-t-ar, cf. caber 'fit'

1.7 s increment

Consider the preterit indicative of decir:

dije	dijimos
dijiste	dijisteis
dijo	dijeron

Note first that in the third plural the ending is eron instead of the usual ieron which appears for example in comieron, vivieron, hubieron, movieron, durmieron, perdieron, sintieron, etc. The same eron ending also occurs after stems ending in palatal consonants as for example in bulleron, gruñeron, riñeron, etc., suggesting that although the j of dijeron is not phonetically a palatal consonant (but rather velar X), at one stage of its derivation it must have been a palatal consonant, presumably ǰ. Then the i of the standard ending ieron is deleted after a palatal consonant by the following rule:

Yod absorption:

$$y \rightarrow \emptyset / \left[\begin{array}{l} +\text{consonantal} \\ -\text{vocalic} \\ -\text{grave} \\ +\text{compact} \end{array} \right] \quad \text{---}$$

But if the j comes from š, what does š come from? It is first necessary to ascertain what the root of these preterit forms (dije, dijiste, etc.) is. Consideration of the present indicative

digo	[digo]	decimos	[dešimos]
dices	[díses]	decís	[desís]
dice	[dise]	dicen	[disen]

shows that it is dik with lenition of k to g when followed by a back vowel as in the first singular digo (see section 1.8 on lenition), and with assibilation of k to s when followed by a front vowel as in the other forms (see section 2.7 on assibilation below). For the alternation of the radical vowel see section 7.1 on class 2 radical changing verbs. A discussion of the alternations of the thematic vowel is beyond the scope of this thesis. Note, however, that a superficial examination reveals that the thematic vowel appears as i when stressed and e when unstressed.

The past participle dicho comes from the root dik with the participial suffix to which appears phonetically as to when preceded by a consonant as in muerto 'dead' (cf. morir 'die'), and as do when preceded by a vowel as in amado 'loved' (cf. amar 'love' and the discussion of lenition in section 1.8), dik-to becomes dicho by the same rules which convert nokte to noche and lakte to leche (1.6, 5.1)

dije comes from the same root dik with the addition of a root increment. The increment which will give the correct result is s. For just as kt goes to č by the gravity assimilation, glide formation, and palatalization rules given in section 1.6, so too will ks go to š by the very same rules. Thus dijeron will have the following derivation:

dik-s-yeron	
dišsyeron	gravity assimilation*
diysyeron	glide formation*
diyšyeron	palatalization*
dīšyeron	glide lengthening

dišeron yod absorption
 dišeron shortening
 diXeron š → X

Other examples of an s increment are

pujar 'make a strenuous effort' from pug-s-ar, cf. pagnar
 'struggle' from pug-n-ar, pugilato 'boxing';
traje 'dress' from trag-se, cf. traer 'carry' from trag-er
 (with deletion of intervocalic g followed by front vowel);
flujo 'flux' from flug-so, cf. fluir 'flow' from flug-ir
tejado 'roof' from teg-s-ado, cf. techado 'roof' from teg-t-ado,
proteger 'protect', tejer 'weave' from teg-s-er, and
textil 'textile';

lujar 'strive, polish' from luk-s-ar of lucido 'lucid'

For an example of s increment in a preterit verb form note the following conjugation of querer 'desire' in the present indicative and preterit:

quiero	queremos	quise	quisimos
quieres	queréis	quisiste	quisisteis
quiere	quieren	quiso	quisieron

Here the root is kis⁵ with rhotacism of the intervocalic s in the present indicative. Rhotacism does not occur in the preterit since to these forms is added a s increment like the s increment added to root dik above. Thus e.g. quisiste comes from kis-s-iste where the increment s prevents rhotacism from applying (since neither s is intervocalic). Note also the past participle quisto from kis-to.

For a final example of an s increment consider two of the most common depreciative suffixes in Spanish: aco and ejo. Thus for example we have pajarraco [paXarako] 'ugly bird' alongside pájaro 'bird' and librejo 'old worthless book' alongside libro 'book'. However, there is in fact only one suffix here, namely ak. This appears unadorned in pajarraco ('from pajar-a-ko'), but with a s increment in librejo ('from libr-ak-so'). In the derivation of librejo k becomes y which first converts so to š and then combines with a to produce the observed long ē as in (leche from lakto).

1.8 Lenition

In group E we see voiceless stops in erudite words alternating with voiced stops in vulgar words. The voiceless stops of the erudite forms appear in the underlying roots. The conversion of these voiceless stops to voiced stops in the vulgar forms is commonly called lenition. The lenition rule could be formulated:

$$[-\text{continuant}] \longrightarrow [+ \text{voice}] \quad / \quad V_V$$

Recall at this point the phenomenon of rhotacism which was said to convert intervocalic s to r. In fact, however, rhotacism occurs in two steps. First s becomes z by the lenition rule generalized to include continuants:

Lenition * :

$$[\quad] \longrightarrow [+ \text{voice}] \quad / \quad V_V.$$

Then z is converted to r by the following rule:

Rhotacism:

$$z \longrightarrow r \quad / \quad V_V.$$

Footnotes to chapter 1

1 There are difficulties with the operation of this rule. In some vulgar forms it simply does not apply, as in fiar 'trust' from fidar (cf. fidelidad 'fidelity'). Forms like this must be marked as exceptions.

2 This is not the same rule which converts tl to ll (cf. silla from sit-la and nl to ll (cf. colección from con-leccion), etc. l assimilation is restricted to vulgar forms while the rule just mentioned is not (note the erudite colección with the erudite reflex (l) of a geminate ll cluster, see next footnote).

3 Long ī becomes simply i in erudite forms, as long ñ becomes simply n in erudite forms. Note colección 'collection' from collection which in turn is from con-lección, anual from annual, etc.

4 This rule can be combined with neither the rule which assimilated nasals to the following consonant (cf. um poco from un poco) nor with the rule which produces geminate liquid clusters (cf. silla from sit-la) since it is restricted to vulgar words, while the two rules just mentioned are not.

5 The radical i is converted to e which can then diphthongize when followed by r which in turn is followed by a vowel. See the discussion of class 2 radical changing verbs, 7.1.

Chapter 2

Rhotacism

2.1 Rhotacism

Rhotacism is a common phenomenon of Spanish and appears for example in the following related forms where s appears when followed by a consonant, but r appears intervocalically:

sugerir 'suggest', sugestión 'suggestion';

rural 'rural', rustico 'rustic';

querer 'want', quisto (irregular past participle of querer appearing chiefly in the phrase bien quisto 'well-liked');

gerente 'manager', gestionar 'manage';

jurado 'jury', justicia 'court of justice'.

There are, of course, many examples of intervocalic s in Spanish. These may occur for a variety of reasons. For example, rhotacism does not apply to Greek words, as we see in física and tesis.

Another source of intervocalic s is from double ss to which rhotacism cannot apply since neither s is intervocalic. Thus, for example, prisa 'haste' comes from prissa. After rhotacism has failed to apply, the geminate cluster becomes a long consonant by the same rule which converts sequences of vowels into long vowels. This long consonant is then reduced to the corresponding short consonant if it is an obstruent by the same rule which reduces long vowels to short vowels. Thus prisa has the following derivation:

prissa

prissa rhotacism fails

prīsa contraction

prisa shortening

If, however, the long consonant is a resonant, it does not become simply a short consonant, especially in vulgar forms. Long r̄ remains long as in querré (first singular future of querer 'desire')

and irregular 'irregular', from in-regular, cf. insufrible 'insufferable' from in-sufrible: long \bar{l} becomes y in vulgar words as in silla 'chair' from sit-la cf. sentar 'seat for the root and regla 'rule' from reg-la for the suffix, but simply \bar{l} in erudite words as in colección 'collection' from con-leccion and ilegal from in-legal; and long \bar{n} becomes palatal \tilde{n} as año 'year' from anno, but simply short n in erudite forms, e.g. anual from annual.

2.2 Irregular past participles, dental assibilation, d deletion

For other examples of intervocalic s from a geminate cluster note the following past participles with their associated infinitives:

dividir 'divide', with pp. diviso;

circuncidar 'circumcise', with pp. circunciso;

invertir 'invert', with pp. inverso;

suspender 'suspend', with pp. suspenso.

In order to analyze these forms it is necessary to ascertain what the past participle morpheme is. From consideration of muerto (alongside inf. morir 'die') where the ending is added directly to the root without an intervening thematic vowel and amado (alongside inf. amar 'love') where a thematic vowel occurs between the root and the ending, we see that the past participle morpheme must be to which appears as do when preceded by a vowel (see 1.8 on lenition).

Clearly diviso is similar to muerto with addition of the participial suffix to directly to the root. That is, diviso must come from divid-to. When lenition applies there is no intervocalic s , but rather a cluster of dental stops, which is reduced to ss by the following rule:

dental assibilation

$$\left\{ \begin{array}{c} d \\ t \end{array} \right\} t \rightarrow ss$$

Thus diviso has the following derivation:

divid-to

" lenition (i.e. $s \rightarrow z$) fails to apply

divisso dental assibilation

diviso contraction

diviso shortening.

Similarly for the other forms.

For other examples of this t/s alternation note admitir 'admit' with past participle admisso as well as admisión 'admission' where the latter is derived from ad-mit-t-ion where the t is the same suffix which occurs in the past participles and the ión is the same suffix occurring in e.g. religión 'religion'. Similarly for evadir 'evade' alongside evasión 'evasion' from eks-vad-t-ion. (See cluster simplification 2.4 and sonorization 2.3.)

Further examples of intervocalic s from double dentals are the words usar 'use' and paso 'step' from ut-t-ar and pat-to. The roots ut and pat appear in útil 'useful' and pata 'foot', 'leg'. The t suffix of usar appears phonetically when preceded by a labial stop as in raptar 'kidnap' from rap-t-ar, cf. rapar 'rob of everything' and captar 'capture', cf. caber 'befall'.

Now consider some examples which illustrate a slightly different version of the same theme:

recluir 'seclude' alongside recluso 'recluse, hermit'

raer 'scrape' alongside raso 'smooth'

reir 'laugh' alongside risa 'laugh'

In line with the above discussion we would expect each of the forms with intervocalic s to come from a dental cluster, that is recluso from reclud-to, raso from rad-to, risa from rid-to. But whereas in the previous examples this dental has actually appeared in the related forms it does not appear here. Nevertheless, in order to account for the intervocalic s in the cited forms we must assume that the root ends in a dental stop. That is, for recluir we would

have to postulate a underlying form re-clud-ir, for raer, rad-er, and for reir, rid-ir. But d's do not actually appear in the phonetic output since they are deleted when followed by a front vowel by the following rule which is restricted to vulgar forms:

d deletion* :

$$d \longrightarrow \emptyset / V_ \{i, e\} .$$

Reir and risa thus have the following derivations:

rid-ir	rid-ta	
red-ir	rid-ta	vowel lowering '2.3)
re-ir	rid-ta	<u>d</u> deletion
re-ir	rissa	dental assibilation
re-ir	riša	contraction
re-ir	risa	shortening.

Furthering evidence for the existence of the root rid is its actual appearance in the related form ridículo 'ridiculous'. The d is not deleted in ridículo or in e.g. dividir because these are erudite forms.

Other examples of deletion of d before front vowels are pie 'foot' from pede with diphthongization of a short mid vowel (3.2), cf. pedal 'pedal';

juicio 'judgment; trial' from judicio, cf. judicial 'judicial';
paraíso 'paradise' from paradiso, cf. paradisíaco 'paradisiacal';
caer 'fall' from cader, cf. decadencia 'decadence';
creer 'believe' from creder, cf. credibilidad 'credibility' as creíble 'credible' alongside credulidad 'credulity';
despearse 'bruise one's feet' from despedarse, cf. pedicuro 'pedicure', pedestre 'pedestrian'.

Note that only original d's are deleted. d's which come from underlying t by lenition are not deleted as we see in pedir 'request' from petir, cf. petición 'petition' and poder 'be able' from poter, cf. potencia 'potency', thus indicating that d deletion applies before lenition.

2.3 Nasal increments, vowel lowering, and sonorization

It was remarked above that irregular past participles in s such as diviso resulted from the juxtaposition of a stem ending in a dental with the participial suffix to. In connection with this consider the following two sets of irregular past participles.

- A. pretender 'to pretend to' with pp. pretenso;
suspender 'suspend' with pp. suspenso;
- B. confundir 'confuse' with pp. confuso;
contundir 'bruise' with pp. contuso;
prender 'seize' with pp. preso.

In both sets the s of the past participle comes from a dt cluster. Notice, however, that in the first set the n which appears in the infinitive also appears in the past participle while in the second set the n of the infinitive does not appear in the past participle. Further, the same phenomenon occurs in derivatives. Related to words of the first set we have pretensión 'pretension', tensión 'tension' (cf. tender 'stretch out'), suspensión 'suspension', pensión 'pension' (cf. pende 'hang') while related to words of the second set we have fundir 'smelt', fusor 'smelting ladle', fusión 'fusion'; tundir 'lash, shear', tusar 'shear' tusón 'fleece', contusión 'bruise'; and prisión 'seizure'.

Although in both sets an n appears in the infinitive, the fact that it appears in derivatives of only one set indicates that the form which appears in the infinitive cannot be considered the root. Rather it is the case that we have two different types of roots. For set A the roots contain nasals, that is, for the examples of set A the roots are tend and pend. This nasal which is part of the root then appears in all related words. However, in set B the nasal is not part of the root. Rather the roots of set B are fud, tud, and pred, and no nasal appears in the derivatives. The nasal which appears in the finite verb forms is an increment which is added to the root.

Thus tundir, fundir and prender come from tud-n-ir, fud-n-ir, and pred-n-er. This nasal increment metathesizes with the preceding segment if it is a stop but not otherwise, as we see for example in e.g. pones from pos-n-es (see below 2.3) and prosternarse 'prostrate oneself' from pro-ster-n-ar-se. (4.5)

For another example of a nasal increment note the present indicative of romper 'break';

rompo	rompemos
rompes	rompéis
rompe	rompen.

All the finite forms of this verb have the stem romp. However, consideration of the related form ruptura 'rupture' and the past participle roto indicate that the root is rup with a nasal increment in the finite verb forms. (for u in erudite ruptura and o in vulgar romper see this section below). This nasal increment is the same n which appears in fundir, tundir, prender, etc. However, after it has metathesized with the preceding stop it assimilates the gravity and compactness of this obstruent:

Nasal assimilation:

$$[+nasal] \rightarrow \left[\begin{array}{l} \alpha \text{ grave} \\ \beta \text{ compact} \end{array} \right] / - \left[\begin{array}{l} + \text{consonantal} \\ - \text{vocalic} \\ - \text{nasal} \\ \alpha \text{ grave} \\ \beta \text{ compact} \end{array} \right]$$

The Greek letters in this rule are variables ranging over the values + and -, with the restriction that every occurrence of a variable must have the same value. This provides a convenient way of changing the value of a feature in a segment to match the value of a feature in another segment without having to actually specify the value of the feature explicitly. The consequence of this convention with regard to this rule is to assimilate the gravity and compactness of the nasal segment to the gravity and compactness of the following segment, whatever values these features may have in the

following segment. See Morris Halle, "A Descriptive Convention for Treating Assimilation and Dissimilation" (Quarterly Progress Report no. 66, July 15, 1962, Research Laboratory of Electronics, Massachusetts Institute of Technology).

This rule is not formulated solely for this instance but is rather a rule of general application in Spanish. Note en paz [em pas] , ancho [año] cinco [sinko] . In the first example n becomes +grave -compact m when followed by the +grave -compact p, in the second example n becomes -grave +compact ñ when followed by the -grave +compact ç, and in the third example n becomes +grave +compact ɲ when followed by the +grave +compact k.

Note that the nasal increment which appears in romper does not appear in the past participle roto. This so-called irregular past participle is formed in the same way as muerto (from mor-to) and diviso (from divid-to), i.e., with addition of the past participle suffix to directly to the root rup, giving rupto. The radical p assimilates to the participial t by a general assimilation rule giving the form rutto. (This assimilation applies only to vulgar words, not to erudite words.) This double tt becomes a long t by the contraction rule and then the short t of the phonetic output by the shortening rule. We do not get groso from rotto like diviso from divid-to because dental assimilation occurs before the pt cluster assimilates to tt.

It might be thought that instead of the participial suffix to being added to the root rup that it is added to an alternate form ro. However, this maneuver would complicate the grammar by requiring statements concerning the distribution of morpheme alternants. Clearly a much simpler grammar will result if morphemes always have the same phonological shape and no such distribution statements are required, other things being equal. Aside from such considerations, however, it is clear that in this example to could not be added to a morpheme alternant ro, for this would result in the lenition of

intervocalic t to d like in amado from amato. See the discussion of lenition above.

Consider finally the alternation of the radical vowel, with u in ruptura and o in romper and roto. The root here is rup with reduction of the short u to o in the vulgar forms romper and roto, but not in the erudite form ruptura (note also that the pt cluster remains in ruptura instead of reducing to t as in roto). The vowel lowering rule reduces short diffuse vowel to non-diffuse vowels, ie. u to o and i to e. It applies only to vulgar forms:

vowel lowering * :

$$\left[\begin{array}{l} -\text{consonantal} \\ +\text{vocalic} \\ -\text{long} \end{array} \right] \rightarrow [-\text{diffuse}]$$

Thus ruptura, romper, and roto have the following derivations;

rup-tura	rup-n-er(vg)	rup-to(vg)	
"	"	"	dental assibilation fails
"	runper	"	increment metathesis
"	rumper	rutto	assimilation of <u>p</u> to <u>t</u> , nasal assimilation
"	romper	rotto	vowel lowering*
"	"	roto	contraction and shortening

Other examples of vowel lowering are

correr 'run', cf. curso 'course';

reir 'laugh', cf. ridículo 'ridiculous';

joven 'young', cf. juvenil 'juvenile' 'youthful', and juventud 'youth';

moco 'mucus', cf. mucoso 'mucous';

agrícola 'agricultural', cf. agricultor 'agriculturalist';

gobernar 'govern', cf. gubernativo 'governmental';

boca 'mouth', cf. bucal 'buccal';

fondo 'bottom; ground', cf. fundamental 'fundamental';

El Escorial (town in central Spain), cf. escorialense 'pertaining to El Escorial';

calor 'heat, warmth', cf. caluroso 'warm, hot';

selva 'forest', cf. silvicultura 'forestry';

lengua 'tongue, language', cf. lingual 'lingual';

emperador 'emperor', cf. imperial 'imperial';

cobre 'copper', cf. cuproso 'cuprous';

pesca 'fishing', pez 'fish', cf. piscona 'fishpool';

hender 'split, cleave', cf. fisura 'fissure'.

For another example of a nasal increment note the form sentar 'to seat' alongside silla 'chair'. Clearly sentar is related to silla, as well as to sitial 'chair of presiding officer', sitiar 'besiege', sitio 'site', situación 'situation', situar 'locate', etc. The root common to all these forms is sit. Silla is derived from sit-la where the la is the same suffix which appears in regla 'rule' from reg-la (cf. regir 'to rule', regio 'regal', rey 'king' (4.2) etc., muralla 'wall' from mural-la (cf. mural 'mural'),

The rule which converts tl to ll (as in silla from sit-la) and nl to ll (as in bella from ben-la) is the following:

Liquid gemination:

$$\left[\begin{array}{l} +\text{consonantal} \\ -\text{grave} \\ +\text{diffuse} \end{array} \right] \rightarrow \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \\ \propto \text{continuant} \end{array} \right] / _ \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \\ \propto \text{continuant} \end{array} \right]$$

This rule converts any segment which is -grave and diffuse and not a vowel or a glide to a liquid when followed by a liquid. The liquid produced has the same value for the feature continuant as the following liquid. Thus, for example, nl becomes ll while nr becomes rr. Other examples of the operation of this rule are

illegal 'illegal' from in-legal (through illegal);

irregular 'irregular' from in-regular;

corromper 'corrupt' from con-romper;
arrasar 'smooth' from ad-rasar;
estelar 'stellar' from ster-lar (through stellar).

Words such as enredo and tendré are only apparent counter-examples to the operation of this rule and discussed below in section 3.1.

Sentar is derived from sit-n-ar with the same nasal increment which appears in fundir, tundir, prender, and romper. After metathesis the result is sintar. The radical i is reduced to e by the vowel lowering rule discussed earlier.

Other examples of nasal increments occur in the following sets of related words:

figir 'feign, imagine' from fig-n-ir, cf. ficcion 'fiction' figurarse 'imagine'. The radical i of figir does not lower to e because figir is an erudite word.

yunta 'yoke of oxen' from yug-n-ta with deletion of first non-nasal stop in cluster of three or more consonants (2.4), cf. yugo 'yoke, marriage tie'.

For still another example of a nasal increment note the present indicative of poner 'place':

pongo	ponemos
pones	poneis
pone	ponen.

Taken by themselves, there is nothing particularly strange about these forms except for the g of the first singular. But when considered together with the past participle puesto 'placed' and the preterit indicative:

puse	pusimos
pusiste	pusisteis
puso	pusieron

certain questions arise. For example, it is not immediately obvious what the root is. However, consideration of related forms such as posición 'position', postillón 'postilion', postura 'posture',

preósito 'chairman', preposición 'preposition', proposición 'proposition' suggest that the root is pos. The past participle is then formed by adding to directly to this root like muerto is formed by adding to directly to the root mor. The o of pos-to then diphthongizes under stress to ue just as the o of mor-to diphthongizes to give muerto, cf. inf. morir.

The same root pos must also occur in the present indicative. Here, however, the root is followed by a nasal increment just like romper from rop-n-er. Thus e.g. pones comes from pos-n-es.

The radical s first becomes z under the influence of the following voiced consonant by a general rule of Spanish:

Voicing assimilation:

$$[\quad] \rightarrow [\text{voice}] \quad / \quad - [\text{+ cons}] \text{ voice}$$

This z then combines with the preceding vowel to produce a long vowel:

Sonorization:

$$Vz (+) C \rightarrow \bar{V} (+) C$$

Thus pones and puesto would have the following derivations:

pos-n-es	pos-to	
poznes	"	voicing assimilation
pōnes	"	sonorization
"	puesto	diphthongization of short mid vowel
pones	"	shortening

Notice that although both the radical vowels are stressed only the originally short one is diphthongized. The one which becomes long by combining with the following z does not diphthongize under stress. Note also that this length is predictable.

Examples of the operation of the sonorization rule occur in the following sets of related words:

primo 'first'; prime' from pris-mo, cf. prístino 'pristine'.

Note also principal 'main, chief, principal' from pris-m-cap-al (see medial vowel raising 7.2);

judicial 'judicial' from jus-dic-ial, cf. justicia 'justice':

The two rules mentioned above together with the cluster simplification rule which deletes the first non-nasal stop in a cluster of three or more consonants account for other facts of Spanish morphology. Perhaps it would be appropriate here to discuss in more detail the cluster simplification rule before giving other examples of the operation of the above rules.

2.4 Cluster simplification

Note first the words exaltación [eksaltasíón] 'exaltation' and excavar [eskabar] 'excavate'. In both of these cases the prefix is eks. In the first instance when prefixed to a stem beginning with a vowel it appears as eks. But in the second instance when prefixed to a word beginning with a consonant it appears as es, without the k. This is due to the operation of the cluster simplification rule which deletes the first non-nasal stop in a cluster of three or more consonants:

Cluster simplification:

$$\left[\begin{array}{l} \text{-vocalic} \\ \text{-nasal} \\ \text{-continuant} \end{array} \right] \rightarrow \emptyset / \begin{array}{l} \text{---} [-\text{voc}] [+ \text{cons}] \quad (\text{part a}) \\ [+ \text{cons}] \text{---} [-\text{voc}] \quad (\text{part b}) \\ [+ \text{cons}] [-\text{voc}] \text{---} \quad (\text{part c}) \end{array}$$

The cluster simplification rule consists of three parts which apply in the order given. To illustrate the operation of the rule consider first the word exclamar [esklamar] 'exclaim', which has the underlying form eks-clamar. Part a applies to this form (k meets the requirements specified on the left of the arrow, s is -vocalic, and k is +consonantal), giving the observed phonetic result esklamar. But this form still has to go through the next two parts of the rule. Part b fails to apply to esklamar because part b specifies that the segment following the non-nasal stop must be -vocalic, and l is +vocalic. Part c fails because the k is not preceded by two consonants.

Next consider the word entre 'between'. The cluster simplification rule must not apply to this cluster of three consonants, for if it did, the incorrect form genre would be the result. Since the only non-nasal stop occurs in the middle of the cluster, the only part of the rule which has a chance is part b. But this part fails because the segment following the t is +vocalic. Like entre are espléndido 'splendid', lustre 'lustre', etc., and in fact any word in which the non-nasal stop is followed by a liquid.

Next consider the form absorto 'absorbed' from absorb-to (cf. the infinitive absorber 'absorb'). Part a of the rule fails because the first segment of the cluster does not meet the requirements on the left of the arrow. But part b will apply since the r is +consonantal, the b is a non-nasal stop, and the t is -vocalic, thus giving the correct result, absorto. Part c fails to apply because a three consonant cluster no longer exists.

Next consider elegir 'elect' from eks-legir. Part a applies here (since s is -vocalic and l is +consonantal), giving es-legir which is converted to elegir by the sonorization rule (2.3).

Like the example exclamar are

excluir 'exclude', excogitar 'excogitate', excomulgar 'excommunicate', excoriar 'excoriate', excretar 'excrete', expectorar 'expectorate', exposición 'exposition', etc. Like the example absorto are cinto 'girdle' from cing-to, cf. cíngulo 'girdle'; extinto 'extinguished' from exting-to, cf. extinguir 'extinguish'; untar 'annoint' from ung-tar, cf. ungir 'annoint'; tuerto 'twisted' from torc-to, cf. torcer 'twist'; escultura 'sculpture' from esculptura, cf. esculpir 'sculpture'.

Like the example elegir is erigir 'erect' from eks-regir, cf. regir 'rule; direct'.

For an example of the third consonant of a cluster being deleted note the past participle salvo [salbo] 'saved' alongside the infinitive salvar [salbar]. We would expect the underlying form of

the participle to be salv-to. From this one might expect to get esalto like absorto from absorb-to with deletion of the second consonant, the non-nasal stop b. But instead it is the participial t which is here deleted. In order for this third consonant of the cluster to be deleted, it must be the first stop of the cluster, indicating that the orthographic v (phonetic b) is not a stop in the underlying form, but rather the glide w. With the underlying form of salvo being salw-to part c of the cluster simplification rule will apply deleting the t, since the l is +consonantal as specified, and the w is -vocalic, as specified. The w of the underlying form is later converted to b of the phonetic output.¹

Returning now to the first example of cluster simplification note that all of the examples of the prefix ex being pronounced es are with stems beginning with voiceless consonants. There are no examples of stems beginning with voiced consonants. This is because when a stem begins with a voiced consonant the k of eks is of course deleted by the cluster simplification rule. Then the remaining s becomes z by the voicing assimilation rule mentioned earlier and then combines with the preceding vowel by the sonorization rule which accounts for the form pones from pos-n-es. Thus the phonetic result of the prefix ex when added to a morpheme beginning with a voiced consonant is simply e as we see in the following examples:

ebullición 'boiling'; from eks-bullicion cf. bullir 'boil'
edición 'edition' from eks-dicion
editar 'publish' from eks-ditar
educar 'educate' from eks-ducar, cf. dúctil 'ductile'
elegir 'elect' from eks-legir
elevar 'elevate' from eks-levar, cf. levantar 'raise'
elucidar 'elucidate' from eks-lucidar, cf. lucir 'illuminate'
eludir 'elude' from eks-ludir

emanar 'emanate' from eks-manar, cf. manar 'pour forth'
emancipar 'emancipate' from eks-mancipar, cf. 'enslave'
emerger 'emerge' from eks-merger
emigración 'emigration' from eks-migración, cf. migración
 'migration'
emitir 'emit' from eks-mitir
emoción 'emotion' from eks-moción, cf. moción, 'motion'
erudición 'erudition' from eks-rudición, cf. rudo 'coarse'
evacuar 'evacuate' from eks-vacuar, cf. vacuo 'vacant'
evadir 'evade' from eks-vadir
evaporar 'evaporate' from eks-vaporar, cf. vapor 'vapor'
evocar 'evoke' from eks-vocar, cf. vocal 'vocal'
evolución 'evolution' from eks-volución, cf. volver 'turn'.

Apparent exceptions to the sonorization rule are the forms hazlo [azlo] 'do it' and asno [azno] 'donkey, jackass'. Here the z does not combine with the preceding vowel as in pones from pos-n-es or as in elegir from eks-legir. This is because in the underlying form of say asno the s and the n are not juxtaposed, but rather separated by the vowel i which appears phonetically in asinino 'donkey-like'. Thus asno comes from asino, to which neither voicing assimilation nor sonorization can apply. After these rules fail, the i is syncopated. The phonetic z of asno is due to lenition at the state asino, as the following derivation shows:

<u>pos-n-es</u>	<u>asino</u>	
<u>pos-n-es</u>	<u>azino</u>	lenition
<u>poznes</u>	<u>azino</u>	voicing assimilation
<u>pōnes</u>	<u>azino</u>	sonorization
<u>pōnes</u>	<u>azno</u>	syncope
<u>pones</u>	<u>azno</u>	shortening.

Similarly the form hazlo comes from hazelo, compare comelo 'eat it'. Even further evidence for the existence of a front vowel which later syncopates in the form hazlo is the fact that the root

here is hak with assibilation of k before a front vowel (see section 2.7 on assibilation below). Note first singular present indicative hago from hako (see 1.8 on lenition) and pp. hecho from hakto (see derivation of leche 1.6).

Similarly mismo [mizmo] 'same' must come from an earlier misimo.

2.5 Prothesis

Another set of apparent exceptions to the sonorization rule are the following words where the prefix des is added to stems beginning with voiced consonants. Here although the s becomes voiced to z by the voicing assimilation rule, it does not combine with the preceding vowel:

desdecirse 'contradict oneself', cf. decir 'say'

desgranar 'thresh', cf. grana 'seed'

deslucir 'tarnish', cf. lucir 'illuminate'

desmerecer 'lose merit', cf. merecer 'deserve'

desmontar 'dismount', cf. montar 'mount'

desnatar 'take the cream from (milk)', cf. nata 'cream; elite'

desnudar 'undress', cf. nudo 'nude'

desvainar 'to shell (peas, beans, etc.)', cf. vaina 'sheath'

Recall that in the examples given of the prefix eks, the s, did combine with the preceding vowel after it had become voiced and the k had been deleted by the cluster simplification rule.

Before this problem can be solved it is necessary to consider the phenomenon of prothesis in Spanish, and in particular the behavior of prefixes with regard to prothesis. Consider the following sets of related words:

escindir 'split', cf. abscisa 'abscissa'

escribir 'write', cf. adscribir, circunscribir, inscribir,
transcribir, conscripto, suscribir (from sub-scribir)

espectador 'spectator', cf. introspectivo 'introspective',

conspicuo 'conspicuous'

espirar 'breathe', cf. aspirar 'inhale' (from ad-spirar)
conspirar 'conspire', inspirar 'inhale',
expirar 'expire', suspirar 'sigh',
transpirar 'transpire'

estar 'be, cf. constar 'to be certain', constatar 'state, prove',
contrastar 'resist', distar 'be distant' (from dis-star)
éxtasis 'ecstasy' (from eks-stasis)

In each of these examples the roots scid, scrib, spect, spir, and sta appear with a prothetic e in the unprefixed form, but without this prothetic e in the forms with prefixes. This e is added by the following rule:

Prothesis:

s [+consonantal] → # es [+consonantal] .

This rule applies to all initial clusters of s followed by a +consonantal segment. The +consonantal segment may be either -vocalic as in e.g. estar, or +vocalic as in e.g. eslavo 'Slav'. Note that the rule does not apply to initial clusters of say fl as in flor 'flower', or fr as in freno 'bridle'.

Prothesis does not occur in the prefixed forms because these prefixes are added to the stems with a morpheme boundary, e.g. inscribir from in+scribir, conspicuo from con+spicuo, conspirar from con+spirar, expirar from eks+spirar, constricción from con+strig+ción etc.

But not all prefixes are added with a morpheme boundary. Some come in with a word boundary #. The chief evidence for the existence of # instead of + is that prothesis occurs with these prefixes. Thus although the intensifying prefix in is added with a morpheme boundary as we saw in inscribir, the negative prefix in is added with a single word boundary as we see in inestable 'unstable' from in#stable with the same root which appears in estar, constar, etc. Also the prefix des is entered with a single word boundary as we see in desesperar 'despair' from des#sperar.

This, then, explains why the s of the prefix eks combines with the preceding vowel while the s of the prefix des does not. The voicing assimilation rule applies across any boundary, while the sonorization rule applies only across morpheme boundary. Thus desesperar, expirar, deslucir, and elegir have the following derivations:

<u>des#sperar</u>	<u>eks+spirar</u>	<u>des#lucir</u>	<u>eks+legir</u>	
<u>des#esperar</u>	"	"	"	prothesis
"	<u>es+spirar</u>	"	<u>es+legir</u>	cluster simplification
"	"	<u>dez#lucir</u>	<u>ez+legir</u>	voicing assimilation
"	"	"	<u>ē+legir</u>	sonorization
"	<u>espirar</u>	"	<u>elegir</u>	contraction and shortening

2.6 Nasalization

For another set of examples of intervocalic s (which might be considered counter-examples to rhotacism but which are in fact not) consider the following set of words:

mes 'month'
mesura 'moderation'
mesa 'table'
pesar 'consider'
seso 'brain'

However, there is not intervocalic s in the underlying form of these words. Rather there is an ns cluster which actually appears in related words:

mensual 'monthly'
mensurable 'measurable'
comensal 'table companion'
pensar 'think'
sensato 'sensible'

Since we want to relate these two sets of words, we say that mes and mensual, mesura and mensurable both have the root mens; that mesa and comensal both also have the root mens; that pesar and pensar both have the root pens; ³ and that seso and sensato both have the root sens. The difference in the phonetic output is due to the operation of the nasalization rule which applies only to vulgar words and which converts a vowel followed by n followed by s into a long vowel followed by s:

Nasalization*:

$Vns \rightarrow \bar{V}s$

This rule applies to words of the first set (vulgar forms), but not to words of the second set (erudite forms). Thus mesa and comensal have the following derivations:

mensa (vg)	comensal	
"	"	rhotacism fails
mēsa	"	nasalization*
mesa	"	shortening.

Other examples of the operation of the nasalization rule are tesón 'tenacity' from ten-s, cf. tener 'hold'; and esposo 'husband', esposa 'wife' (pl: esposos 'handcuffs') from spon-s, cf. esponsales (pl) 'espousals, betrothal'. Note failure of diphthongization in esposo.

2.7 Assibilation

Another set of words with phonetic intervocalic s which does not rhotacize to r include electricidad [elektrɨsɨdad] 'electricity' and medicina [medɨsɨna] 'medicine'. Although these forms might be thought exceptions to the lenition rule which converts intervocalic s to z (1.8) and to the rhotacism rule which converts intervocalic z to r (1.8), it is clear from consideration of the related forms electrico [elektriko] and medico [mediko] that the s is not s when lenition applies. Rather this s comes from k by the following rule:

Assibilation:

$k \rightarrow ts \quad / \quad _ \{i, e\}.$

Lenition cannot apply to this ts sequence because neither segment is intervocalic. After lenition fails, ts is reduced to ss by the following rule:

ts → ss.

Thus medicina has the following derivation:

medikina	
meditsina	assibilation
"	lenition fails
medissina	ts → ss
medīsina	contraction
medisina	shortening.

For other examples of assibilation note

damasina 'light damask, damassin', cf. damasco 'damask';

piscicultor 'fish breeder', cf. piscator 'almanac', piscatorio 'piscatorial';

difícil 'difficult', cf. dificultad 'difficulty';

sacerdote 'priest', cf. sacro 'sacred';

opacidad 'opacity', cf. opaco 'opaque';

farmacia 'pharmacy', cf. farmacólogo 'pharmacologist';

torácico 'thoracic', cf. tórax 'thorax';

Suecia 'Sweden', cf. sueco 'Swede';

Grecia 'Greece', cf. greco 'Greek';

mendicidad 'mendicancy', cf. mendicante 'mendicant';

apéndice 'appendix', cf. apendicular 'appendicular';

laicismo 'secularism', cf. laico 'lay';

frances 'French', cf. franco 'Frank', francófilo 'Francophile',

Francho (from frank-to) 'Frank';

costarricense 'Costa Rican', cf. Costa Rica;

nuez 'nut; walnut', cf. nogalina 'walnut stain' and see 5.1 and 1.8.

The establishment of the assibilation rule not only accounts for the facts mentioned above but also allows us to account for a common alternation in the paradigm of certain verbs. This alternation is exemplified by the present indicative of conocer 'to be

acquainted with':

conozco [konosko]	conocemos
conoces [konoses]	conocéis
conoce	conocen

In terms of the present analysis the sk/s alteration can be accounted for without adding any new rules to the grammar, if we assume that the stem here is not konos, but rather konosk. Then when konosk is followed by a back vowel the k will remain, but when followed by a front vowel it will be assibilated to ts, as illustrated in the following derivation:

konosko	konoskes	
"	konostses	assibilation
"	"	lenition fails
"	konosses	cluster simplification part b
"	konošes	contraction
"	konoses	shortening.

Like conocer/conozco are the following verbs:

aparecer 'appear', 1st sg. aparezco;
conducir 'lead', 1st sg. conduzco;
crecer 'grow', 1st sg. crezco;
introducir 'introduce', 1st sg. introduzco;
merecer 'deserve', 1st sg. merrezco;
nacer 'be born', 1st sg. nazco;
obedecer 'obey', 1st sg. obedezco;
ofrecer 'offer', 1st sg. ofrezco;
parecer 'seem', 1st sg. parezco;
traducir 'translate', 1st sg. traduzco;
agradecer 'thank', 1st sg. agradezco;
lucir 'illuminate', 1st sg. luzco.²

Of course there are many instances of k appearing in the phonetic output before front vowels as in words like aquí [akí] 'here', qué [ké] 'what?', quién [kyén] 'who?', querer [kerér] 'to desire', quilla [kíya] 'keel', quitar [kitár] 'remove', quince [kínse] 'fifteen',

etc. However, in the underlying structure of these words the k is not followed by a front vowel, but rather by the glide w. This w insulates the k from the assibilating influence of the front vowel, and is later deleted by the following rule:

Cw → C.

For further evidence for the existence of a w in these forms see the discussion of quince in section 4.6 below and note also erguir 'raise' from eks-reg-w-ir, cf. erigir 'erect' from eks-reg-ir, cf. regir 'rule; direct'.

There are, however, instances of labial velars in the phonetic output of Spanish, as for example antiguo [antig^wo] 'ancient', antigüedad [antig^wedad] 'antiquity', cualidad 'quality', cuarto 'quarter', guapo 'handsome', cuidado 'care', cuota 'quota', etc. In these examples the labial velar is not the result of a velar followed by w, as in the above examples which give a simple velar in the phonetic output, but rather of a velar followed by the vowel u which becomes w when followed by a vowel and then combines with the preceding velar by the rule:

Labialization:

Cw → C^w.

Thus que and antigüedad have the following derivations:

kwe	antigüedad	
"	"	assibilation fails
ke	"	Cw → C
"	antigwedad	syneresis
"	antig ^w edad	labialization.

Footnotes to chapter 2

1 Words like abstracto, abstener, absterger, abstinente, abstruso, adscribir, instrumento, constar, etc, might be thought exceptions to the cluster simplification rule. But in fact they are not, for the cluster simplification rule does not apply to words like adscribir which are composed of a prefix ending in a stop followed by a stem beginning with s followed by a stop. To words of this structure the following rule applies:

Prefix truncation:

$$\left[\begin{array}{l} \text{-vocalic} \\ \text{-continuant} \\ \alpha \text{grave} \\ \beta \text{diffuse} \\ \gamma \text{nasal} \end{array} \right] \rightarrow \emptyset / _ + s \left[\begin{array}{l} \text{-vocalic} \\ \text{-continuant} \\ \alpha \text{grave} \\ \beta \text{diffuse} \\ \gamma \text{nasal} \end{array} \right]$$

This rule deletes the final stop of a prefix if it agrees in gravity, diffuseness, and nasality with the stop following the s of the stem to which the prefix is attached. In other words, the final stop of the prefix is deleted if it has the same manner of articulation as the first stop of the stem.

This rule thus converts

sub-s-pender to suspender 'hang; suspend', cf. pender 'hang';

sub-spi-c-acia to suspiciacia 'suspicion', cf. espión 'spy';

sub-spirar to suspirar 'sigh', cf. espirar 'breathe';

ab-sparc-s-ar to asperjar 'sprinkle', cf. esparcir 'scatter'

and MVR 7.2;

ad-stringir to astringir 'constrict'; bind', cf. estreñir 'constipate; bind'.

It does not apply to instrumento 'instrument', constar 'be clear', completo 'complete', contrato 'contract', etc. since the final stop of the prefix does not agree in nasality with the first stop of the stem.

The rule as stated above requires absolute agreement with regard to diffuseness, gravity, and nasality for its operation. However,

it also operates rather sporadically in situations where these conditions are not met with regard to diffuseness and gravity, although the other conditions must still be met. Thus we have doublets with regard to the prefix sub as the following examples show:

sustancia alongside substancia 'substance';

sustitución alongside substitución 'substitution';

sustraer alongside substraer 'subtract', from sub-s-traer,
cf. traer 'drag';

but sustenable 'sustainable, arguable' from sub-s-tenable, cf.

tener 'have; hold' with no substenable.

There is also suscribir alongside subscribir 'subscribe';

but susceptible 'susceptible' from sub-s-captible, cf. captar 'capture', with no subsusceptible;

suscitar 'stir up, provoke', from sub-s-citar, cf. excitar
'excite', with no subscitar;

and no subscapular, but rather subscapular 'subscapular'.

With regard to the suffix ab the rule applies as stated with no difficulties. Thus we have

abstracto 'abstract' from ab-s-trag-to, cf. traer 'drag' but
no castracto;

absceso 'abscess' but no casceso;

abscisa 'abscissa' but no casquisa;

abstener 'abstain' from ab-s-tener, cf. tener 'have; hold'
but no casterner;

absterger 'cleanse (a wound)' from ab-s-terger, cf. detergente
'detergent', but no casterger;

abstinente 'abstinent' from ab-s-ten-ente, cf. tener 'have; hold';
but no castinente;

abstruso 'abstruse' from ab-s-trud-to, cf. intruso 'intrusive',
but no castruso;

where the rule as stated does not apply and

no cabasperjar but rather asperjar 'sprinkle' from ab-sparc-s-ar,
cf. esparcir 'scatter';

where the rule as stated does apply.

With regard to the prefix ad we have the following:

no ascibir from ad-scribir, but rather adscribir 'ascribe',
cf. escribir;

but ascender 'ascend' from ad-scender', cf. descender 'descend',
but no adscender;

aspecto 'aspect' from ad-specto-, cf. espectador 'spectator',
but no adspecto;

aspirar 'aspire' from ad-spirar, cf. espirar 'breathe', but no
adspirar.

2 For a set of examples illustrating the operation of the sonorization, cluster simplification, and assibilation rules consider the following related words:

lucido 'lucid';
luz 'light', pl. luces;
lujar 'shine, polish';
lustre 'lustre';
lucir 'shine' with 1st sg. luzco;
lumbre 'light, fire';
luna 'moon';

The root common to all these forms is luk. Lucido comes from luk-ido with assibilation of k to s before a front vowel. Similarly luz comes from luke while luces comes from luke-s, see 5.1. Lujar comes from luk-s-ar like traje from trag-se, etc. see 1.7. Lustre comes from luk-s-tre with deletion of the k by part a of the cluster simplification rule. Part b cannot apply because the t is followed by a +vocalic segment.

Lucir with 1st sg. luzco [lusko] comes from luk-sk-ir, while luzco comes from luk-sk-o. In luk-sk-o the first non-nasal stop is deleted by the cluster simplification rule part a. In lucir from luk-sk-ir the first k is deleted by the cluster simplification rule

and the second k is assibilated before the front vowel i:

luk-sk-ir	
luk-sts-ir	assibilation
lu-sts-ir	cluster simplification part a
lu-ss-ir	cluster simplification part b
lūsir	contraction
lusir	shortening

Lumbre comes from luk-s-m-re with deletion of the k by the cluster simplification rule, voicing of the s by the voicing assimilation rule, deletion of the z and lengthening of the vowel by sonorization, and insertion of an epenthetic b by the same rule which inserts epenthetic d in future forms like tendre, pondre, etc:

luk-s-m-re	
lusbre	cluster simplification
luzmre	voicing assimilation
lūmre	sonorization
lūmbre	epenthesis
lumbre	shortening.

Similarly luna comes from luk-s-na:

luk-s-na	
lusna	cluster simplification
luzna	voicing assimilation
lūna	sonorization
luna	shortening.

3 Actually the root here is pend with a t increment. That is, pens is from pend-t with dt going to s as in the past participles diviso, admiso, etc. The t increment also occurs in raptar, captar, etc. Note pender 'hang' and pesar 'weigh; consider'.

Chapter 3

Spanish Semivowels

3.1 The origin of Spanish long r

There are phonetically two types of r in Spanish: a flap (r) and a trill (rr). The trill occurs initially as in roca 'rock', rueda 'wheel', reja 'grate'; intervocalically as in irregular 'irregular', querré 'I will desire', correr 'run', arropar 'wrap', sierra 'saw', perro 'dog'; and after n, l, s as in enredo 'tangle', honra 'honor', malrotar 'squander', Israel 'Israel'. The flap also occurs intervocalically as in corazón 'heart', pared 'wall', parejo 'equal', paro 'lockout', postconsonantly as in prieto 'dark-complexioned', prestar 'lend', fresco 'fresh', freir 'fry', sangre 'blood', preconsonantly as in corto 'short', cuerdo 'cord', curso 'course', and in final position as in flor 'flower', coger 'seize'.

The long rr in medial position comes from a geminate cluster, rr, which in turn has various sources. Consider first the long rr in the future querré. In connection with this it is necessary to consider the future indicative of comer:

comeré	comerémos
comerás	comeréis
comerá	comerán

where the future tense is formed by adding the endings é, ás, á, émos, éis, and án to the infinitive of the verb. However, in some verbs the thematic vowel e drops, thus juxtaposing the final consonant of the root with the r of the infinitive ending. Thus the first singular future indicative of poder 'be able' is podré (from poderé), of poner is pondré (from poneré with insertion of an epenthetic d, see also fn. 2.2), of tener is tendré (from teneré) of venir is vendré (from veniré). Similarly the first person singular future indicative of querer is querré (from querer-e). This, then, is the source of the long r of querré.

Another source of a geminate rr cluster is from prefixation of the negative prefix in to a stem beginning with r, as we see in the following examples: irreal 'unreal', irreflexivo 'thoughtless', irrefrenable 'uncontrollable', irregular 'irregular', irreligioso 'irreligious', irremediable 'irremediable', irreproachable 'irreproachable', irresistible 'irresistible', irresoluto 'irresolute', irrespetuoso 'disrespectful', irreverente 'irreverent', etc. For the prefix cf. inacción 'inaction', inaceptable 'unacceptable', inactivo 'inactive', inadecuado 'inadequate', etc.

A similar source of rr is from prefixation of the prefix ad to stems beginning with r. Note

arraigar 'take root', cf. raigal 'pertaining to a root';
arrasar 'level', cf. raso 'smooth';
arreglar 'arrange', cf. regla 'rule';
arrestar 'arrest', cf. restar 'take away' (cf. also estar 'be');
arriba 'above' (rio arriba 'up stream'), cf. ribera 'riverside';
arrinconar 'corner', cf. rincón 'corner';
arrogante 'arrogant', cf. rogar 'beg';
arropar 'wrap', cf. ropa 'clothing';
arruinar 'ruin', cf. ruina 'ruin';
arrumbar 'lay aside', cf. rumbo 'direction'.

For the prefix cf. adherir 'adhere', adjuntar 'connect', admirar 'admire', admitir 'admit', adscribir 'attribute', adsorber 'adsorb', advenir 'come', adverbio 'adverb', advertir 'notice', etc.

Another source of rr is from the prefixation of the prefix con to stems beginning with r:

corregir 'correct', cf. regir 'rule';
corroborar 'corroborate', cf. roborar 'strengthen';
corromper 'corrupt', cf. romper 'break';
corrosión 'corrosion', cf. roer 'gnaw'

For the prefix note concentración 'concentration', concurrir 'concur', etc.

Another source of rr is from underlying rs which appears in erudite words, although not in the related vulgar words:

correr 'run', alongside curso 'course';

sierra 'saw' from ser-s-a with s increment alongside

insertar 'insert' from in-ser-t-ar with t increment.

Thus we see the evidence for considering the long \bar{r} to be a geminate cluster of two short r's.¹ For the long \bar{r} in initial position I have no explanation other than to state the fact by the following rule:

Resonation:

$$\left[\begin{array}{l} + \text{consonantal} \\ + \text{vocalic} \\ + \text{continuant} \end{array} \right] \longrightarrow [+ \text{long}] / \# _$$

The features +consonantal and +vocalic specify the two liquids, r and l. The feature continuant separates the continuant r from the stop l. This rule will account for the long initial \bar{r} in words like roca, rueda, reja, etc. However, it still remains to discuss the long \bar{r} in words like enredo, malrotar, honra, etc.

Consider first the word enredo. Note that the existence of the nr cluster is somewhat unexpected. For we would expect either the insertion of an epenthetic d as in tendré from tenré, pondré from ponré, vendré from venré, etc. or else for gemination to occur like in irregular from in-regular. Also one would like an explanation of the trill in this position which goes beyond merely stating the fact, for usually after consonants we find the flap as in prieto, tropel, truenco, fresco, siempre, bravo, sobre, etc.

These problems suggest that we consider more closely the analysis of these forms. In irregular, irreligioso, etc., the n and the r are separated by a single word boundary (#) as we saw earlier (2.5) from the fact that prothesis occurs after this negative prefix

(recall inestable). On the other hand in corregir, corromper, etc., the n and r are separated by a morpheme boundary as we saw earlier from the fact that prothesis does not occur after the prefix con (cf. constar). From these facts we conclude that n will assimilate to the following r whether separated by a single word boundary or by a morpheme boundary. This discovery requires the following reformulation of the liquid gemination rule (refer to 2.3):

Liquid gemination:

$$\left[\begin{array}{l} +\text{consonantal} \\ -\text{grave} \\ +\text{diffuse} \end{array} \right] \rightarrow \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \\ \alpha\text{continuant} \end{array} \right] / \left(\begin{array}{l} + \\ \# \end{array} \right) \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \\ \alpha\text{continuant} \end{array} \right]$$

where the items enclosed in parentheses are optional.

The nr clusters of the future tense do not become rr because they are separated by the thematic vowel when this rule applies. Later the thematic vowel is dropped by syncope² and epenthesis occurs. Thus irregular, corregir, and tendré have the following derivations:

in regular	con regir	ten e r-é	
irregular	corregir	"	liquid gemination
"	"	tenré	syncope
"	"	tendré	epenthesis.

Now return to consideration of enredo. We see now that one would expect erredo, for there is no intervening vowel here to prevent gemination of nr to rr with later syncope and epenthesis as in tendré. However, the fact remains that the n of en does not assimilate to the following r. Now one might think that the erudite/vulgar distinction established earlier is the cause of this non-gemination with gemination applying only to vulgar words, but not to erudite words, like in the curso/correr doublet. However, this solution is not possible, for the word enredo is clearly a vulgar word

as seen from the lention of the intervocalic t of the root rēt (cf. retículo 'network') to d.

Thus it seems that since en and redo, although clearly separated by some constituent boundary, but separated neither by # or + (for else liquid gemination would occur), must be separated by double word boundary ##. In other words, we have here not a case of prefixation, but rather compounding of two independent words. This is what we would expect, for en actually exists as a separate word, a preposition meaning in; into; at; on; while in exists only as a prefix, and not as a separate word. Note that the liquid gemination rule as re-formulated above does not apply across ##.

Like enredo are

enrabiar 'enrage', cf. rabiar 'rage';
enraizar 'take root', cf. raíz 'root';
enramar 'intertwine (branches)', cf. rama 'branch';
enranciar 'make rancid', cf. rancio 'rancid';
enrarecer 'rarefy', cf. rarefacer 'rarefy';
enrasar 'make even', cf. raso 'smooth';
enratonar 'get sick from eating mice (said of cats)', cf. ratón ('mouse');
enrayar 'put spokes in (a wheel)', cf. raya 'ray';
enrejar 'lattice', cf. rejilla 'lattice';
enriquecer 'enrich', cf. rico 'rich';
enrizar 'curl', cf. rizar 'curl';
enrodar 'torture on the wheel', cf. rodo 'roller';
enrojar 'redden', cf. rojo 'red';
enrollar 'wind', cf. rollar 'roll';
 etc.

The existence of the long r̄ of malrotar is related to the fact that the elements of malrotar are separated by a double word boundary like in enredo. This is not unexpected, since mal also exists as a separate word meaning badly; wrongly; scarcely; cf. also rotar 'roll; rotate; abound.'

The explanation of the length of the r̄ in honra 'honor' is not clear (the solution which applies to enredo cannot apply here), but is probably connected with the derivation of this word from presumably the root hones, cf. honor 'honor' and honeste 'just; honest'.

3.2 the phonetic distinction between u, w, and w̄; diphthongization

There is a phonetic distinction in Spanish between the vowel u, the glide w, and the labial glide with velar friction indicated here by the macron : w̄. The last often has a stop onset in initial position: gw̄.

Consider first the distinction between u and w as exemplified by the following words:

huí [uí] 'I fled'
fui [fwí] 'I went; I was'

The first example is the first person singular preterit of the verb huir 'flee' which has the following conjugation in the present indicative and preterit:

huyo	huimos	huí	huimos
huyes	huís	huiste	huisteis
huye	huyen	huyó	huyeron

The second example is the first person singular preterit of both the verb ir 'go' and the verb ser 'be'. In either case it is apparently a suppletive stem (although this is not certain) and has the following conjugation in the preterit:

fui	fuimos
fuiste	fuisteis
fué	fueron

The problem here is to account for the appearance of a phonetic u in huí and a phonetic w in fui.

To see the solution, it is first necessary to consider two rules of Spanish; the syneresis rule and the rule which deletes g before front vowels in vulgar words.

Syneresis is a common phenomenon of Spanish and consists essentially of converting a short diffuse vowel into a glide when contiguous to another vowel. Thus i becomes y and u becomes w. Note, for example, yendo, the present participle of ir 'go' where the y is the phonetic reflex of the radical i.

Another common phenomenon of Spanish is the deletion of g before a front vowel in vulgar words, but not in erudite words, as we see in the following examples:

leer 'read' from leger, cf. lector 'reader';

freir 'fry; tease' from fregir, cf. fregar 'rub; annoy';

huir 'flee' from fugir, cf. fuga 'flight'.

Note especially that the underlying form of huir is fugir. This solves the problem of hui and fui. In the former case the root is fug, while in the latter case it apparently is simple fu. The g of the root fug prevents conversion of the radical u to w:

fugi	fui	
"	fwi	syneresis
fui	"	deletion of <u>g</u> before front vowel
hui	"	aspiration* -(1.3)

Next consider the two types of w, as seen in the following examples:

nuevo [nwebo] 'new'

huevo [webo] 'egg'

suerte [swerte] 'luck'

huerta [werta] 'orchard; garden'

In the first column w occurs after a consonant, while in the second column w occurs in initial position. No new rule is needed to account for this fact, rather a more general version of the rule given earlier for initial r will handle this case. If instead of specifying +consonantal and +vocalic we merely require that the value of these features be identical, the rule will not only still apply to r, but also to w and y, which are -consonantal and -vocalic ,

but still + continuant :

Resonation:

$$\left[\begin{array}{l} \alpha \text{ consonantal} \\ \alpha \text{ vocalic} \\ + \text{ continuant} \end{array} \right] \rightarrow [+long] \quad / \# _$$

This rule accounts for the distinction between w and ̄w. The precise phonetic characterization of ̄w is determined by other rules.

The w's in these examples do not occur in the underlying forms but rather are the result of diphthongization of a stressed o which actually appears phonetically when unstressed in related forms such as novedad 'novelty', sortear 'cast lots for', ovar 'lay eggs', hortelano 'gardener'. Many examples of this type of alternation appear in the conjugation of verbs, where the infinitive is stressed on the thematic vowel, and the first singular on the radical vowel:

acordarse 'remember', 1st sg. me acuerdo;
acostarse 'go to bed', 1st sg. me acuesto
almozar 'lunch', 1st sg. almuerzo
colgar 'hang (up)', 1st sg. cuelgo;
costar 'cost', 3rd sg. cuesta;
demostrar 'demonstrate', 1st sg. demuestro;
dormir 'sleep', 1st sg. duermo;
encontrar 'meet', 1st sg. encuentro;
llover 'rain', 3rd sg. llueve;
jugar 'play (a game)', 1st sg. juego
morder 'bite', 1st sg. muerdo;
morir 'die', 1st sg. muero;
mostrar 'show, point out', 1st sg. muestro;
mover 'move', 1st sg. muevo;
poder 'be able', 1st sg. puedo;
probar 'test', 1st sg. pruebo;
recordar 'remember', 1st sg. recuerdo;
rogar 'beg', 1st sg. ruego;
soler 'be in the habit of', 1st sg. suelo;

soñar 'dream', 1st sg. sueño;

volarse 'fly away', 1st sg. me vuelo;

volver 'return', 1st sg. vuelvo.

When an o does not diphthongize under stress this may be for any of three reasons. The vowel may be long when the diphthongization rule applies as in the case of pones from posnes, cf. puesto and 2.3. The vowel may be short, but from a diffuse vowel which is lowered in vulgar words after diphthongization fails. This is the case with romper where the root is rup, cf. ruptura and 2.3. Or the word may be an erudite word to which the diphthongization rule does not apply. This is the case with inmóvil 'immovable'. The situation is exactly the same with the mid vowel e.⁵ Thus we have the following rule which applies only to vulgar words:

Diphthongization*:

$\begin{matrix} \circ \\ \bullet \\ \circ \end{matrix} \longrightarrow ye$
 $\begin{matrix} \circ \\ \bullet \\ \circ \end{matrix} \longrightarrow we$

An apparent exception to the above discussion is the form deshuesar 'to bone' where the root is os as we see in osamenta 'skeleton; bones', osario 'ossuary, charnel house'. When stressed the radical o diphthongizes to ue as in hueso 'bone'. However, deshuesar is anomalous since the diphthong appears even though the stress is on the thematic vowel. This is because the form deshuesar is denominative, that is, formed not from the root os but rather from the noun hueso.

Thus we see that the difference between the w's of nuevo and suerte on the one hand and huevo and huerta on the other is not related to diphthongization, since they all are diphthongized reflexes of short stressed o's, but rather due to the fact that the w's of the latter pair occur initially.

However, the situation is not always so simple as we see for example in the pair

desuello [desweyo] 'skinning'
deshueso [dezwezo] 'I debone'

where neither w appears in initial position. One might think that deshueso should be analyzed des#hueso and that desuello should be analyzed de#suello. With this analysis the w of deshueso will become ṽ by the resonation rule since it is preceded by a word boundary, whereas the w of desuello is protected by the initial s.⁶

The main objection to this analysis is that it fails to reflect the fact that there are not two prefixes here, de in one case, and des in the other. Rather the prefix is des, the same des discussed earlier. However, this can be rectified by assuming that the underlying structure of desuello is des#suello. This will still distinguish it from deshueso in the required manner, and as we have seen earlier, the two s's will contract and shorten to yield the single s of the phonetic output.

3.3 the phonetic distinction between i, y, and ṽ:

Finally consider the alternation between i, y, and ṽ where ṽ is a palatal voiced strident continuant frequently written z, often with stop onset when initial, i.e. d^hz.

First consider the phonetic distinction between i and y as exemplified in fió fió 'he trusted' alongside dió dyó 'he gave'; oiremos oiremos 'we will hear' alongside oigamos oygamos 'we would hear'.

Fió is the third singular preterit of the verb fiar 'trust', while dió is the third singular preterit of the verb dar 'give'. The conjugation of these verbs in the preterit is

fié	fiamos	di	dimos
fiaste	fiasteis	diste	disteis
fió	fiaron	dió	dieron

Oiremos is the first plural future indicative of the verb oír 'hear' and oigamos is the first plural present subjunctive. The conjugation of this verb in the present subjunctive and future indicative is

oiga	oigamos	oiré	oiremos
oigas	oigáis	oirás	oiréis
oiga	oigan	oirá	oirán.

The solution to the problem of fió and dió is obvious. At one stage there was a d in fió which prevented the operation of the syneresis rule just like the g of huir prevented it (3.2). This d appears phonetically in related erudite forms such as fidelidad 'fidelity', fidelísimo 'most faithful, etc, but is deleted in vulgar forms like fiar by the d deletion rule (2.2). There is no such d in the underlying form of dió and so the syneresis rule applies without hindrance, converting the radical i of dió to the glide y. Similarly for the forms fiador [fiador] 'bondman' and viajero [byaXero] 'traveler'.

The solution to the oiremos/oigamos couplet is similar, although not quite so simple. Oi remains in oiremos instead of becoming oy by the syneresis rule since (like in the examples above) these two vowels are separated by a consonant when the syneresis rule applies. This consonant is the d which appears in audible 'audible', audiencia 'audience', etc. That is, oiremos comes from audiremos:

audiremos	
odiremos	syneresis, glide assimilation, glide lengthening (1.6) shortening (1.1)
"	syneresis fails
oiremos	<u>d</u> deletion (2.2)

Now consider oigamos. It is necessary here to realize that the g in this form is the same g which appears before a back vowel in certain verbs whose stems end in dental consonants, e.g. poner 'put', valer 'be worth', asir 'seize', etc.

Present Indicative		Present Subjunctive	
pongo	ponemos	pongo	pongamos
pones	ponéis	pongas	pongáis
pone	ponen	ponga	pongan

valgo	valemos	valga	valgamos
vales	valéis	valgas	valgáis
vale	valen	valga	valgan

asgo	asimos	asga	asgamos
ases	asís	asgas	asgáis
ase	asen	asga	asgan.

Although it is not clear why g appears in these forms, apparently it appears in

oigo	oímos	oiga	oigamos
oyes	oís	oigas	oigáis
oye	oyen	oiga	oigan

for the same reason. That is, it must be added when the underlying stem still contains a d, i.e. oigamos must be from odgamos parallel to pongamos, valgamos, and asgamos. This d then becomes y by the glide formation rule mentioned earlier (1.6) in connection with palatalization (recall e.g. hecho from hak-to). Thus we have the following derivation of oigamos:

audamos	
odamos	glide assimilation, glide lengthening, shortening
odgamos	insertion of <u>g</u>
oygamos	glide formation.

These, then, are the reasons for the appearance of i in oiremos and y in oigamos. In oiremos the orthographic i is the thematic vowel, while in oigamos the orthographic i is a front glide from the final radical consonant d.

Next consider the following examples of phonetically distinct y and ȳ (Rio de la Plata dialect) where the words in the first column have y and those in the second column ȳ:

abierto 'opened'	abyecto 'abject'
hiniesta 'Spanish broom'	inyecta 'injects'

unieron 'they united'

siega 'harvest'

hierba 'grass, herb'

hiendo 'I cleave'

hierro 'iron'

deshielo 'thaw'

verno 'son-in-law'

yegua 'mare'

yerba 'Paraguay tea'

yendo 'going'

yerro 'mistake'

desyemar 'debud'

The \bar{y} in abyecto is easy to explain. Abyecto is analyzable into the prefix ab and the stem yecto which also occurs in e.g. inyectar 'inject'. This prefix is added with a single word boundary just like the prefix des and the negative prefix in. The y preceded by a word boundary then becomes \bar{y} by the same rule which converts w to \bar{w} and r to \bar{r} . Abierto, however, cannot be subjected to such an analysis.

Of course there is no y in the underlying form of abyecto. Rather the root here is iec. The radical i becomes y by the syneresis rule and is later converted to \bar{y} by the resonation rule. There is also no y in the underlying form of abierto. Rather the root here is aper with lenition of p to b and diphthongization of a short stressed e to ye, cf. the erudite form apertura 'aperture'.

Hiniesta, inyecta, unieron, siega, verno and yegua are like abierto and abyecto and offer no problem.

Next consider the examples hiendo and yendo, hierro and yerro. Here we have both y and \bar{y} occurring in phonetically initial position. This might be thought reason enough to establish \bar{y} as a phoneme.⁷ But in point of fact, the y of hiendo and hierro is not in initial position in the underlying form. Rather these forms have initial f which becomes h (cf. aspiration 1.3) in vulgar words, but not in erudite words. (Recall that the h is later deleted.) This initial f appears in fisura 'fissure', from fid-tura (cf. hender from fid-n-er) and férreo 'ferrous'. The forms with initial \bar{y} , on the other hand, do not have initial consonants to prevent the operation of the

resonation rule (3.2). the y of yerro is the result of the diphthongization rule, cf. errar 'err'. The initial y of yendo on the other hand comes from the radical vowel of ir by syneresis. Thus we have the following derivations:

ferro	erro	fendo	iendo	
herro	"	hendo	"	aspiration
"	"	"	yendo	syneresis
hyerro	yerro	hyendo	yyendo	diphthongization
"	"	"	yendo	yod absorption 1.7
"	yerro	"	yendo	resonation 3.2
yerro	"	yendo	"	h → ∅

Finally consider the examples deshielo and desyemar which in the Río de la Plata dialect are pronounced [dezyelo] and [dez̄yemar]. One might think that these should be analyzed as [de#zyelo] and [dez̄#yemar] with y predictable after the word boundary. But consideration of the related forms hielo [yelo] 'ice' and yema [yema] 'bud' show not only that this is an incorrect analysis, but also that the problem is independent of the prefixes.

One could say that hielo was from ielo and yema from yema, thus establishing a contrast between i and y. But this won't work because the i of ielo will become y by the syneresis rule and then y by the resonation rule just like yendo from iendo.

Another possibility is to take cognizance of the fact that the root of hielo is clearly gel (with diphthongization) as we see for example, in related erudite words such as gelatina 'gelatin', gélido 'frosty' congelar 'congeal' etc. This initial g would prevent operation of the resonation rule and then later be deleted by the rule which deletes g before front vowels in vulgar words (recall leer, etc). The difficulty with this solution is that yema also has an erudite cognate, namely gema 'gem; bud'.

In other words, the roots of both hielo and yema contain an initial g: gel and gem. Yet in the first case the vulgar reflex of this g is h, and in the second case the vulgar reflex is y.

The only solution I can see at the moment is to say that although the g's of the erudite forms are phonetically identical, they nevertheless must be distinct in their underlying representation, say g and ġ, where g becomes h in vulgar words before front vowels and ġ becomes y.

It is interesting to note in connection with this problem that although both of these g's come from the same Latin g (cf. gelū 'frost' and gemma 'bud'), the g of gelū goes back to IE *g (cf. Lithuanian gėlmenis, gelumà), while the g of gemma goes back to IE *ġ (cf. Lithuanian žėmbu).

Footnotes to chapter 3

1 The long r̄ in words like perro, carro, etc. comes from a geminate cluster rr in the underlying form. There is no morphological evidence for deriving this cluster from anything else as in the above examples.

2. The conditions under which syncopation occurs are not clear. Apparently it will be necessary to list those verbs in which syncopation occurs in the future tense.

5 For examples of short e diphthongizing under stress note the following verbs where the radical vowel is unstressed in the infinitive, but stressed in the first person singular:

comenzar 'begin', 1st sg. comienzo;
confesar 'confess', 1st sg. confieso;
defender 'defend', 1st sg. defiendo;
empezar 'begin', 1st sg. empiezo;
entender 'understand', 1st sg. entiendo;
errar 'err', 1st sg. yerro;
mentir 'lie' 1st sg. miento;
negar 'deny', 1st sg. niego;
nevar 'snow', 3rd sg. nieva;
pensar 'think' 1st sg. pienso;
perder 'lose', 1st sg. pierdo;
preferir 'prefer', 1st sg. prefiero;
querer 'want', 1st sg. quiero;
sentar 'seat', 1st sg. siento;
sentir 'feel sorry', 1st sg. siento;
tropezar 'stumble', 1st sg. tropiezo;

For examples of stressed e which does not diphthongize because it is long note mes 'month' from mens, cf. mensual 'monthly' and the discussion in 2.6. Note also leche 'milk' from lakto (1.6). For stressed e from i note the vulgar pega 'pitch varnish' alongside the erudite píceo 'pitchy'. For an erudite word with stressed e which does not diphthongize note mérito 'notable'.

6 This is essentially the solution of Sol Saporta and Heles Contreras, A Phonological Grammar of Spanish (University of Washington Press, 1962):

The contrast between /u/ and /w/ is similarly accounted for by indicating the constituent boundary in the derivation of the string: /de-sue/ vs /des-ue.../ for [desueño] desuello 'skinning' vs. [dezwesár] deshuesar 'to bone.'

7 This is essentially Erica Garcia's solution in her review article of Saporta and Contreras (Word 19,258 (1963))

Chapter 4

Glide increments and the rule G1

4.1 quepo

Consider the present indicative of the verb caber 'be contained, fit into':

quepo [kepo]	cabemos
cabes [kabes]	cabéis
cabe	caben.

Note that in the first person singular the radical vowel is e, although in all the other forms the radical vowel is a; and that the final radical consonant is p, although in all the other cases it is b. Note also that although the k of the first person singular is followed by a front vowel, it does not assibilate to s, contrary to the assibilation rule (2.7) and that although the p of the first singular is intervocalic, it does not lenite to b by the lenition rule (1.8). Also note that the stressed e does not diphthongize.

Recall that there are three reasons why a stressed mid vowel does not diphthongize. It may occur in an erudite word. But this is not an erudite word. (Note the lenition on cabes). Or it may come from a short i which appears in erudite cognates, but as e in vulgar words. (recall ridículo, reir, etc.) But this e does not come from i, since in the cognate erudite words capacidad 'capacity', capaz 'capable; capacious, spacious' the radical vowel is not i, but rather a as in the present indicative, with the exception of the first singular. Or the vowel may be long when the diphthongization rule applies. But if this vowel is long, thus preventing its diphthongization, we would not only like to account for this length, but we would also like to explain why this vowel is e, when the radical vowel in the rest of the forms is a.

In this connection recall the previous discussion of leche from lakte (1.6). Since the rules for converting ay to e already exist, it will cost nothing to assume that the underlying form of quepo is kaypo. Not only are no extra rules necessary to go from kaypo to quepo, but this analysis also possesses many other advantages. Quepo now has the same radical vowel which appears in the other forms, which is not only more symmetrical, but also explains why the radical k does not assibilate to g: when assibilation applies the initial k is still followed by a, as in the other forms. This analysis also explains why the radical p does not lenite to b as in the other forms. When lenition applies, it is not intervocalic, but rather preceded by a y glide. That the root is cap and not cab may be seen from the erudite forms capacidad and capaz, as well as captar 'capture; impound (water)', where the lenition does not occur because the root cap is followed by a t increment (cf. raptar and rapar, sec. 2.2, 1.6).

The only remaining problem is the source of this y and why it doesn't occur in the other forms. Note that just because it appears at this stage on the left of the radical p, that does not mean that it started out there. For recall that although the nasal increments of romper, tundir, fundir, etc. appear to the left of the final radical consonant, they did not start out there, but rather were affixed to the root with subsequent metathesis if the root ended in an obstruent stop as above, but not otherwise (cf. pones from pos-n-es, sec. 2.3 and prosternarse from pro-ster-n-ar-se, sec. 4.5).

This suggests that the y of kaypo is also an increment, i.e. that kaypo is from kap-y-o. Not only is such an analysis possible; it is also desirable from the standpoint of explaining why this y increment appears only in the first singular, but not in the other forms. Actually it is added to all the present tense forms, just like the nasal increments were, but when followed by a front vowel, it is deleted:

y deletion:

$$y \rightarrow \emptyset \quad / _ \left\{ \begin{matrix} i \\ e \end{matrix} \right\} .$$

When followed by a back vowel, however, as in the first singular, it is not deleted. Thus we have the following derivations for quepo and cabes:

kap-y-o	kap-y-es	
"	kap-es	y deletion
kaypo	"	metathesis
"	kabes	lenition
"	"	assibilation fails
kēpo	"	glide assimilation and glide lengthening
"	"	diphthongization fails
kepo	"	shortening.

The present subjunctive of caber as well as the present subjunctive of saber 'know (with root sap, cf. sapiencia 'sapience'):

quepa	quepamos	sepa	sepamos
quepas	quepáis	sepas	sepáis
quepa	quepan	sepa	sepan

also illustrate the failure of lenition and raising and lengthening of the radical vowel. Like the present indicative of caber is the present indicative of saber:

sé	sabemos
sabes	sabéis
sabe	saben,

although the first singular form is anomalous, since we would expect ésepo like quepo. There is no explanation for this form.

4.2 rey

For another example of a y increment, only this time in a noun, note the form rey 'king', plural reyes. Clearly this form is related to regal 'royal', regla 'rule', regir 'to rule', where the root

apparently is reg. The problem is to account for the y or rey and reyes, where the other forms would suggest a g. We cannot say that e.g. reyes comes from reges, for g in this position does not change to y, but is rather deleted, as we saw for example in leer, huir, etc. (3.2). Also recall from the discussion of quepo/cabes etc. that y is deleted before front vowel, so that the underlying form of reyes cannot be reyes, for this would be converted to grees. Besides, we want the root to be the same reg which appears in the related forms mentioned above.

Thus the underlying representation of reyes must be reg-y-e-s with root reg, increment y, thematic vowel e, and plural ending s. The radical g is first assimilated to the following y, and then y is deleted before the following front vowel:

reg-y-es	
rey-y-es	assimilation of g to y
reyes	y deletion.

The singular form rey is from reg-y-e, with application of the above rules, and then apocope of a final short e. See section 5.1 below.

Like rey/reyes are ley/leyes, 'law/laws', cf. legal 'legal', and grey/greyes 'flock/flocks', cf. gregario 'gregarious', and egregio 'distinguished' from eks-greg-io, cf. 2.3 and 2.4

4.3 gozo and cabeza

For another example of a y increment consider gozo 'joy', gozar 'enjoy', alongside godesco 'gay, merry', as well as cabeza 'head', alongside capitán 'leader', capital 'capital; paramount', capítulo 'chapter'. In each of these cases the forms with z are the result of addition of a y increment to a root ending in a dental stop, where the roots are god, cf. godesco, and capit, cf. capítulo. First the dental stop becomes the continuant z, and then the y metathesizes and combines with the preceding vowel as in quepo from

kap-y-o (4.1). Thus gozo and cabeza have the following derivations:

god-y-o	capit-y-a	
"	capetya	vowel lowering in vulgar forms (2.3)
"	cabetya	lenition
gozyo	cabezya	{t,d} → z / __y
goyzo	cabeyza	metathesis
gōzo	cabēza	glide lengthening (1.6)
"	"	diphthongization fails
gozo	cabeza	shortening (1.1).

Note especially the penultimate stress on cabeza and see sec. 5.4 below.

4.4 w increments

Consider the conjugation of caber 'fit', tener 'have', and estar 'be' in the preterit indicative:

cupe.	tuve [tube]	estuve [estube]
cupiste	tuviste	estuviste
cupo	tuvo	estuvo
cupimos	tuvimos	estuvimos
cupisteis	tuvisteis	estuvisteis
cupieron	tuvieron	estuvieron.

Note that although in e.g. cupe, where we presumably have the same root which occurs in the present indicative, i.e. kap (4.1), the radical vowel in the preterit is not a, but rather u. Also note that the radical p is not lenited to b even though intervocalic. These facts suggest that there is a glide increment in these forms which both prevents lenition of the radical p and also accounts for the raising and flattening of the radical vowel. However, this glide increment cannot be y, for then the radical vowel would be raised to e as before in quepo, the first person singular present indicative of

caber. If, however, the glide increment is a w, the glide assimilation rule (1.6) will raise the radical a to o, just like y raised a to e in quepo. Then ow will become long ō just like ey became long ē by the glide lengthening rule (1.6). However, why the radical vowel in these preterit forms is diffuse is not clear. (Recall that e did not go to i in quepo.) The only way to make them diffuse is by a special ad hoc rule:

Preterit diffuseness:

preterit radical vowel \rightarrow [+diffuse].

Thus cupe would have the following derivation:

cap-w-e	
cawpe	metathesis
"	lenition fails
cowpe	glide assimilation
cōpe	glide lengthening
cūpe	preterit diffuseness
cupe	shortening.

Like caber/cupe are haber/hube 'have' (root hab) and saber/supe 'know' (root sap).

Next consider the preterit of estar. The problem here is to account for the uv ending. But first it is necessary to ascertain what the root of the verb estar is. Recalling the discussion of prothesis (2.5) and related forms such as constar we see that the e is not part of the root, but rather a prothetic vowel. The r is the sign of the infinitive and the a is apparently the thematic vowel which appears in amar, comprar, etc. This would suggest that what is left, namely st, is the root. However, consideration of related forms such as estación 'station', estabilidad 'stability', etc. suggest that the root is rather sta. However, this causes no difficulty, for recalling the rule which contracts identical vowels

(1.1) we see that if the thematic vowel a were added to the root sta, the radical a and the thematic a would contract to give a single phonetic a. Thus estar comes from e-sta-a-r. The only difference between estar and other verbs in this respect is that the root sta ends in a vowel, while most roots (d.g. am, cap, ten, etc.) end in a consonant.

This, then, explains the u of estuve. It comes from the radical a of the root sta just like the u of cupe comes from the radical a of the root cap. However, the appearance of this u suggests the presence of a w increment like in cupe. In fact, this w increment appears in the phonetic output as b by the same rule that converts the w of e.g. salvo to phonetic b (2.4). This is the source of the orthographic v (phonetic b) of estuve. Thus estuve has the following derivation:

sta-w-e	
estawe	prothesis
estowe	glide assimilation
estobe	w → b
"	lengthening fails
estube	preterit diffuseness.

Like estar/estuve is andar/anduve 'walk' (root anda).

4.5 the rule GL with reference to liquids

There are several sets of Spanish words which consist of doublets differing chiefly in that one member contains an r which the other member does not. Consider first the doublet triple 'triple, treble' and tiple 'soprano; treble guitar'. Clearly these words have the same root, namely tri, which occurs also in triángulo 'triangular', triciclo 'tricycle', triplicar 'triple', trigésimo 'thirtieth', etc.

This suggests the following rule which applies only to vulgar words:

$$GL^* : \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \end{array} \right] \longrightarrow \emptyset / C_VC_o C \left[\begin{array}{l} +\text{consonantal} \\ +\text{vocalic} \end{array} \right]$$

Thus the vulgar tiple comes from the underlying representation triple by the above rule.

Another example of the operation of this rule is furnished by the following doublet: prosternarse 'prostrate oneself' alongside postrarse 'prostrate oneself'. Both of these verbs are reflexive particle se added to the infinitives prosternar and postrar. Also in both cases prefix pro is added to the root ster (which also occurs in estelar 'stellar'. However, in prosternarse there is an n increment which does not occur in postrarse. Other than this, the chief difference between the two forms is that the former is an erudite form in which syncopation does not occur, and the latter is a vulgar form in which syncopation does occur.¹ Thus prosternarse comes from pro-ster-n-ar-se, while postrarse comes from pro-ster-ar-se. In the latter case syncope occurs, giving pro-str-ar-se. Once this syncope has occurred the conditions for the operation of the rule GL are met and it applies, giving postrarse.

Still another example of the operation of the rule CL is furnished by the doublet trémulo 'tremulous' alongside temblón 'tremulous'. These differ chiefly in that the former is an erudite form while the latter is a vulgar form, and that the suffix ón has been added to the latter. Thus temblón comes from tremul-ón. First syncope deletes the unstressed u, producing an ml cluster to which an epenthetic b is added by the same rule which adds epenthetic d in the future tense of certain verbs, e.g. tendré (3.1). Once this b has been added, the condition for the operation of the rule GL are met and it deletes the first r:

tremul-ón	
tremlón	syncope
tremblón	epenthesis
temblón	GL.

Finally consider the forms trabanca 'paperhanger's table', alongside tabla 'table'; trabón 'cross-planks in oil-wells' alongside tablón 'plank'. In all these cases the root is trab. In

trabanca the suffix anca is added to the root trab and the r remains. In tabla the suffix l (cf. regla, silla, bella, etc. and 2.3) is added to the root trab and the r is deleted by the rule GL. In trabon the suffix on is added and the r remains. In tablón both the suffix l and on are added, and the r is deleted by the rule GL.

4.6 the rule GL with reference to glides

Consider the following words:

cinco [sinko] 'five';
quinto [kinto] 'fifth';
quince [kinse] 'fifteen'.

Clearly these words are related, although it is not so clear how. Note that in quince the initial k does not assibilate to s, even though followed in the phonetic output by a front vowel. This is because the initial k is not followed by a front vowel in the underlying representation, but rather by a w which insulates the k from the assibilating influence of the front vowel. (See the discussion of aquí, etc 2.7). However, since these forms must all have the same root, we assume that the initial s of cinco is the reflex of k. So apparently in the underlying form of cinco, the initial k is not protected by a w. Also where cinco has a radical final k, quince has a radical final s, superficially the assibilated reflex of the same k which appears in cinco. Actually the s which appears in quince is not the assibilated reflex of the k which appears in cinco, but rather the assibilated reflex of the k of the suffix ke 'teen' which is added to the first five numbers to form the teens, e.g. once 'eleven' from on-ke, cf. uno 'one';

doce 'twelve' from dos-ke, cf. dos 'two';

trece 'thirteen' from tres-ke, cf. tres 'three';

catorce 'fourteen' from cator-ke, cf. cuatro 'four';

quince 'fifteen' from kwink-ke, cf. cinco 'five'.

The first k of the cluster nkk is deleted by the cluster simplification rule and then the k of the suffix is assibilated. Thus

at one stage cinco must come from kinko, and quince must come from kwink-ke.

It remains only to determine whether kink or kwink is the root, and to predict the occurrence of the other. If we think that kink is the root, then we will have to establish a special ad hoc rule to insert w in kwink. If, however, we assume that the root common to both forms is kwink, then we do not need to establish a new rule, rather a generalized version of the rule GL established earlier:

$$\left[\begin{array}{l} \alpha \text{consonantal} \\ \alpha \text{vocalic} \end{array} \right] \rightarrow \emptyset \quad / \text{C_VCoC} \quad \left[\begin{array}{l} \alpha \text{consonantal} \\ \alpha \text{vocalic} \end{array} \right]$$

will delete the w, provided that we also assume that the underlying representation of cinco contains a glide increment, in particular a w: kwinkwo. To this underlying representation the rule GL will apply, giving kinkwo. Then before the w increment can metathesize as it does in e.g. cupe from cap-w-e, it combines with the following o to give long ō. With the deletion of the first glide by GL, the initial k is now free to be assibilated.

The form quince, however, has no w increment in its underlying representation but rather the suffix ke and thus the first w remains and prevents the operation of the assibilation rule. There is nothing to prevent the assibilation of the suffixal k. In the form quinto there is also no w increment, but rather a t which, however, cannot effect the deletion of the radical w. That is, quinto is from kwink-t-o with deletion of the final radical k by the cluster simplification rule (2.4). Thus cinco, quince, and quinto have the following derivations:

kwink-w-o	kwink-k-e	kwink-t-o	
kinkwo	"	"	GL
kinkō	"	"	wo → ō
tsinkō	kwinktse	"	assibilation
"	kwintse	"	cluster simplification

ssinkō	kwinsse	kwin-t-o	ts → ss
šinkō	kwinše	"	contraction
sinko	kwinse	"	shortening
"	kinse	kinto	Cw → C

Footnotes to chapter 4

1 Although the exact conditions under which syncope occurs are not clear, its effects are seen in the following examples:

amable 'amiable' from amabile, cf. amabilidad 'amiability';

caldo 'broth, gravy' from calido, cf. cálido 'warm';

afable 'affable' from ad-fabile, cf. afabilidad 'affability';

noble 'noble' from nobile, cf. nobiliario 'nobiliary';

instable 'unstable' from in-stabile, cf. instabilidad 'instability';
(these forms are variants of inestable and inestabilidad)

vocablo 'word' from vocabilo, cf. vocabulario 'vocabulary'.

Note also madre 'mother' from matere with lenition of intervocalic t to d before syncope destroys the environment for lenition, cf. the erudite maternal 'maternal' as well as cabra 'goat' from capera, cf. caprino '(pertaining to a) goat'

Chapter 5

Apocope, plural formation, and the prediction of Spanish stress

5.1 Apocope

Consider the following two sets of words:

voz [bos] 'voice'
 voces [boses] 'voices'
 vocal [bokal] 'vocal';

red 'net'
 redes 'nets'
 retículo 'network'.

In the first set the root is vōc, which we see also in the related words vocablo 'word', vocación 'vocation', vocear 'shout', convocar 'convoke', etc. In vocal the radical k appears as phonetic k when followed by a back vowel, while in voces the radical k appears as s when followed by a front vowel by the assibilation rule established earlier (2.7). But in the singular form the radical k also appears as s, even though followed by no front vowel in the phonetic output.

In the second set the root is rēt as we see for example in retículo. In the plural form redes the t of the root has been lenited to d by the lenition rule established earlier (1.8). In the singular form red, however, the radical t also appears as d, even though it is followed by no vowel in the phonetic output.¹

These facts suggest that even though the singular forms do not end in vowels in the phonetic output, at one stage of their derivation they must have ended in a vowel, a vowel which would cause assibilation of k to s as well as lenition of t to d. To assibilate k to s this vowel must be a front vowel. The vowel which suggests itself is the vowel which appears in the plural, namely e. However, since this vowel does not appear in the phonetic output, there must be a rule which apocopes it after it has assibilated the k of voz

and lenited the t or ret. Thus voz and red would have the following derivations:

bōke	rēte	
bōtse	"	assibilation
"	rēde	lenition
bōsse	"	ts → ss
bose	rede	contraction and shortening
bos	red	apocope ²

But not all final e's are apocopated. For example, if a final e is preceded by two consonants, it is not apocopated. This accounts for the final e in second singular preterit forms such as comiste, viviste, amaste, etc.³ Words like noche [noče] 'night' and leche [leče] 'milk' might be thought exceptions to the apocope rule for here the final e remains, even though preceded by only a single consonant as in the above examples voz and red. However, as we saw earlier (1.6) the phonetic č of these forms is the reflex of a kt cluster (cf. nocturnal, lactar, etc.). When the apocope rule applies the final e is not deleted because these two consonants have not yet been reduced to single č of the phonetic output.⁴ This observation also explains why there is no final č in Spanish.⁵

But still there are words which end phonetically in final e, even though preceded by only a single consonant, or no consonant at all, for example, apéndice 'appendix', boto 'thrust' clase 'class' héro 'hero'. However, these words are all erudite, indicating that the apocope rule applies only to vulgar words. We know that apéndice is erudite because the penultimate i, even though short (see below on stress 5.3), does not lower to e by the vowel lowering rule (which applies to vulgar words, but not to erudite words 2.3). That bote is erudite is suggested from the facts that the stressed o does not diphthongize and the intervocalic t does not lenite to d. That clase is erudite is evident from the failure of the initial cl cluster to

become ll as in e.g. llamar from clamar (1.4).⁶

These facts suggest the following statement of the apocope rule:

Apocope* :

$$e \rightarrow \emptyset \quad / \quad V (C) _ \# ,$$

where C stands for $\left\{ \begin{array}{l} + \text{ consonantal} \\ - \text{ vocalic} \end{array} \right\}$

Furthermore this C is optional. That is, the final e can be immediately preceded by a vowel. This is the case in words like rubí 'ruby' from rubie, cf. pl. rubies; alhelí 'gilly flower' from alhelie, cf. pl. alhelies; carmesí 'crimson' from carmesie, cf. pl. carmesíes; tisú 'tissue' from tisúes, cf. pl. tisúes; alajú 'paste made of nuts, honey, and spices' from alajue cf. pl. alajúes.

If, however, C is present, it must be preceded by a vowel for the apocope rule to apply. This is the case with words like red 'net' from rete, cf. plural redes and retículo 'network'; flor 'flower' from flore, cf. pl. flores; rey 'king' from an earlier reye, cf. pl. reyes.

If, however, the final C is preceded by a segment which is not a vowel, the apocope rule fails to apply. This is the case with words like comiste, arte, alegre, humilde, hombre, aire [ayre], peine [peyne], noche from nok-te, etc,

The apocope rule also fails if the final e is long ē as we see in come 'he eats'. That this vowel is long is clear both from its stress and failure to diphthongize in the 1st pl. comemos 'we eat'. See 5.3 below.

5.2 Plural formation

In the usual description of the method of forming substantive plurals in Spanish it is said that if a word ends in a vowel, s is added (e.g. amigo 'friend', pl. amigos), while if a word ends in a consonant, es is added (e.g. papel 'paper', pl. papeles).⁷

By this rule the plural of voz is formed by adding es to give voces and the plural of red is formed by adding es to give redes. However, as we saw in the previous section, this e which is traditionally considered to be part of the plural morpheme is not really a part of the plural morpheme, for it must also occur in the singular forms to account for the assibilation and lenition which occurs.

The discovery of a final e in voz and red which later apocopes not only accounts for the assibilation and lenition in these forms, but also simplifies the plural formation rule, if we also assume that other forms which end phonetically in consonants also have final e's in their underlying representation, e.g. papele. For now instead of having two plural allomorphs, s and es, and having to make statements with regard to their distribution, we can say that the plural morpheme is simply s and that it occurs everywhere without restriction.

Thus e.g. papel and papeles would have the following derivations, just like voz/voces and red/redes:

papele	papele-s	
papel	"	Apocope
papel	papeles.	

Note that apocope does not apply to the plural papeles because the e is no longer in final position once the plural s has been added. Other examples of words ending phonetically in consonants in the singular and with es in the plural are ratón 'mouse', pl. ratones; flor 'flower', pl. flores; pared 'wall', pl. paredes; calor 'heat', pl. calores; mujer 'woman', pl. mujeres; gabán 'overcoat', pl. gabanes; etc.

Realizing that the plural morpheme is simply s not only has the advantages mentioned above, but also allows us to account very simply for words which are identical in the singular and plural, such as

crisis 'crisis', pl. crisis;
dosis 'dose', pl. dosis;

éxtasis 'ecstasy', pl. éxtasis;
lunes 'Monday', pl. lunes;
martes 'Tuesday', pl. martes;
 etc.

In terms of the traditional analysis these forms are exceptions since, although ending in a consonant, they do not add es to form the plural. However, in terms of the analysis just proposed, in which there is only a single plural morpheme, namely s which is added to all substantives to form the plural without restriction, these words are not exceptions (if we assume that the underlying representation does not end in a final e, but rather in the s which appears phonetically in final position). For then to form the plural s will be added, giving crisiss, dosiss, éxtasiss, luness, martess, etc. However, this double ss will be contracted to ̄s by the contraction rule established earlier (1.1) and then shortened to the single s of the phonetic output by the shortening rule also established earlier (1.1).

5.3 the Spanish stress rule

The position of Spanish stress, although generally considered to be unpredictable, is restricted to one of the last three syllables. Thus we may have phonetically ultimate stress as in papel 'paper', phonetically penultimate stress as in amigo 'friend', and phonetically antepenultimate stress as in periódico 'newspaper'.

Consider first the distinction between phonetic ultimate stress and phonetic penultimate stress. Like papel are

lección 'lesson', pl. lecciones;
dificultad 'difficulty', pl. dificultades;
color 'color', pl. colores;
ratón 'mouse', pl. ratones;
flor 'flower', pl. flores;
pared 'wall', pl. paredes;
mujar 'woman', pl. mujeres;
 etc.

Like amigo, pl. amigos are

cuaderno 'notebook', pl. cuadernos

palabra 'word', pl. palabras;

hermano 'brother' pl. hermanos, etc.

Notice, however, that all the words with ultimate stress, although ending phonetically in a consonant, actually end in final e as we saw earlier in the discussion of plural formation (5.2). Thus the stems of the above words with phonetically ultimate stress are papele, leccione, dificultade, colore, ratone, flore, paredes, mujere, etc. First stress is assigned to these words to the penultimate vowel, and then the final short e is apocopated:

amigo papele

amígo papéle assignment of stress to penultimate vowel

" papél apocope.

Thus we see that instead of assigning stress to the ultimate vowel if the word ends in a consonant, but to the penultimate vowel if the word ends in a vowel, we simply assign stress to the penultimate vowel,⁸ and require that stress be assigned before apocope.

It remains only to consider the distinction between words with penultimate stress and words with antepenultimate stress. For examples of this distinction consider pesquera 'fishery' (with penultimate stress), and huésped 'guest; lodger; stranger; host' (with antepenultimate stress, since huésped is from huéspedede, note the plural huéspedes and discussion of papel, etc., above).

This difference in stress assignment is due to a difference in the length of the penultimate vowel of these words when the rule which assigns stress applies.

To see this first consider the form huéspedede. Consideration of related forms such as hospitalidad 'hospitality', hospitalario 'hospitable', hospital 'hospital', etc. show that the root is

hōspītě, with short ō which diphthongizes under stress in the vulgar form, with short ī, which is lowered to e in the vulgar huésped (although not in the erudite forms hospitalidad, hospitalario, etc.), and with short ě which is apocopated. Note in particular that the penultimate vowel of the underlying representation of huésped is short.

On the other hand, that the penultimate vowel of pesquera is long is clear from the following considerations. Note first that the final radical k (cf. pesca 'fishing') although followed by a front vowel does not assibilate to s, and that the penultimate e, although stressed, does not diphthongize to ie. This calls to mind the previously discussed example of quepo where the underlying structure is caypo from cap-y-o (4.1), suggesting that pesquera comes from pescayra which in turn comes from pescarya, where the suffix is -arya. The same suffix occurs in hospitalario and mobilario. In these erudite words the y does not metathesize as it does in the vulgar pesquera. In connection with this metathesis note not only quepo but also recall cabeza from capitya (4.3). Thus pesquera has the following derivation:

peskarya	
peskayra	metathesis
"	assibilation fails
peskeyra	glide assimilation
peskēra	glide lengthening
peskēra	assignment of stress to long penultimate vowel
peskéra	shortening, ⁹

while huesped has the following derivation:

hōspītě	
hōspīdě	lenition
hōspēdě	vowel lowering
hōspēdě	assignment of stress to antepenultimate vowel when penultimate vowel is short
huésped	diphthongization and apocope.

Having seen how the position of stress in pesquera and huesped is correlated with the length of the penultimate vowel, we state the following rule for assigning stress to Spanish words:

Stress the penultimate vowel if long, otherwise stress the antepenultimate vowel.

Although in all cases it will not be possible to give independent motivation for the length of the penultimate vowel as it was in the above examples, we nevertheless assume that stress is always assigned by the above rule in terms of the length of the penultimate vowel. That is, in the case of e.g. morena 'brunette', the fact that this word has penultimate stress and also the fact that the e does not diphthongize even though stressed indicates that it must be long when the stress assignment and diphthongization rules apply, even though there is no other independently motivated evidence for its length as in the example of pesquera above. Rather morena will have to be entered in the dictionary with a long penultimate vowel.

Other examples of words with antepenultimate stress are féretro 'bier', geómetra 'geometrician', monólogo 'monologue', ecónomo 'guardian', égloga 'eclogue', éxodo 'exodus', vírgen 'virgin (from vírgene)', árbol 'tree' (from arbole, pl. árboles), árcade (Arcadian), árbitro 'independent', cárcel 'jail' (from cárcele, pl. cárceles), azúcar 'sugar', última 'last', práctica 'practice', fábrica 'factory', sábado 'saturday', pájaro 'bird', miércoles 'Wednesday', página 'page'; próximo 'next', lástima 'pity', líquido 'liquid', apéndice 'appendix'.

Examples with penultimate stress are señorita 'young lady', primero 'first', temprano 'early', abogado 'lawyer', come mos 'we eat', etc.

There is still one class of words which are not covered by the stress rule stated above. Consider hacienda 'estate', sangriento 'bloody', saneamiento 'sanitation', remiendo 'correction'. Here the underlying forms are hacēnda, sangrēnto, saneamēnto, remēndo where

the penultimate vowel is a short e which diphthongizes to ie under stress. However, the fact that it is both short and stressed is counter to the stress assignment rule established above. But note that this set of words is different from the examples above in that the penultimate vowel is followed by two consonants, suggesting the following amendment:

Stress the penultimate vowel if long or followed by two consonants, otherwise stress the antepenultimate vowel.

Note that the second consonant of the consonant cluster must not be a liquid if the penultimate vowel is to be stressed. For when the second consonant is a liquid and the penultimate vowel short, the antepenultimate vowel is stressed as we see for example in cátedra 'class; subject; chair', lúgubre 'mournful', íntegro 'complete', décuplo 'tenfold', múltiple 'multiple', cómitre 'galley boatswain', suggesting the following restatement:

Stress the penultimate vowel if long or followed by two consonants of which the second is not a liquid, otherwise stress the antepenultimate vowel.

(Note that if the first consonant of a cluster is a liquid, this does not prevent a short penultimate vowel from being stressed as we see in desierto.)

5.4 Real and apparent exceptions to the stress rule

Although there are many apparent exceptions to the stress rule stated above,¹⁰ there is only one group of words whose position of stress is not predictable by the above rule, and that is foreign words stressed on the last syllable, which do not have plurals in es, such as domínó 'domino', pl. dominós; ananá 'pineapple', pl. ananás. Apparent exceptions with ultimate stress are first and third singular preterit forms such as amé, amó, comí, comió, etc. will be discussed in the next chapter.

Another set of apparent, not real, exceptions is the future tense of verbs. Consider, for example, the future indicative of comer:

comeré	comeremos
comer-as	comeréis
comerá	comerán.

Since there is no way in which the stress rule can assign stress to the last vowel of a word which ends in a vowel, these might be thought exceptions. However, they are not once we ascertain the underlying structure of these verbs. These forms are different from, say, the present indicative where endings are added to the root com, for here the endings are added to the infinitive. Furthermore, these are not verbal endings, in the usual sense, but rather the present indicative forms of the auxiliary verb haber.¹¹ That is, the future tense is a compound composed of two separate words, as were the forms discussed earlier with en prefix (3.1). Stress is assigned to each of these words by the stress rule and then all stresses to the left of the right-most stress are erased. Thus e.g. comeré has the following structure and derivation:

$\left[\left[\text{comēre} \right]_V \quad \left[\bar{e} \right]_V \right]_{Vc}$	
$\left[\left[\text{comére} \right] \quad \left[\acute{e} \right] \right]$	stress assignment
$\left[\left[\text{comér} \right] \quad \left[\acute{e} \right] \right]$	apocope
$\left[\text{comēr} \quad \acute{e} \right]$	erase innermost parenthesis and left-most stress.

Another apparent counter-example to the stress rule is forms like después an adverb meaning 'after, afterward; then, later'. The diphthong ue comes from a short o in this form. Yet for this short ultimate vowel to be stressed is counter to the stress rule. That it is stressed is related to the fact that pues also exists as a separate word, a conjunction meaning 'since, because, for, inasmuch as;

then'. That is, the adverb después is formed on the conjunction pues as follows:

[des [pos] conj.]	adv.
[des [pués]]	assignment of stress to monosyllable and diphthongization
[des puës]	erase innermost parentheses.

Consider next escuela 'school'. The ue diphthong comes from a short stressed ō. This o appears phonetically when unstressed in escolástico 'scholastic'. The problem is that with a short penultimate vowel we would expect antepenultimate stress, i.e. éscola. That this does not occur is because the initial e is a prothetic vowel added after stress is assigned to the underlying form scōla:

scōla	
scōla	stress
scuēla	diphthongization
escuēla	prothesis.

Now consider buenísimo 'very good'. Here the antepenultimate stress is not unexpected. What is unexpected, however, is the diphthong in buen when this is phonetically not stressed. (cf. bueno 'good', bondad 'goodness'). This is because the structure of buenísimo is

[[bon] issimo]	
Here stress is assigned first to <u>bon</u> , and then to the whole word:	
[[bon] issimo]	
[[bón] issimo]	stress
[[buén] issimo]	diphthongization
[buén issimo]	erase innermost parentheses
[buén íssimo]	stress
[buén ísimo]	failure of rhotacism, contraction, shortening
[buen ísimo]	erasure of stresses to left of rightmost

The erudite doublet bonísimo has the same derivation. The lack of diphthongization is because diphthongization does not apply to erudite words. Like buenísimo is deshuesar 'debone'.

Finally consider the form cabeza 'head'. This form is discussed here in support of its earlier analysis (4.3). Superficially it offers no problem, for the penultimate stress could be ascribed to a long penultimate vowel. However, this vowel is in fact short as we saw earlier since it comes from an underlying short i which appears in the related erudite forms capítulo and capital. Recall that in the previous analysis in order to account for the z of this form we assumed a y increment. That is, cabeza was derived from capitya. Now we see that the y increment is not only necessary to convert the radical t to z, but also necessary for the placement of the stress on a short penultimate vowel.

Footnotes to chapter 5

1 Another example like red is huésped 'guest; lodger; stranger; host', cf. hospitalidad 'hospitality', hospitalario 'hospitable'.

2 For another example with assibilation of k and then apocopation of final e note the form pez 'fish', related to pesca 'fishing', piscina 'fishpool', piscatorio 'piscatorial', piscator 'almanac'. The root here is pisk with lowering of short i to e in vulgar form (2.3) Thus pez is from piske as follows:

piske	
peske	vowel lowering
pestse	assibilation
"	lenition fails
pesse	cluster simplification part b
peše	contraction and shortening
pes	apocope.

3 This accounts for the failure of apocope in aire 'air', baile 'dance', peine 'comb' where these are analyzed as ayre, bayle, peyne, with two consonants before the final e when the apocope rule applies.

4 For other examples of words like noche and leche where a consonant cluster in the underlying form prevents apocope, even though only a single consonant precedes the final e in the phonetic output note eje 'axis' from akse, the vulgar counterpart of the erudite axis 'axis', as well as words with orthographic double rr and ll such as torre 'tower; turret', calle 'street', muelle 'soft; luxurious; wharf', valle 'valley', etc. The failure of apocope in these forms is further evidence for considering ṛ and Castillian ṛ (as well as Latin American y from ṛ) to come from geminate clusters. Note in particular the form talle 'shape, figure, stature; fit; outline, appearance'. Related to this word is not only talla 'cut; carving', but also retal 'fit; outline, appearance', retajar

'cut around', tajar 'cut, slice, chop'. It is especially evident in the case of talle that this double ll comes from a consonant cluster. The root here is tal 'cut' which appears in retal. The double ll of talle is due to the addition of an n increment (i.e. talle from tal-n-e with assimilation of ln to ll by the same rule which converts sit-la to silla, ben-la to bella, etc.), while the j of tajar is due to the addition of a y increment to the root tal (i.e. tajar from tal-y-ar with ly going to j like in hijo 'child', from fil-y-o, cf. filial 'filial'). (Also formed from the root tal is detalle 'detail'.)

5 This has been observed by Saporta and Contreras, A Phonological Grammar of Spanish 4 (University of Washington Press, 1962), although they do not know the reason behind this fact:

"However, there are purely phonological restrictions on what may follow /č/; i.e., neither a consonant nor a pause but only a vowel may follow, so that not all combinations of morphemes are phonologically grammatical."

6 Other examples of failure of apocope in erudite words are base 'base', frase 'phrase', ataque 'attack', duque 'duke', cheque 'check', debate 'debate' (notice failure of lenition), intérprete 'interpreter' (notice failure of lenition), suave 'suave', grave 'grave', sublime 'sublime', infame 'infamous', galope 'gallop' (notice failure of lenition).

7 The stressed mid vowel does not diphthongize in papel because it is long in the underlying form.

8 Note that the penultimate vowel of amigo is long. For, since this is clearly vulgar word as evidenced by the lenition of intervocalic k to g (i.e. amigo is from amico, cf. amicísimo 'most friendly'),

if the i were short, it would be lowered to e.

Note also that infinitives have final short e's in their underlying representation which are apocopated after stress assignment, cf. comér 'eat' from comēre.

9 Like pesquera is higuera [igera] 'fig tree' where the g is not deleted before a front vowel because when that rule applies the g of this form is followed by a i.e. higuera is from higaria, cf. higo 'fig tree', etc.

10 There are a few words with different stress on singular and plural forms which have always been considered exceptions: carácter 'character', pl. caracteres, régimen 'regime', pl. regímenes.

11 The conjugation of haber in the present indicative is

he	[e]	hemos	[emos]
has	[as]	habéis	[abéis]
ha	[a]	han	[an].

The second plural form is anomalous.

Chapter 6

Preterit stress

Consider the preterit indicative of vivir 'live' and amar 'love':

viví	vivimos	amé	amamos
viviste	vivisteis	amaste	amasteis
vivió	vivieron	amó	amaron.

Note first the third plural vivieron where the penultimate vowel has diphthongized under stress to ie. The thematic vowel here is e instead of the i which occurs in the other forms because of a rule which lowers short i to e when followed by r followed by a vowel:

$\text{ĩ} \longrightarrow \text{ě} / \text{__rV}$

However, even after this rule has lowered the thematic i to e, there is still a problem connected with the diphthongization of this vowel to ie. For the stress rule will not assign stress to a short penultimate vowel unless it is followed by two consonants. But although this thematic vowel is phonetically the penultimate vowel, there is no reason to assume that it was penultimate when the stress rule applied, for recollection of the discussion of e.g. huesped, etc. 5.3 suggests that it was not penultimate in the underlying representation, but rather that a final e has been apocopated.

Thus part of the derivation of vivieron proceeds in the following manner:

vivířňe	
vivěřňě	$\text{ĩ} \longrightarrow \text{ě} / \text{__rV}$
vivěřňě	assignment of stress to antepenultimate vowel when penultimate vowel short
viviérňě	diphthongization
viviéron	apocope

The intervocalic r of vivieron comes from s by the phenomenon of rhotacism discussed earlier (1.7 and 1.8). The s underlying this phonetic r is the preterit morpheme which appears phonetically in viviste (viv-i-s-te) and vivisteis (viv-i-s-te~~is~~). Although

the preterit morpheme s does not appear phonetically in the other forms, there is reason to believe that it exists in the underlying representation.

To see this first consider the first plural form vivimos. There is a stress problem here, although it is not immediately obvious. For note that the stress is on the penultimate vowel. If this thematic vowel were long as in the present indicative

vivo	vivimos
vives	vivís
vive	viven

there would be no problem. But the fact that this thematic vowel diphthongizes after it has been lowered to e in the third plural suggests that it must be short in the preterit, even though it is long in the present.¹ But if it is short, then there is a problem with the stress assignment. Note that it is not possible here to say that there is a final e in vivimos which is apocoped after stress is assigned to the thematic vowel, for such a final vowel would lenite the s of the ending to z (cf. huesped and red, 5.3).

So it is not possible to account for stress on this short vowel in phonetically penultimate position by saying that in the underlying representation it is in antepenultimate position as it was in the case of vivieron. The only other way to account for the stress on this vowel would be to claim that in the underlying representation of vivimos the short thematic vowel is followed by two consonants. Such an assertion is not motivated solely to account for the stress on this vowel. For if it is claimed that the s of viviste and vivisteis as well as the r of vivieron is the preterit morpheme, then presumably this morpheme occurs in the underlying representation of all the preterit forms, even though it may not appear phonetically. For clearly it is much simpler to say that this morpheme occurs in all the preterit forms than to have to make a distributional statement to the effect that it appears in the second singular and plural and third plural, but not in the first singular and plural or third singular.

Thus we see that claiming that the underlying representation of vivimos is viv-i-s-mos not only allows us to claim that the preterit s occurs in all the preterit forms (for first and third singular see below), but also allows us to account for the stress on the short thematic vowel. Furthermore, no new rules are needed to get rid of this s, which does not appear in the phonetic output. For it will be voiced to z and then combined with the preceding vowel by the voicing assimilation and sonorization rules established earlier in connection with the forms pones (from pos-n-es) and elegir (from eks-legir). See 2.3 and 2.4. Thus vivimos has the following derivation:

viv-i-s-mos

vivísmos assignment of stress to short penultimate vowel
followed by two consonants

vivízmos voicing assimilation

vivímos sonorization
vivimos shortening. 2

Next consider the first and third singular forms viví and vivió. In both these forms there is the problem of the stress on the last vowel, where it could not be assigned by the stress rule. However, although the stress of viví is on the phonetically last vowel, there is no reason to assume that it was assigned to the last vowel of the underlying representation. The fact that all the other preterit forms have thematic vowels followed by some sort of ending suggest that the final i of viví is the result of a contraction of the thematic i with an i of the first person ending (see discussion of amé below). That is, viví would come from viv-i-i with stress being assigned not to the phonetically ultimate vowel, but rather to the phonetically penultimate vowel, although how it will be assigned to this short thematic vowel is not yet clear.

In the third singular vivió the ultimate stress is a secondary development. The stress is first assigned to the thematic vowel as in all the other preterit forms. However, after the two i's

of the first person have contracted to long i, the third singular is the only form which has a vowel following the thematic vowel. This results in the short diffuse thematic vowel becoming a glide by the syneresis rule discussed earlier (3.2) with concomitant shift of the stress from this glide to the contiguous vowel:

viv-i-i	viv-i-o	
viv-í-i	viv-í-o	assignment of stress to short penultimate vowel
"	"	failure of diphthongization
viví	"	contraction and shortening
"	vivyo	syneresis and shift of stress to contiguous vowel.

However, it is still not clear how stress is assigned to this short penultimate vowel. If it were followed by two consonants in the underlying representation, this would account for the position of the stress. It immediately occurs to us that these thematic vowels are followed by the same preterit s which occur in viviste, vivimos, vivisteis, and vivieron. That is, viví is from viv-i-s-i and vivío is viv-i-s-ó. However, the fact that the other personal endings (te, mos, teis) all start with consonants, as well as the need for another consonant for the correct assignment of stress suggests that these forms in turn are from viv-i-s-Ci and viv-i-s-Co where C is some unidentified consonant. This underlying structure for viví and vivío is not too unmotivated and will allow us to account for the placement of stress. However, since these consonants do not appear in the phonetic output, there must be rules which delete them. Unfortunately, these rules are not yet known.

Finally consider the first and third singular forms amó and amó. The fact that these mid vowels do not diphthongize under stress suggests that they are long vowels when the diphthongization rule applies. Furthermore, the failure of assibilation in the

first singular preterit forms ataqué (cf. infinitive atacar 'attack') and me acerqué (cf. infinitive acercarse 'approach') suggests that the source of the first singular e is ay (recall discussion of guepo, 4.1), pesquera, 5.3, etc.) which in turn is from ai by syneresis. That the first singular e is from ai is what we would expect. For the appearance of the thematic vowel a in the preterit forms amaste, amamos, amasteis, and amaron suggests that it also occurs in the underlying representations of amé and amó. Also since the vowel of the ending in vivi is i, there is no reason to suppose that there would be a different vowel in the ending of amé. In fact the same vowel occurs. Thus amé comes from am-a-s-Ci, where the s is the same s which occurs in the other preterit forms of amar and vivir and the Ci is the same Ci which occurs in the underlying representation of vivi. Thus amé has the following derivation:

<u>am-a-s-Ci</u>	
<u>amásCi</u>	assignment of stress
<u>amáí</u>	deletion of s and C by rules not yet discovered
"	failure of assibilation
<u>améy</u>	glide assimilation
<u>amē</u>	lengthening
<u>amé</u>	shortening.

Similarly for amó.

Footnotes to chapter 6

1 Why the thematic vowel is long in the present and short in the preterit is beyond the scope of this thesis.

2 Historical digression:

In Portuguese there is rather convincing evidence for the existence of a preterit s in the preterit first plural even though there is no phonetic reflex. Consider first the present indicative of the verb falar 'speak':

falo	[fálu]	falamos	[fə́lɨ́ mus]
falas	[faləs]	falais	[fə́lɨ́ys]
fala	[fále]	falam	[fə́lɨ́w]

Note that there are two different reflexes of a: it appears as ə when unstressed or when followed by a nasal, otherwise as a.

But now note the preterit of falar:

falei	[fə́léy]	falámos	[fə́lɨ́mus]
falasti	[fə́lásti]	falastes	[fə́lástis]
falou	[fə́ló]	falaram	[fə́lárɨw]

Note that the reflexes of a have the same distribution as before, except that in the first plural where we would expect ə before a nasal, a actually occurs. However, in view of the discussion of the Spanish first plural preterit vivimos it is clear that a appears here instead of the expected ə because in the underlying representation of falámos there is the preterit s which appears phonetically in falaste, falastes, and falaram. a does not become ə in the preterit form falamos because when the rule which converts a to ə before a nasal applies, this a is not followed by a nasal but rather by the preterit s, and we thus get the same a as in e.g. falasti. Later the preterit s disappears in the first plural, presumably by the same rules as in Spanish.

Next consider the situation in Italian where the present indicative of parlare 'speak' is

parlo	parliamo
parli	parlate
parla	parlano

while the preterit is

parlai	parlammo
parlasti	parlaste
parlo	parlarono,

where the geminate mm of the preterit apparently is the result of assimilation of the preterit s to the following consonant.

Finally consider the situation in Rumanian where the present indicative of cânta 'sing' is

cânt	cântăm
cânți	cântați
cântă	cântă

while the preterit is

cântai	cântarăm
cântași	cântarați
cântă	cântară.

Note first the second plural of the preterit. Corresponding to the Spanish form cantasteis we have Rumanian cântarați. For some reason which is not clear, in the Rumanian form a vowel has developed between the ending ti and the preterit morpheme s so that it appears in its rhotacized version, namely r. Note also that the same thing has occurred in the first plural. The preteris s which prevents a from becoming d in Portuguese and which enters into a geminate cluster in Italian actually appears phonetically in its rhotacized form in Rumanian.

Chapter 7

Class 2 radical changing verbs and medial vowel raising

7.1 class 2 radical changing verbs

Consider the conjugation of pedir 'ask for, request' in the present indicative:

pido	pedimos
pides	pedís
pide	píden.

Note that the radical vowel appears as i when stressed and e when unstressed. And since this radical vowel is a short vowel (refer to discussion below for evidence), the question arises as to why it does not diphthongize under stress as in quiero from quero, cf. querer and 3.2. Apparently there are two classes of verbs with short radical e's. In one class ě diphthongizes to ie when stressed and in the other class ě becomes i when stressed. Consideration of examples of the former case:

atravesar 'cross', 1st sg. atravieso;
cerrar 'close', 1st sg. cierro;
comenzar 'commence', 1st sg. comienzo;
defender 'defend', 1st sg. defiendo;
despertarse 'wake up', 1st sg. me despierto;
empezar 'begin', 1st sg. empiezo;
entender 'understand', 1st sg. entiendo;
helar 'freeze', 3rd sg. hiela;
negar 'deny', 1st sg. niego;
nevar 'snow', 3rd sg. nieva;
pensar 'think', 1st sg. pienso;
querer 'want', 1st sg. quiero;
sentarse 'sit down', 1st sg. me siento;
tropezar 'stumble', 1st sg. tropiezo;

as well as examples of the second case:

pedir 'ask for, request', 1st sg. pido;
elegir 'elect', 1st sg. elijo;
decir 'say, tell', 1st sg. digo;

reír 'laugh', 1st sg. río;
repetir 'repeat', 1st sg. repito;
reñir 'scold, quarrel', 1st sg. riño;
regir 'rule', 1st sg. rijo;
seguir 'follow, pursue, continue', 1st sg. sigo;
referir 'refer, relate', 1st sg. refiero;
sentir 'feel sorry, regret', 1st sg. siento;
mentir 'tell a lie', 1st sg. miento;
divertirse 'have a good time, enjoy oneself', 1st sg. me divierto;
servir 'serve', 1st sg. sirvo;
venir 'come', 2nd sg. vienes;

reveals that the radical e becomes i only in verbs of the third conjugation (infinitive in ir) but never in verbs of the first (infinitive in ar) or second conjugation (infinitive in er), suggesting the following rule:

Radical ě raising:

radical ě \longrightarrow í in the 3rd conjugation¹

However, radical short stressed e does not appear phonetically as ir in all verbs of the third conjugation as we see in the forms referir, sentir, mentir, divertirse, and venir above. Nevertheless we assume that radical short stressed e becomes i in all verbs of the third conjugation by the above rule and that its failure to appear as i is due to the later operation of other rules. Thus for example the ie of refiero is due to the lowering of i to e before rV by the rule established earlier⁶ to account for the third preterit form vivieron. Thus prefiero has the derivation:

preféro

prefíro short stressed radical e to i in third conjugation

preféro í \longrightarrow ě / __rV

prefiéro diphthongization.

The appearance of the diphthong ie in siento, miento, and me divierto is due to the operation of a rule which lowers í to ě when followed

by a resonant followed by a consonant:

RK:

$\dot{\text{i}} \rightarrow \text{ě} / \text{ ___RK } , \text{ where } K = \begin{bmatrix} +\text{cons} \\ -\text{vocalic} \end{bmatrix}$

Thus e.g. siento has the following derivation:

siento
 $\dot{\text{s}}\text{iento}$ short stressed radical e to i in third conjugation
siento RK
siénto diphthongization

Similarly for miento and me divierto.

The rule RK above not only accounts for the forms discussed above but also for the lowering of thematic i to ě in the present participle of third conjugation verbs. Cf. viviendo, present participle of vivir by the following derivation:

vivindo
 $\dot{\text{v}}\text{ivendo}$ rule RK
viviéndo diphthongization.²

Note also comiendo from comendo (inf. comer) and amando from amando (inf. amar). Note that the form sirvo is superficially anomalous, for since the radical vowel here is followed by phonetic rb, we would expect it to go to e by rule RK and later diphthongize to ie, giving siervo. However, in the underlying representation of sirvo there is no b but rather the glide w which is converted to b after rule RK fails. (For conversion of w to b see above sections 2.4 and 4.4).

Thus sirvo has the derivation:

sérwo
 $\dot{\text{s}}\text{irwo}$ radical ě to i in third conjugation
 " rule RK fails
 " diphthongization fails
sírbo $w \rightarrow b$

The form vienes is superficially anomalous for with the infinitive venir we would expect vines (cf. pedir, pides). However, apparently the underlying form of vienes when the rule RK applies is vinges.

This g will be later deleted when followed by a front vowel by a rule established earlier (cf. leer, etc. 3.2), but not when followed by a back vowel as in first singular vengo:

<u>v</u> énges	
<u>v</u> ínges	é to í in third conjugation
<u>v</u> énges	rule RK
<u>vi</u> énges	diphthongization
<u>vi</u> énes	$g \rightarrow \emptyset / _ \{i, e.\}$

Although this analysis accounts for the form viénes, it is not clear why we do not get viengo in the first singular.

7.2 medial vowel raising

Consider the words virgen 'virgin', virginal 'virginal'. In particular note that the e of virgen becomes i in virginal. Now it might be thought that this alternation is due to the vowel lowering rule established earlier which lowers i to e in vulgar words. That is, one might think that virgen is a vulgar word and virginal an erudite word, and that virgen thus comes from the underlying form virgin. However, this explanation is not possible since virgen is in fact an erudite word as evidenced by the fact that the g does not drop before front vowel as it does in vulgar words (cf. 3.2). Thus the erudite/vulgar distinction cannot be utilized to account for the difference between virgen and virginal since they are both erudite words. The facts as presented, however, suggest that the underlying e of virgen (which is short as evidenced by the position of stress: bírxen, see 5.3) becomes i when an addition syllable is added, suggesting the rule:

$$\text{ě} \rightarrow \text{i} / _ \text{CV}$$

Note that this rule has to apply after the apocope rule has deleted the final short e of virgen (5.1). Like virgen/virginal are crimen/criminal 'crime/criminal' and many other such pairs.

But consideration of the pair fácil 'easy', difícil 'difficult' suggests that the above rule should be extended to include addition

of a syllable to the left as well as to include the change of short a to i. However, instead of saying that a goes to i we say that a goes to e and then e will go to i by the reformulation of the rule above as follows:

a. $\text{ä} \longrightarrow \text{ě} / \text{VC}_1 \text{---} \text{C}_1 \text{V}$

b. $\text{ě} \longrightarrow \text{ĩ} / \text{VC}_1 \text{---} \text{C}_1 \text{V}$

where C_1 means one or more consonants. Thus difícil will come from difácil³ and virginal from virgenál as follows:

difácil	virgenál	
difécil	"	a.
difícil	virginal	b.

However, the above rule is still not formulated properly. For note that the root in facil and difícil is fac. This root occurs also in hacer 'do, make' where initial f has become h in vulgar words (1.3), as well as in confección 'making, confection', perfecto 'perfect', i.e. 'completed'. In confección and perfecto the radical a goes to e by part a above but does not go to i by part b above, suggesting that part b applies only when the medial vowel is followed by a single consonant as in difícil and virginal, but not when followed by two consonants as in confección and perfecto as indicated by the following reformulation of the above rule:

Medial vowel raising:

a. $\text{a} \longrightarrow \text{e} / \text{VC}_1 \text{---} \text{C}_1 \text{V}$

b. $\text{e} \longrightarrow \text{i} / \text{VC}_1 \text{---} \text{C}_1 \text{V}$

where C_1 means one and only one consonant. Thus difícil, confección, and virginal have the following derivations:

difacil	confaccion	virgenal	
difecil	confeccion	"	part a
difícil	"	virginal	part b ⁴

Finally consider the word veinteñal 'twenty-year', composed of the elements veint 'twenty' (cf. veinte 'twenty'), eñ 'year', (cf. año 'year' and anual 'annual'), and the suffix al. Note that here the initial vowel of the stem añ has been raised to e when another syllable was added to the left by part a of the medial vowel raising rule above. However, if the palatal ñ is to be interpreted as the single consonant it is in the phonetic output, then we would

expect veintiñal like in difícil from difácil above. The fact that we get veinteñal suggests that the palatal ñ is the reflex of a double nn, as was maintained in the discussion of año/anual earlier (2.1, 1.5).

Thus veinteñal has the following derivation:

veintannal

veintennal medial vowel raising, part

" medial vowel raising, part b fails

veinteñal contraction, resonant palatalization*, shortening.

Other examples of MVR are sacrificar 'sacrifice', from sacri-fac-ar, cf. hacer 'make, do' from fac-er and dirigir 'direct' from dis-reg-ir (voicing assimilation 2.3 and sonorization 2.3), cf. regir 'rule; direct' and director 'director'.

Footnotes to chapter 7;

1 This rule applies to both erudite and vulgar words. Note that pedir, 1st sg. pido is a vulgar word as evidenced by the lenition of the radical t (root = pet, cf. petición 'petition'), while gemir, 1st sg. gimo is an erudite word as evidenced by the failure of g to be deleted before a front vowel (recall hielo from gelo 3.3).

This rule applies to the verbs decir and reir as if the roots were dek and red, even though the roots are dik and rid as we see from the related forms dictar 'dictate' and ridículo 'ridiculous'. This is because the roots dik and rid are first converted to dek and red by the vowel lowering rule (2.3). The radical e raising rule then applies to dek and red just as to ped. etc.

2 Why the thematic vowel of vivendo, comiendo and amando is short in the present participle and long in the infinitives vivir (from vivirē), comer (from comērē), and amar (from amārē) is beyond the scope of this thesis.

3 Actually difícil comes from dis-fácil where the prefix dis is the same prefix that occurs in desesperar 'despair', deslucir 'tarnish', etc. The short i of this prefix is lowered to ě by the vowel lowering rule (2.3) in the vulgar forms desesperar and deslucir, but not in the erudite form dis-fácil. That difícil is an erudite form is clear from the failure of the f to convert to h and failure of the short penultimate ĩ (difícil from dĩfícilē, see discussion of stress assignment above, sections 5.3 and 5.1) to be lowered to ě. Dis-ficil becomes difficil and then difícil by the contraction rule (1.1) and difícil by the shortening rule (1.1).

4 The form integérrimo 'most integral, complete' is superficially anomalous since the e followed by the single g does not become i, giving the incorrect éintigerrimo. Since the medial vowel raising rule applies only to short vowels, it might be thought that the vowel here was long. But this is not true, for the root in fact is tag, with a short a, as we see in intacto 'intact'. Since the radical a becomes e, but e does not become i, we suspect that when the medial vowel raising rule applies, this radical vowel is followed not by one consonant, but rather by two consonants. This suspicion is corroborated by the form integro 'integral, complete' from in-tag-r-o with the following derivation:

intagro	
integro	MVR part a
"	MVR part b fails

Similarly integérrimo comes from in-tag-r-simo where the r is the same r as in integro and the simo is the suffix used to form superlatives (cf. malísimo 'worst'). The e is inserted in integérrimo in the environment C_RC (where R = resonant) by the following rule:

Anaptyxis:

CRC → CeRC

This rule fails to apply to integro since the r here is not followed by a consonant. Thus integérrimo has the following derivation:

intag-r-simo	
"	deletion of g before front vowel fails
integrismo	MVR part a
"	MVR part b fails
integersimo	anaptyxis
integerrimo	rs → rr in vulgar words, cf. <u>curso/correr</u> 2.3, 3.1.

Finally consider the form intacto, from in-tag-to. The problem with this word is that one would expect éintecto by the medial vowel raising rule part a. And it is difficult to say that this rule fails because

the a is a long ā, since in fact in the root tāg it is short and MVR does apply as illustrated in the above derivation. However, even though the a in the root tāg is short, by the time MVR part a applies to the form intacto, it fails because the a has become lengthened by the following well-known rule:

Lachmann's Law:

$$[+vocalic] \longrightarrow [+long] \quad / \quad \begin{matrix} +consonantal \\ -vocalic \\ +voice \end{matrix} \quad \begin{matrix} +consonantal \\ -vocalic \\ -voice \end{matrix}$$

Thus intacto has the following derivation:

in-tag-to	
intāgto	Lachmann's Law
intācto	voicing assimilation
"	MVR part a fails
"	MVR part b fails
intacto	shortening.

Like intacto is abstracto from ab-s-trag-to.

Other examples of anaptyxis are sacerdote 'priest' from sacridote, with syncopation to sacrdote, thus furnishing the environment for anaptyxis, cf. sacro 'sacred'; and tercero 'third' from tricero with syncopation to trcero, cf. tres 'three' from tris with vowel lowering 2.3.

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Biographical note

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