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THE PHONOLOGY OF EGYPTIAN ARABIC

A Dissertation Presented

By

Ellen I. Broselow

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

DOCTOR OF PHILOSOPHY  
August, 1976  
Linguistics Department

THE PHONOLOGY OF EGYPTIAN ARABIC

A Dissertation Presented

By

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ABSTRACT

The Phonology of Egyptian Arabic

(August 1976)

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The purpose of this study is to investigate the phonology of the dialect of Egyptian Colloquial Arabic spoken in Cairo, with particular attention to the relationship between the form of a rule and its ordering in the grammar. It's suggested that the observation that morphological rules tend to precede phonological rules can be explained by general principles of rule ordering. An approach to the problem of representing the phenomenon of emphasis in terms of the existing feature system is proposed. Reference to the notion of the syllable is found to be necessary to explain certain phonetic facts; the merits of various proposals for referring to syllable structure are evaluated, and the proposal of Kahn (1976) advocated. Since several phonological processes are seen to be sensitive to the presence of clitic forms, an analysis of the cliticization rules of the language is motivated, and on the basis of this analysis the hypothesis that cliticization rules follow all other rules of the syntax is rejected. The morphology of the verbal system is investigated, and the root and pattern system, prominent in Classical Arabic, is shown to be of decreasing influence in Egyptian

Arabic. Alternative methods of capturing the generalizations of the morphology are proposed.

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## INTRODUCTION

### Purpose of the study.

Numerous claims have been made concerning the typology of rules and the connection between a rule's characteristics and its place in the grammar.<sup>1</sup> Unfortunately, many of these claims are difficult to evaluate, since their arguments make use of two or three rules viewed in isolation.

The purpose of this study is to examine in detail the phonology of a dialect of Arabic, with a view toward testing certain hypotheses about the organization of a grammar. By considering the phonological system in its entirety, I've hoped to avoid the errors often attendant on an investigation which is limited to a study of only a few rules. In the course of the work I've pointed out several instances in which a cursory examination of the facts might suggest one analysis, while broadening the scope to include a wider range of facts suggests quite a different solution.

The topics to which I've paid special attention are these:

1) the need for a notion of the syllable in phonology, the most efficient means of expressing this notion, the type and ordering of rules which depend on the notion of the syllable, and the connections between syllabication rules and other rules of the grammar;

2) the definition of the notion 'clitic' in formal terms,

the ordering of cliticization rules, and the means by which phonological rules can refer to the notion 'clitic';

3) the most efficient way of expressing morphological generalizations, and the ordering of morphological rules with respect to other rules of the phonology;

4) the ordering of stress rules, and the connection between the form of a rule and its position in the grammar.

#### The sound system.

The language with which this work is concerned is the dialect of Arabic spoken in and around Cairo.<sup>2</sup> Although the dialect of Cairo differs in several significant respects from other varieties of Egyptian Arabic, notably the sa8iidi of Upper Egypt, it is usually Cairene which grammarians refer to as Egyptian Colloquial Arabic (ECA). I've accepted and perpetuated the use of the term ECA to refer to Cairo Arabic.

ECA must also be distinguished from Classical Arabic (CA), and from the present-day reflex of that language, Modern Standard Arabic (MSA). Classical Arabic, or the Fuṣḥa, is the language of the Qurʾān and subsequent texts, and is presumably the language from which the various geographical dialects developed; hence, any hypotheses about the history of ECA in this work (as well as in earlier works, for example Birkeland) are based on the relationship of ECA to the classical language.

Modern Standard Arabic differs from Classical Arabic mainly in vocabulary and in stylistic devices; its phonology



### The vowels.

I've followed the conventional practice of representing a long vowel as a sequence of two identical vowels. This should be recognized as merely a matter of orthographic convenience. Although an analysis of long vowels as geminates is well-motivated in the case of MSA (see Brame, 1970), such an analysis would simply complicate the statement of certain phonological rules in ECA. This matter will be discussed as it arises in the next sections.

The chief peculiarity of the ECA vowel system is the asymmetry resulting from its lack of short mid vowels. Classical Arabic has the following vowel system:

2) i,ii                      u,uu  
                                 a,aa

and it's clear that Egyptian mid vowels were historically derived from vowel-glide sequences:

3) CA baytun            'house'                      ECA beet    'house'  
         CA lawnun        'color'                      ECA loon    'color'

To determine whether this historical change is reenacted in the synchronic grammar of ECA--in which case there would be evidence that (2) is the underlying vowel system of ECA as well as CA--it's necessary to examine evidence internal to the language. Such evidence is discussed in Chapter III.

### Emphasis.

The major problem in the description of the ECA sound

system is posed by the phenomenon of emphasis, which has been described as both pharyngealization and as velarization.

Although there is evidence that only the segments /ṭ, ḍ, ṣ, ẓ, ṛ, and ḷ/ are underlyingly emphatic, the pronunciation of segments sharing a syllable with any of these emphatics is altered: compare the pronunciation of baat 'he spent the night,' in which the vowel is approximately [ɛ̣] or [aẹ] with that of baat 'armpit,' in which the vowel is closer to [a] or [ɔ̣].

Brame has argued (Brame, 1970) that tongue position rather than pharyngeal constriction is the primary feature distinguishing emphatic consonants, and proposes a feature [+rhizo-lingual], indicating tensing of the tongue root, to characterize them.<sup>3</sup> Brame's argument is that the feature complex used in SPE to describe pharyngealization, [+back, +low], can't be used to indicate the emphatic articulation of segments conditioned by the presence of an underlying emphatic in a syllable, since, for example, the vowel [i] can be either emphatic or non-emphatic: tiin 'figs' vs. tiin 'mud'.

This argument is weak on two counts. First, not only the emphatic coronals but also the segment [q̣] condition emphatic articulation in tautosyllabic segments:

- |    |          |            |                 |
|----|----------|------------|-----------------|
| 4) | q̣aaʔid  | 'general'  | (military rank) |
|    | q̣awmi   | 'national' |                 |
|    | ṣaqaafi | 'cultural' | <sup>4</sup>    |

Since the tongue position involved in production of [q̣] is quite different from that of the coronal emphatics, the appropriateness of the feature [+rhiz] to [q̣] is questionable;

[q] seems not to involve the same sort of tensing of the tongue.

Secondly, the feature system lately proposed by Halle and Stevens provides a means of overcoming the problem of characterizing the emphaticization of underlying non-emphatic segments by making use of the feature [±Constricted Pharynx] ( [±CP] ), and allowing the description of pharyngealized vowels. If, as Jakobson contends, "The characteristic feature of all the 'emphatic' phonemes is the contraction of the upper pharynx" (Jakobson, 1971), the feature [±CP] can serve both to distinguish the coronal emphatics and their non-emphatic counterparts, and to create a natural class consisting of the coronal emphatics, [q], and the pharyngeal consonants [ħ] and [ʕ]. ( [q], produced farther back than the uvular stop customarily represented by this symbol, does seem to involve pharyngeal constriction.) This approach is supported by Gairdner's statement (Gairdner, p. 96) that "in colloquial Egyptian both the pharyngeal buccals (i.e. the coronal emphatics) and the pharyngeals appear to exert a modifying retracting influence on preceding and following vowels." Therefore since emphasis can be characterized in terms of existing features, we must reject the claim that it demands the addition of a new feature [rhz] to the feature inventory.

This approach predicts that no distinction will be found between pharyngeals in emphatic vs. non-emphatic

environments. Although Lehn claims that emphatic [h̄] and [8̄] occur, Harrell finds "no phonetically different allophones of [h̄, 8̄] ... which could be called emphatic." (Harrell, 1957, p. 74). Only further work can provide a conclusive answer to this question, but I will adhere to Harrell's position, which accords with my own judgments.

#### The feature system.

Given the above considerations, we can use the following chart to describe the sound system of ECA. For the sake of clarity, I've given the feature specifications for the pharyngealized vowels, although it should be understood that such segments are not underlying. The features used are roughly those of Halle and Stevens, with one change. While the feature [CP̄] is meant in their system to replace the feature [low̄], I've used both [low̄] and [CP̄] in order to distinguish pharyngealized [ā] from pharyngealized [eē] and [oō], and to distinguish pharyngealized [x̄] and [ɣ̄] from [h̄] and [8̄]. Thus the claim is made here that the Halle and Stevens system, which does not contain the feature [low̄], is not adequate to handle the facts of at least one language. Essentially the same claim was made by Kiparsky (Kiparsky, 1974), where it is argued that a system containing the features [high̄] and [low̄] along with the features [ATR̄] and [CP̄] allows one to express certain generalizations not readily capturable in the Halle-Stevens system.

A. Vowels.

	i	ī	u	ū	a	ā	e	o	·i/C	·u/C	·a/C	·e/C	·o/C
hi	+	+	+	+	-	-	-	-	+	+	-	-	-
bk	-	-	+	+	-	-	-	+	-	+	-	-	+
lo	-	-	-	-	+	+	-	-	-	-	+	+	-
CP	-	-	-	-	-	-	-	-	+	+	+	+	+
ATR	+	+	+	+	-	-	+	+	-	-	-	-	-
syll	+	+	+	+	+	+	+	+	+	+	+	+	+
cons	-	-	-	-	-	-	-	-	-	-	-	-	-
son	+	+	+	+	+	+	+	+	+	+	+	+	+

1. ATR = Advanced Tongue Root

2.  $\overline{[+CP, +ATR]}$  is impossible, since pharyngeal constriction pulls the tongue root back.

B. Non-syllabic conorants.

	y	w	l	l̥	m	n	r	r̥	h	?
high	+	+	-	-	-	-	-	-	-	-
back	-	+	-	-	-	-	-	-	-	-
low	-	-	-	-	-	-	-	-	+	+
CP	-	-	-	+	-	-	-	+	-	-
coronal	-	-	+	+	-	+	+	+	-	-
anterior	-	-	+	+	+	+	+	+	-	-
STV	-	-	-	-	-	-	-	-	-	+
continuant	+	+	+	+	+	+	+	+	+	+
cons	-	-	+	+	+	+	+	+	-	+

STV = stiff vocal chords (voiceless)<sup>5</sup>

C. Obstruents.

	b	f	t	ṭ	d	ḍ	s	ṣ	z	ẓ	ʃ	k	g	x	ʒ	q	h̄	ʁ	
hi	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	
back	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	
low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	
CP	-	-	-	+	-	+	-	+	-	+	-	-	-	-	-	-	+	+	+
STV	-	+	+	+	-	-	+	+	-	-	+	+	-	+	-	+	+	-	
coronal	-	-	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	
anterior	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	
continuant	-	+	-	-	-	-	+	+	+	+	+	-	-	+	+	-	+	+	
cons	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
son	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
syll	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

## NOTES

### Introduction

<sup>1</sup>Among the many works dealing with this question are Cearley (1974), Aronoff (1974), and Anderson (1974). Anderson's paper contains a review of some of the literature on this subject.

<sup>2</sup>The principal source of data for this study is the text Beginning Cairo Arabic by W. Lehn and P. Abboud. Lehn and Abboud's transcriptions are the most consistent and accurate to be found in any of the texts on Egyptian Arabic. My informant was Ms. Aida Nawaar, a native of Cairo; I also used notes compiled while studying the language with Ernest Abdel-Massih and Sohair Soukkari, both native Cairenes. Other works I've used are Abdel-Massih's Introduction to Egyptian Arabic, Mitchell's Colloquial Arabic, Harrell, Tewfik, and Selim's Lessons in Colloquial Egyptian Arabic, and Harrell's The Phonology of Colloquial Egyptian Arabic.

<sup>3</sup>Harrell, 1957, p. 70, fn. 4a: "The importance of pharyngeal striction in the formation of Arabic emphatic consonants has been conclusively demonstrated by investigation of an Algerian dialect, see. Ph. Marcais, "L'Articulation de l'emphase dans un parler arabe maghrebin" (Annales de l'Institut d'Etudes Orientales, Faculté des lettres d l'université d'Alger, Tome VII, 1948, pp. 5-28)."

<sup>4</sup>These transcriptions and all those involving the indication of emphatic articulation are from Lehn and Abboud, unless otherwise specified.

<sup>5</sup>The feature STV is adopted from the Halle-Stevens feature system.

## C H A P T E R I

## THE PHONOLOGY

The following sections outline the major phonological processes of ECA. It is argued that certain phonological rules apply on the domain of the word, while others apply on a larger domain. Rules assigning syllable structure are claimed to belong to the second category.

1.1 I Epenthesis

Sequences of three consonants are anathema in ECA; where such a sequence would occur, an /i/ is inserted after the second of the three consonants:

- 1) a. katab 'he wrote'  
b. makatabs 'he didn't write'
- 2) a. katabt 'I wrote'  
b. makatabtis 'I didn't write'

The restriction prohibiting three-consonant sequences holds even between words:

- 3) a. katab dars 'He wrote a lesson'  
b. katabti dars 'I wrote a lesson'
- 4) a. ilkitaab sahl 'The book is easy'  
b. iddarsi sahl 'The lesson is easy'

(The *ilwid* alternation of the definite article is due to a rule assimilating the /l/ to a following coronal. /l/ may also optionally assimilate to a following /k/ or /g/. I'll call this process L-assimilation.)

The rule inserting /i/ will be called I Epenthesis

(I Ep):

$$5) \text{ I Ep: } \emptyset \rightarrow \begin{bmatrix} +\text{syll} \\ +\text{hi} \\ -\text{bk} \\ -\text{long} \end{bmatrix} /X \text{ } [-\text{syll}]_2 \text{ } [-\text{seg}]_0 \text{ } [-\text{syll}]_1$$

## 1.2 High Vowel Deletion.

The effects of a second rule of ECA can be seen in a comparison of the following paradigms:

- 6) a. *kātab* 'he wrote'    b. *fihim* 'he understood'  
       *katabt* 'I wrote'        *fihimt* 'I understood'  
       *kātabna* 'we wrote'    *fihimna* 'we understood'  
       *kātabu* 'they wrote'    *fihmu* 'they understood'  
       *kātabit* 'she wrote'    *fihmit* 'she understood'

I'll assume that the past tense stem of the verb 'to write' is *katab*, of 'to understand' *fihim*.<sup>1</sup> While the shape of *katab* is invariant throughout the past tense paradigm, *fihim* loses its second vowel when a vowel-initial inflectional ending is added to it. A rule deleting /i/ in an open syllable will account for this fact, as well as for the following forms:

- 7) a. *saāhib* 'friend (m)'  
       b. *saḥba* 'friend (f)'  
       c. *saḥbiin* 'friends'
- 8) a. *huwwa kātib* 'he is writing'  
       b. *hiyya kātba* 'she is writing'  
       c. *humma katbiin* 'they are writing'

(Shortening of the /a/ in (7b,c) and (8b,c) and in (9) is

explained in section 1.4)

That the rule deleting /i/ applies to /u/ as well is shown by the forms of (9):

- 9) tāakul 'you (m) eat'  
 takli 'you (f) eat'  
 taklu 'you (p) eat'

The deletion of high vowels is restricted to a more narrow environment than simply an open syllable. In accordance with the ban on three-consonant sequences, the vowel to be deleted must be preceded as well as followed by no more than one consonant:

- 10) mista8miliin 'using (p)'

And, as the forms of (6b) show, each of the consonants flanking the high vowel must itself be flanked by a vowel: we find fihim, not \*fihm, fihimt, not \*fhimt. However, a vowel in another word may be part of the structural description of the rule:

- 11) a. huwwa širib 'He drank'  
 b. huwwa širb il Pahwa. 'He drank the coffee.'  
 12) a. širibt il?ahwa. 'I drank the coffee.'  
 b. ana šribt il?ahwa. 'I drank the coffee.'  
 13) a. Fariid mudarris. 'Fariid is a teacher.'  
 b. huwwa mdarris. 'He is a teacher.'

Thus we can write the rule of High Vowel Deletion (HVD) as follows:

14) HVD:

$\begin{bmatrix} +\text{syll} \\ +\text{hi} \\ -\text{str} \end{bmatrix} \rightarrow \phi / X[+\text{syll}][-\text{seg}]_0[-\text{syll}]_1[-\text{syll}]_2[-\text{seg}]_3[+\text{syll}]_4 Y$

The placement of the elements [-seg] in (14) is adequate to handle all cases of deletion, since at the time HVD applies there are no initial vowels in ECA which are subject to HVD, and final vowels are not deleted:

15) a. katabu gawaab. 'They wrote a letter.'

b. hawaali saa8a 'about an hour'

Therefore, although HVD may apply across word boundaries, it is still sensitive to the position of word boundaries. The placement of optional word boundaries at only two points in the environment of the rule prevents the deletion of word-final vowels.

The feature [-stress] is necessary to prevent the derivation

16) huwwa širib → \*huwwa šrib 'he drank'

### 1.2.1. Ordering.

An epenthetic /i/ may serve as part of the environment of HVD:

17) a. ilwalad ilgidiid 'the new boy'

b. iddars ilgidiid 'the new lesson'

18) a. walad gidiid 'a new boy'

b. dars<sup>i</sup> gdiid 'a new lesson'

Therefore HVD must follow I Ep.

### 1.2.2 Mode of Application.

One puzzling aspect of the rule of HVD is its mode of application. The rule may apply to more than one vowel:

- 19) neg tense person stem number neg  
       ma     bi     yi     zaakir     uu     's  
       mabiyzakruus' 'they are not studying'

Both the /i/ of /yi/ and the /i/ of /zaakir/ are deleted. However, there are actually three vowels in the above form which are in an environment subject to HVD; they are underlined below:

- 20) mabiyzaakirus'

When two vowels are simultaneously the focus and part of the environment of HVD, only one is deleted; the deleted vowel is always the rightmost:

- 21) a. tisiil' 'she carries'  
       b. bitsiil 'she is carrying'  
       c. hiyya bitsiil 'she is carrying'
- 22) a. nifuut 'we pass'  
       b. binfuut 'we are passing'  
       c. mabinfuts' 'we are not passing'

A possible explanation of these facts is that HVD operates right to left; the facts are also compatible with the assumption that HVD is cyclic, in which case (22) is derived as follows:

23) Cycle I: nifuut

HVD: n/a

Cycle II: bi nifuut

HVD: binfuut

Cycle III: ma binfuut 's

HVD: n/a

However, neither approach is necessary when one realizes that /bi/ is a clitic; it's argued in Chapter II that clitics are attached to words by a single word boundary. Thus the structure of mabinfuut's is /ma#bi#ni+fuut#s/, and the /i/ of /bi/ is therefore not in an environment for HVD, which applies only to vowels in the environment V(#)C\_C(#)V.

### 1.2.3 Exceptions.

There are several exceptions to HVD, for example, ṭaaliba 'student (f)', malika 'queen'. These words are all borrowings from Classical Arabic, which has no rule deleting high vowels. We can compare the form Faatiḥa 'the first (opening) chapter of the Qur'an' and the participle fathā (<faatiḥ+a) 'opening (f)'. Participles in both Classical Arabic and ECA are formed on the pattern CaaCiC, with the addition of /a/ in the feminine; the verb stem /fataḥ/ 'to open' is common to both languages. Thus the underlying form of the participle fathā is identical to the surface form of the word Faatiḥa. The coexistence of both words in ECA shows that some words must simply be marked with a feature  $\left[ \begin{smallmatrix} - \\ + \end{smallmatrix} \text{Classical} \right]$  which prevents them from undergoing

certain rules.

### 1.3 Stress.

Since a stressed vowel does not undergo HVD, the assignment of stress must precede HVD. Stress in ECA is quite regular and predictable, but a description in formal terms presents some rather interesting problems.

Stress always falls on one of the last three syllables of a word. The facts are as follows:

Condition A: A final strong syllable (a syllable containing a long vowel or a vowel followed by two consonants) is always stressed:

- 24) kitaab 'book'  
 yišiil 'he carries'  
 ɖarabuu 'they beat him'  
 katabt 'I wrote'  
 itgaraħt 'you (m) were wounded'

Condition B: When the last two syllables are weak and no sequence of two consonants follows the antepenultimate vowel, stress falls on the antepenult:

- 25) katabit 'she wrote'  
 ɖarabu 'they beat'  
 'sagara 'tree'  
 inkasarit 'it (f) was broken'  
 saħiba (from saħib + a) 'friend(f)'  
 itnaʔsit (from itnaaʔis + it) 'she discussed'

Condition C: In all other cases, the penultimate syllable is stressed:

26) katab	'he wrote'
katabti	'you (f s) wrote'
yiktib	'he writes'
yiktibu	'they write'
inkasar	'it (m) was broken'
iḥaala	'retirement'
madrāsa	'school'
mudarris	'teacher (m)'
mudarrisa	'teacher (f)'

The stress pattern described by conditions A,B,C is an unusual one, and it's not obvious how to formulate the rule or rules governing stress. If an accurate description of ECA stress consisted either of conditions A and C, or conditions B and C, the environment of the stress rule would be uncomplicated:

27) for conditions A and C:  $-(C \check{V} C \check{V} (C) ) \#\#$

28) for conditions B and C:  $-(C_{\circ} (\check{V} (C)) \#\#$

One possibility then is to adopt one of these rules and to formulate a second rule moving stress to the left. Rule (27) assigns stress to either the antepenultimate or the final syllable; thus it requires a rule moving stress to the penult in certain cases:

29) a....  $v C C \check{V} (C) \#\# \rightarrow \dots \acute{V} C C \check{V} (C) \#\#$   
 \*katabti  $\rightarrow$  katabti

b. ... C C V C  $\check{V}$  (C) ##  $\rightarrow$  ... C C  $\acute{V}$  C  $\check{V}$  (C) ##  
 madrasá  $\rightarrow$  madrása

c. ...  $\check{V}$  C  $\acute{V}$  (C) ##  $\rightarrow$  ...  $\acute{V}$  C  $\check{V}$  (C) ##  
 \*iḥaala  $\rightarrow$  iḥaala

Rule (28) requires a much simpler rule of stress adjustment; since it assigns stress to the penultimate vowel in all words except those having a final strong syllable, there is only one case in which it gives the wrong results. Rule (30) handles that case:

30) ... VC $\check{V}$ CV(C) ##  $\rightarrow$  ...  $\acute{V}$ C $\check{V}$ CV(C)##  
 \*katábu  $\rightarrow$  kátabu

The solution consisting of Rules (28) and (30) is clearly superior to the less general one consisting of (27) and (29), and it derives the correct form in every case. However, given the usual assumptions about the value of a grammar, a single rule which managed to collapse both (28) and (30) would be preferred to the solution requiring two stress rules.

A single rule which accounts for the same facts as do rules (28) and 30) is the following (suggested to me by Alan Prince):

31)  $V \rightarrow \acute{V} / \_ (C_a) (\check{V}_b) (C\check{V}_c) (C)_d ##$

Since the mode of application of (31) may not be obvious,<sup>2</sup> I'll go through it. To ease exposition, I've designated each term of the environment by a lower case

letter.

32) 1.	__CVCVC##	kātabit	a b c (d):	CVCV(C)
2.	__CVCV##	kātabu		
3.	__VCVC##		b c (d):	VCV(C)
4.	__VCV##			
5.	__CCVC##	yiktib	a c (d):	CV(C)
6.	__CCV##	kātabti		
7.	__CVC##	kātab, inkāsar	c (d):	CV(C)
8.	__CV##	madrāsa, iḥāala		
9.	__CC##	masr, kātabt	a (d):	C(C)
10.	__C##	yisiil		
11.	__##	mā, ahoo		

(32) is an unusual rule. Most stress rules are written in terms of syllable structure; for example, Rules (27) and (28) embody the notions 'before two weak syllables' and 'before a final weak syllable', respectively. It's also quite surprising to find a rule in which each term of the environment is parenthesized. But Rule (31) is more highly valued than Rules (28) and (30) together. Thus Rule (31) is, all other things being equal, the better solution.

All other things, however, are not equal. The predictions of Conditions A, B, and C are confirmed with astonishing regularity, but there are in the language two sets of exceptions to them. Several members of the first set are:

33) a.	darābitak	'she beat you (m)'
b.	darābitik	'she beat you (f)'

c.  $\dot{\text{d}}\text{arab}\dot{\text{i}}\text{tu}$  'she beat him'

These forms consist of the verb stem darab, the third person feminine singular suffix /it/, and a pronoun object clitic, /ak/, /ik/, or /u/. They are exceptions to all the solutions presented above; Condition B and Rule (31) predict the following stress:

- 34) a. \*  $\dot{\text{d}}\text{arab}\dot{\text{i}}\text{tak}$   
 b. \*  $\dot{\text{d}}\text{arab}\dot{\text{i}}\text{tik}$   
 c. \*  $\dot{\text{d}}\text{arab}\dot{\text{i}}\text{tu}$

We might attribute the failure of these forms to conform to the pattern exhibited by the forms of (25) to the fact that they all consist of four weak syllables, an unusual shape for an Egyptian word. This is in fact the explanation given by Mitchell and by Harrell (Harrell, 1957). But third person feminine singular verbs whose stems are monosyllabic exhibit the same irregularity:

- 35) a.  $\dot{\text{s}}\text{af}\dot{\text{i}}\text{tu}$  'she saw him'  
 b.  $\dot{\text{s}}\text{al}\dot{\text{i}}\text{tak}$  'she carried you (m)'  
 c.  $\text{zar}\dot{\text{i}}\text{tik}$  'she visited you (f)'

as do verbs with tri-syllabic stems:

- 36)  $\text{ista}\delta\text{mil}\dot{\text{i}}\text{tu}$  'she used it (m)'

We can't say that /it/ is stressed in the lexicon, since it's stressed only when a pronoun clitic follows it:

- 37) a.  $\dot{\text{d}}\text{arab}\dot{\text{i}}\text{t}$  'she beat'  
 b.  $\dot{\text{s}}\text{aaf}\dot{\text{i}}\text{t}$  'she saw'  
 c.  $\text{ista}\delta\text{mil}\dot{\text{i}}\text{t}$  'she used'

We also can't explain lack of antepenultimate stress by the fact that the final syllable is a clitic:

38)  $\dot{d}arabu$  'he beat him'

Thus, /it/ retains stress just when Condition B predicts that stress will fall on the syllable immediately to its left.<sup>3</sup>

It's a simple matter to express this fact in the system containing the following rules, which are simply (28) and (30), given new names:

39) Stress Assignment (SA):

$$[+syll] \rightarrow [+stress] / X \_ [-syll]_o \left( \begin{bmatrix} +syll \\ -long \end{bmatrix} ( [-syll] ) \right) \#\#$$

40) Stress Retraction (SR):

$$X \begin{bmatrix} +syll \\ -syll \end{bmatrix} \begin{bmatrix} +syll \\ -long \\ +str \\ +SR \end{bmatrix} [-syll] [+syll] ([-syll]) \#\#$$

1      2            3            4                            5                     $\Rightarrow$

1      2            3            4                            5

$[+str]$                              $[-str]$

The morpheme /it/ can simply be marked  $[-SR]$ , while other morphemes are redundantly  $[+SR]$ . Some derivations may be useful at this point:

41)	$\dot{d}arabit$	$\dot{d}arabita$	$\dot{s}aafit$	$\dot{s}aafitu$
SA:	$\dot{d}arabit$	$\dot{d}arabita$	$\dot{s}aafit$	$\dot{s}aafitu$
SR:	$\dot{d}arabit$	blocked	n/a	blocked
surface:	$\dot{d}arabit$	$\dot{d}arabita$	$\dot{s}aafit$	$\dot{s}afitu$
	'she beat'	'she beat	'she saw'	'she saw him'
		you (m)'		

	ista8milit	ista8militik
SA:	ista8milit	ista8militik
SR:	n/a	blocked
surface:	ista8milit	ista8militik
	'she used'	'she used you (f)'

All the forms in (41) receive stress on their penultimate syllables; SR is blocked in the case in which the penult is /it/.

Expression of this fact in terms of Rule (31) is a bit more difficult. The object is to prevent sub-rules (1) and (2) of Rule (31) from applying to forms containing /it/ plus clitic:

- 42) sub-rule (1): \_\_ CVCVC## \*darabitak 'she beat you (m)'  
sub-rule (2): \_\_ CVCV## \*darabitu 'she beat him'

Sub-rules (1) and (2) can't be prohibited from applying to all the forms containing /it/, however, since (1) produces, for example, katabit 'she wrote'. So we must add the following condition to Rule (31):

43) Condition: If term b analyzes the third person feminine singular past tense morpheme /it/, then sub-rules (1) and (2) do not apply.

The second set of exceptions to the regular stress pattern consists of a group of plural nouns:

- 44) a. sibita 'baskets'  
b. libisa 'underpants'  
c. dubu8a 'hyenas'

- d. subu<sup>1</sup>8a      'lions'  
 e. ʔiriba<sup>1</sup>      'crows'

Each of these forms is a plural noun; every plural noun of this shape (Cu Cu Ca) is exceptional with respect to stress, and no words of this shape which are not plural nouns exist. An explanation of the exceptionality of these forms is suggested by Mitchell's information that alternate forms exist for some of them:

45. a. libi<sup>1</sup>sa    ~    ilbi<sup>1</sup>sa  
       b. sibi<sup>1</sup>ta    ~    isbi<sup>1</sup>ta  
       c. ʔiri<sup>1</sup>ba    ~    iʔri<sup>1</sup>ba

The stress of the forms on the right is consistent with that of the other words of the language; this suggests that we might wish to set up the nonexceptional alternants as underlying and have a rule of metathesis apply to nouns of this type after stress assignment has been accomplished. This solution has several weaknesses. First, Mitchell's grammar is the only one to mention the alternate forms, and Mitchell is given to recording classicisms which only occur in more formal and educated speech. It seems most likely that the average speaker is not even aware of the alternate forms. Thus, while the reason for the plural forms' aberrant stress pattern is probably explained by their historical derivation from the regular forms, the only justification for reproducing this derivation synchronically is to make the stress rules work out. And finally, this solution would

obscure the fact that these forms are exceptional in exactly the same way as the /it/ forms are. Condition B predicts that stress should fall on the antepenult (as in sāgara 'tree'), but stress actually falls--or, according to the two-rule solution, remains--on the penult.

The two-rule solution is admirably equipped to capture this generalization: a lexical redundancy rule marks plurals of the shape CuCuCa [-SR]. It's impossible, however, to express the similarity shared by the exceptional cases within the system involving Rule (31). To handle the plurals, we must either add another condition to the rule:

46) Condition 2: sub-rule (2) doesn't apply to

plurals of the form CuCuCa

or an exception feature [-sub-rule (2), Rule (31)] on these forms. In either case, a generalization is lost.

Thus, the two-rule solution is superior to Rule (31), since it allows the handling of all exceptional forms in a uniform manner. The fact that Rule (31) can be shown to be the less adequate rule and the fact that (31) is such an odd sort of rule may not be mere coincidence; it might be possible to predict that stress rules which break up syllable structure, as (31) does, will never occur.<sup>4</sup>

The only other form which does not conform to the regular stress pattern is the word yātara, translated 'I wonder'. This form too is exceptional in exactly the same way as the /it/ forms and the plural forms, and may be explained by the

same device.<sup>5</sup>

### 1.3.1 Ordering.

Evidence has been presented that both the stress rules and the rule of I Ep must precede HVD. The following forms show that I Ep must precede SA as well, since the epenthetic vowel in (48b) is stressed:

47)a. katab lilmalik 'He wrote to the king'

b. katabti lilmalik 'I wrote to the king'

48)a. katablu 'He wrote to him.'

b. katabtilu 'I wrote to him.'

The forms of (48) are those in which the preposition and pronoun have been attached to the verb; for the purposes of the stress rules, such forms constitute single words. The /i/ of katabtilu is both epenthetic and stressed; therefore I Ep must precede SA.

### 1.4 Vowel Shortening.

Several alternations between long and short vowels have been noted but not explained (7,8,9). Similar alternations occur in the following forms:

49) a. saatir 'clever (m)'

b. satra 'clever (f)'

c. satriin 'clever (p)'

50) a. itnaa'is 'he discussed'

b. itna'sit 'she discussed'

The rules discussed so far apply to these forms in the following manner:

51)	'saatir	'saatir + a	'saatir + iin
I Ep:	n/a	n/a	n/a
SA	'saatir	'saatira	'saatiriin
SR	n/a	'saatira	n/a
HVD	n/a	'saatra	'saatriin
surface:	'saatir	'satra	'satriin
52)	itnaa?'is	itnaa?'is + it	
I Ep:	n/a	n/a	
SA	itnaa?'is	itnaa?'isit	
SR	n/a	itnaa?'isit	
HVD	n/a	itnaa?'sit	
surface:	itnaa?'is	itnaa?'sit	

The only difference between the output of these rules and the actual surface forms is in the length of the vowel. We can hypothesize that the factor causing shortening of the originally long vowel in each example is the creation by HVD of a consonant cluster directly following the vowel. This hypothesis is borne out by these alternations:

53) a.	fanagiin	'cup'
b.	duruus	'lessons'
c.	beet	'house'
d.	yoom	'day'
54) a.	fanaginha	'her cup'
b.	durushum	'their lessons'
c.	bitha	'our house'
d.	yumkum	'your (p) house'

These alternations can be handled by the following rule:

55) Vowel Shortening (V Sh):

$$\left\langle \begin{array}{c} \text{V} \\ [-10] \\ \text{a} \end{array} \right\rangle \rightarrow \left[ \begin{array}{c} \text{-long} \\ \langle +hi \rangle \\ \text{a} \end{array} \right] \quad / \text{---} \quad \left[ \text{-syll} \right]_2$$

The features in angle brackets reflect the fact that there are no short mid vowels; mid vowels become high when shortened.

Rule (55) fails to explain certain alternations, for example:

- 56) a. 'saafit                    'she saw'  
       b. 'safitak                'she saw you (m)'

A return to the paradigm of itnaa?iʃ makes the solution obvious:

- 57) itnaa?iʃ                    'he discussed'  
       itna?siʃ                    'she discussed'  
       itna?su                    'they discussed'  
       itna?iʃt                    'I discussed'  
       itna?iʃna                    'we discussed'  
       itna?iʃt                    'you (m) discussed'  
       itna?iʃti                    'you (f) discussed'  
       itna?iʃtu                    'you (p) discussed'

Underlying long /a/ is short in the first and second person forms, although it is in an open syllable; it's also stressless in these forms. The following alternations provide further evidence that a stressless vowel is shortened and show that the alternation between mid and high vowels persists in

this case:

- 58) a.  $\text{habbe}^{\prime}\text{ena}$  'we loved'  
 b.  $\text{ma habbina}^{\prime\prime}\text{as}$  'we didn't love'
59. a.  $\text{yoo}^{\prime}\text{m}$  'day'  
 b.  $\text{yumeen}^{\prime}$  'two days'

We must therefore revise the rule of V Sh:

60) V Sh (final version):

$$\left[ \begin{array}{c} +\text{syll} \\ \langle -\text{lo} \rangle_a \end{array} \right] \rightarrow \left[ \begin{array}{c} -\text{long} \\ \langle +\text{hi} \rangle_a \end{array} \right] \left[ \begin{array}{c} \langle \text{stress} \rangle_b \end{array} \right] \left\langle \left[ -\text{syll} \right]_2 \right\rangle_b$$

This rule states that a vowel which is either stressless or before two consonants will be shortened.

#### 1.4.1 Ordering

Since the elision of a vowel creates the environment for V Sh in many forms, V Sh must follow HVD. One derivation involving these rules is the following:

- 61)  $\text{saatir}^{\prime}$   $\text{saatir}^{\prime} + \text{a}$   
 SA:  $\text{saatir}^{\prime}$   $\text{saatira}^{\prime}$   
 SR: n/a  $\text{saatira}^{\prime}$   
 HVD: n/a  $\text{saatra}^{\prime}$   
 V Sh: n/a  $\text{satra}^{\prime}$   
 surface:  $\text{saatir}^{\prime}$   $\text{satra}^{\prime}$   
 'clever (m)' 'clever (f)'

Further evidence for this ordering is provided by these forms:

- 62) a.  $\text{yisiilu}^{\prime}$  'they carried'  
 b.  $\text{yisiluu}^{\prime}$  'they carried him'

The /i/ of the verb stem /siil/ is in the environment of HVD in (62b). We can explain its failure to delete if we assume that HVD does not apply to long vowels, and order HVD before VSh: then the /i/ will be long at the time HVD applies. This solution necessitates a revision of HVD:

63) HVD (final version):

$$\left[ \begin{array}{l} +\text{syll} \\ +\text{hi} \\ -\text{long} \\ -\text{str} \end{array} \right] \rightarrow \phi / X [+ \text{syll}] [- \text{seg}]_0 [- \text{syll}] \_ \_ [- \text{syll}] [- \text{seg}]_0 [+ \text{syll}] Y$$

### 1.5 Word-Initial Epenthesis.

The rule of I Ep is not written to apply to sequences of the type C #CC. This omission is deliberate; no ECA words begin with consonant clusters. There are, however, certain morphological processes which create words beginning in two consonants, and a rule of epenthesis applies to these words.

One set of forms which shows evidence of an initial epenthetic vowel is that of the imperatives. Certain facts about imperatives are relevant:

1) a negative command is expressed by the second person imperfect form of the verb, plus the negative affix /ma...s/:

- 64) a. tiktib 'you (m) write'  
 b. tiktibi 'you (f) write'  
 c. tiktibu 'you (p) write'

- 65) a. matiktib<sup>1</sup>s 'don't write!' (to m)  
 b. matiktibi<sup>1</sup>is 'don't write!' (to f)  
 c. matiktibu<sup>1</sup>s 'don't write!' (to p)

(Lengthening of a vowel before /s/ takes place regularly, and is explained in Chapter II.)

2) The imperative suffixes (∅, i, u) are the same as those of the second person imperfect:

- 66) a. tikallim<sup>1</sup> 'you (m) speak'  
 b. tikallimi<sup>1</sup> 'you (f) speak'  
 c. tikallimu<sup>1</sup> 'you (p) speak'
- 67) a. kallim<sup>1</sup> 'speak!' (to m)  
 b. kallimi<sup>1</sup> 'speak!' (to f)  
 c. kallimu<sup>1</sup> 'speak!' (to p)

3) The imperative stem and the imperfect stem are always identical:

- 68) a. zaakir/ -zaakir 'study (perf/imperf)'  
 b. zaakir! 'study!'
- 69) a. saaf/ -suuf 'see (p/i)'  
 b. suuf! 'see! (look!)'
- 70) a. saal/ -siil 'carry (p/i)'  
 b. siil! 'carry!'
- 71) a. ḥabb/ -ḥibb 'love (p/i)'  
 b. ḥibb! 'love!'
- 72) a. kabb/ -kubb 'pour (p/i)'  
 b. kubb! 'pour!'
- 73) a. ḡanna/ -ḡanni 'sing (p/i)'

- b. ʔ anni! 'sing!'
- 74) a. ista8add/-ista8add 'get ready (p/i)'
- b. ista8add! 'get ready!'

In most cases the vowel of the imperfect stem is arbitrary and not predictable from the shape of the perfect; the imperative has the same vowel, though in theory if there were no relationship between imperfect and imperative, the two could have different vowels: why not kabb/-kubb/\*kibb!? All these facts suggest that the imperative is formed from the second person singular imperfect by deletion of the prefix /ti-/.

There are certain cases, however, in which the imperfect and the imperative stems are not identical. This occurs when the imperfect stem begins with two consonants:

- 75) a. katab 'he wrote'
- b. tiktib 'you (m) write' (stem /-ktib/)
- 76) a. sirib 'he drank'
- b. yisrab 'you (m) drink' (stem /-srab/)
- 77) a. rama 'he threw'
- b. tirmi 'you (m) throw' (stem /-rmi/)
- 78) a. misi 'he went'
- b. yimsi 'you (m) go' (stem /-msi/)

In this case the imperative form begins with /i/:

- 79) a. iktib 'write!'
- b. israb 'drink!'
- c. irmi 'throw!'

d.  $\overset{!}{i}ms\overset{!}{i}$  'go!'

To preserve the relationship between imperfect and imperative stems, I propose the following rule:

80) Word-Initial Epenthesis (WIE)

$$\emptyset \rightarrow i / \# \text{ — } \left[ \text{-syll} \right]_2$$

Since the epenthetic vowel is often stressed (as in iktib), WIE must precede SA. Further applications of WIE are discussed in the following section.

Certain characteristics shared by WIE and the rule of I Ep suggest that these two are not separate entities. Both rules insert /i/ rather than some other vowel, a fact which is accidental if these are two distinct epenthesis rules, but automatic if the rules are collapsed. The rules are effectively disjunctively ordered, since the application of WIE will destroy the environment for I Ep. And there don't seem to be any rules which must be ordered between WIE and I Ep. However, these rules cannot be collapsed within the standard framework. Although both contain the term  $\left[ \text{-syll} \right]_2$ , this term is crucially to the right of the focus in WIE, and to the left of the focus in I Ep. The rules cannot be collapsed by means of the mirror image convention, because while WIE operates in the environment  $\text{ }_S \left[ \text{-CC} \dots \right]$  (as in iktib 'write!'), I Ep does not apply to strings of the form  $\dots \text{CC} \text{ } \left[ \text{ } \right]_S$  (feen ilbint 'where is the girl?').

### 1.6 Glottal Stop Insertion.

No word of ECA begins in isolation with a vowel. However,

certain words with initial glottal stop--followed, of course, by a vowel, since initial consonant clusters are not permitted on the surface--may appear in some environments without the glottal stop. When grammarians have mentioned this phenomenon at all, they have described it as a result of the optional elision of initial glottal stop. Certain facts suggest that it might be better described as insertion of /?/.

There are two major classes of initial /?/, those which are always present no matter what the environment, and those which often drop. The first class includes

(a) glottal stops which serve as the root consonant of a verb, for example:

- 81) a. ?axxar/yi?axxar      'he delayed/delays'  
       b. ?ara?/yi?ra?        'he read/reads'

(b) glottal stops in nouns of the pattern ?VCCaaC or ?VCaaC:

- 82) a. ?asmaa? 'names'      b. ?imaan        'faith  
       ?ahraam 'pyramids'    ?imaan        'religious leader'  
       ?islaam 'Islam'        ?amaan        'peace'

(c) glottal stops derived historically from the /q/ of Classical Arabic. In most cases, Classical Arabic /q/ corresponds to /?/ in ECA:

- 83) a. CA    qalbun        'heart'  
       b. ECA  ?alb        'heart'  
       84) a. CA    qara?a        'he read'  
       b. ECA  ?ara?        'he read'

Recent borrowings from MSA retain /q/ in educated speech (qawmi 'national'); thus there doesn't seem to be a synchronic rule taking /q/ to /?/.

The glottal stops of these three classes never elide, while all other initial glottal stops alternate with  $\emptyset$ . The differences between the first and second classes of initial /?/ may be expressed in one of two ways: one may assume either that all glottal stops are underlying and that only some of them are deletable, as traditional grammarians have assumed, or that some glottal stops are underlying while others are inserted by an optional rule. Since the first course would involve marking the great number and variety of glottal stops described in (a), (b), and (c)  $\overline{[-? - Deletion]}$ , the second seems the wiser. Therefore I'll assume the existence of the following rule:

85) Glottal Stop Insertion (?-Ins):

$\emptyset \rightarrow ?/##\_V$  (optional)

Rule (85) applies whether the preceding word ends in a consonant or a vowel:

86) a. kitaab ?ibnak ~ kitaab ibnak 'your (m) son's book'

b. inta ?ahmar ~ intahmar 'you (m) are red'

This rule generally applies only in slower or more formal speech, or when the word to which it applies is strongly emphasized.

The rule of ?-Ins must precede the rule of I Ep:

87) a. suʔl<sup>i</sup> ?ibnak ~ suʔl ibnak 'your (m) son's work'

b. 8amalt<sup>i</sup> ?eeh ~ 8amalt eeh 'what are you (m) doing?'

In the forms of (87) an initial glottal stop is counted as a third consonant, triggering the application of I Ep.

Of the class of initial glottal stops which are not always present on the surface, there are some which appear only before a major pause, even in quite slow and deliberate speech. These are the glottal stops preceding

88) a. the /i/ of the imperative iCCVC

b. the /i/ of derived verbs of the type itC...,iCt..., istaC..., and the nouns derived from these verbs

c. the /i/ of the definite article il

d. the /i/ of the relativizer illi

These forms provide a contrast with all the other forms whose /?- ø/ alternation seems to be a function of style and speed. Even forms beginning with /i/ show this alternation, so the lack of /?/ in the forms of (88) can't be attributed to the quality of their initial vowel:

89) ?iswiḍ ~ iswiḍ 'black'

?ibliis ~ ibliis 'Satan'

?ingiliizi ~ ingiliizi 'English'

It's already been established that the initial /i/ of imperatives is inserted by the rule of WIE. The following orderings have also been established: WIE precedes I Ep, and ?-Ins precedes I Ep. If it's assumed that ?-Ins also precedes WIE, an explanation for the non-occurrence of initial glottal stops in the imperative is at hand: ?-Ins can't apply to the form /ktib/:

- 90)                    ktib  
       ?-Ins:        n/a  
       WIE:         iktib

Thus in sentence (91) no /?/ precedes the /i/ of the imperative, and therefore nothing prevents the elision of the vowel, which is blocked in sentence (92) by the presence of /?/:

- 91) giib ?alamak wiktib! (\*wi ?iktib)  
       'Bring your pencil and write!'  
 92) ilkitaab ?ahmar wi ?iswiḍ. (or: ahmar wiswiḍ)  
       'The book is red and black.'

This explanation can be extended to account for the remaining cases of (88) if it can be shown that WIE is the source of the initial /i/ in these forms as well.

#### 1.6.1 Derived Verbs.

Various means of forming derived verbs are available in ECA:

- 93) a. gama8            'he combined'  
       b. itgama8        'he was combined'  
       c. igtama8        'he conferred, met'  
 94) a. <sup>1</sup>saal            'he carried'  
       b. <sup>1</sup>itsaal        'he was carried'  
       c. <sup>1</sup>istaal        'he carried'

The (b) and (c) forms above can be described as the addition of prefix /it/, and of prefix /i/ with infix /t/, respectively. However, the word formation processes involved may be described more simply if one assumes that the same derivational element /t/ is involved in both processes, and only its position varies. The necessary word formation rules, in the notation suggested by Aronoff (Aronoff, 1974), are these:

- 95) a.  $\llbracket \bar{C} \dots \rrbracket_v \implies \llbracket \bar{t}C \dots \rrbracket_v$  (itgama8)  
 b.  $\llbracket \bar{C} \dots \rrbracket_v \implies \llbracket \bar{C}t \dots \rrbracket_v$  (igtama8)

These rules make clear the parallels between the two types of derived verbs, and the presence of initial /i/ follows from the rule of WIE. This derivation explains why verbs of this type never have initial /?/, even in slow speech:

- 96) a. huwwa gtama8 (\*?igtama8) ma8a rru?asa.  
 'He conferred with the leaders.'  
 b. sah Iran igtama8 (\*?igtama8) ma8a lbrazidant.  
 'The Shah of Iran conferred with the president.'

The third sort of derived verb makes use of a prefix /ista/; derived nouns formed on these verbs take /isti/:

- 97) a. ?aabil 'he met'  
 b. ista?bil 'he welcomed'  
 c. isti?baal 'a welcome'
- 98) a. ?aal 'he said, told'  
 b. ista?aal 'he resigned'  
 c. isti?aala 'a resignation'

Again, these forms never take initial /?/, except sentence-initially or after a pause:

- 99) a. huwwa sta?bil (\*?ista?bil) isseex.  
 'He welcomed the sheikh.'  
 b. ra?iis Libnaan ista?aal (\*?ista?aal) ?imbaarih.  
 'The head of Lebanon resigned yesterday.'

These facts are explained by the assumption that the word-forming prefixes are actually /sta/ and /sti/.

### 1.6.2 Il and Illi

The definite article il and the relativizer illi never take initial /?/, except before a pause:

100) a. huwwa lmudarris. (\*?ilmudarris)

'He is the teacher.'

b. Fariid ilmudarris. (\*?ilmudarris)

'Fariid is the teacher.'

101) a. issana lli faatit (\*?illi faatit)

'the past year' (lit. 'the year which has passed')

b. huwwa rraagil illi (\*?illi) byiz8al bisur8a.

'He is the man who gets angry quickly.'

If the underlying forms of these words are /l/ and /lli/ (or /ll/, with the final /i/ resulting from the application of I Ep), these facts are explained by the ordering ?-Ins, WIE.

### 1.7 Vowel Deletion Across Word Boundaries.

The /i/ inserted by WIE does not appear when the word preceding it ends in a vowel:

102) a. huwwa lmudarris. 'He is the teacher.'

b. huwwa tgarah̄. 'He was wounded.'

c. 'suufu lli ?uddamkum.<sup>6</sup> 'Look (p) who's in front of you (p).'

The non-appearance of epenthetic /i/ can be handled by the same rule which deletes an underlying initial /i/ when the optional rule of Glottal Stop Insertion has not applied:

103) a. iddithaalu. '(I) gave it to him.'

- b. ana ddithaalu. 'I gave it to him.'
- 104) a. Baazal ingiliizi. 'Basil is English.'
- b. huwwa ngiliizi. 'He is English.'

This rule can be written as follows:

$$105) \quad \begin{array}{c} V \\ \overline{[+hi]} \end{array} \rightarrow \emptyset / V\#\_\_$$

It can't apply, of course, when Glottal Stop Insertion has applied:

- 106) a. ana ?iddithaalu ~ ana ddithaalu 'I gave it to him.'
- b. huwwa ?ingiliizi ~ huwwa ngiliizi 'He is English.'

The phenomenon of vowel deletion across words is actually more extensive than rule (105) indicates. An /i/ is deleted when it is the first member of a pair of inter-word vowels:

- 107) a. 8ali afandi → 8al afandi '8ali effendi'
- b. naawi aruuḥ → naaw aruuḥ 'he intends to go'
- c. xalliini arawwaḥ → xalliin arawwaḥ 'let me go home'

These facts require the following rule:

$$108) \quad \begin{array}{c} V \\ \overline{[+hi]} \end{array} \rightarrow \emptyset / \_\_ \#\#V$$

Rules (105) and (108) can be collapsed by the mirror image convention suggested by Bach (Bach, 1968):

$$109) \quad \begin{array}{c} V \\ \overline{[+hi]} \end{array} \rightarrow \emptyset / V\#\#$$

which expands as

$$110) \quad \begin{array}{c} V \\ \overline{[+hi]} \end{array} \rightarrow \emptyset / \_\_ \#\# \overline{V}$$

This rule will account for

- 111) a. <sup>1</sup>suufu illi ?uddamkum → <sup>1</sup>suufu lli ?uddamkum

'Look (p) who's in front of you (p).'

b. 8ali afandi → 8al afandi

'8ali effendi'

as well as forms such as (112c):

112) a. uxti 'my sister'

b. ya Samiira 'O Samiira'

c. ya xti 'O my sister'

However, rule (110) still does not account for forms such as this one:

113) inta ?aħmar → intaħmar

'You are red.'

These can be handled by parenthesizing the term  $\overline{[+hi]}$  in Rule (110):

114) Vowel Deletion Across ## (VD Across ##) (final version):

$$\overline{\begin{bmatrix} +syll \\ (+hi) \end{bmatrix}} \longrightarrow \emptyset / V##$$

This rule expands as the following four rules:

115) a.  $\overline{\begin{bmatrix} V \\ [+hi] \end{bmatrix}} \longrightarrow \emptyset / V##\_$

b.  $\overline{\begin{bmatrix} V \\ [+hi] \end{bmatrix}} \longrightarrow \emptyset / \_##V$

c.  $V \longrightarrow \emptyset / V##\_$

d.  $V \longrightarrow \emptyset / \_##V$

which will derive the correct forms in all cases. Vowel Deletion Across ## must of course follow the optional rule of Glottal Stop Insertion, and is blocked when that rule has applied. It must also follow WIE.

The fact that the forms with epenthetic initial /i/ have /ʔ/ when post-pausal or sentence-initial has not been explained by any of the rules so far presented. The rule which inserts a glottal stop before a vowel which begins a phrase exists in English as well as in ECA, and is probably a universal phonetic rule. I'll assume that this rule is ordered very late in ECA; its formulation is discussed in section 1.8.6.

### 1.8 Emphasis and the Syllable.

No generally accepted explanation of the phenomenon of emphasis in ECA exists. The facts concerning the distribution of emphasis are as follows:

1. Emphasis never occurs as a feature of one segment only. The minimum domain of emphasis is the sequence CV.

2. All segments except /q/ occur both emphatic and non-emphatic.<sup>7</sup> However, each word which contains any emphatic segments contains at least one of what are called the "independent emphatics."<sup>8</sup>

Essentially two types of theories have been proposed to deal with these facts: emphasis is seen either as an underlying feature of certain segments or as a supersegmental feature. The major problem of the first approach, as well as the major argument for the second, is the fact that the domain of emphasis appears nearly impossible to predict. Hence the suggestion that "emphasis is a prosodic feature which occurs over segments of varying length,"<sup>9</sup> which amounts to simply

marking emphasis where it occurs. Somewhat more interesting is Lehn's proposal that emphasis "patterns as a constituent on the syllable level."<sup>10</sup> This at least recognizes the fact that the distribution of emphasis, coinciding with syllable boundaries, is not totally erratic, but suggests that it's impossible to predict whether or not a syllable will be emphatic. This conclusion is an interesting consequence of Lehn's adherence to structuralist criteria for determining distinctive features; he argues that such pairs as tiin 'figs' and tiin 'mud', generally used to demonstrate a contrast between underlying emphatic and non-emphatic /t/, are not sufficient within the confines of structuralist theory to establish the existence of two separate phonemes /t/ and /t̥/, since all the segments in each word are either emphatic or non-emphatic. Hence minimal pairs can never exist.

Lehn's argument of course, ignores the fact that /t̥/ is one of the 'independent emphatics' mentioned in Fact 2. The existence of such segments suggests that a theory which posits certain underlying emphatic segments and spreads emphasis from these across some specified domain is the correct one. Determining the domain of this rule of emphasis-spreading is a real and difficult problem.

#### 1.8.1 The Role of the Syllable.

Lehn and Abboud argue that the domain of emphasis is defined on the syllable. They cite, among others, the following alternations:

- 116) a. ṣaa/liḥ            'good (m)'  
       b. ṣal/ḥiin        'good (p)'  
 117) a. ḥarraan        'hot (m)'  
       b. ḥarraa/na      'hot (f)'  
 118) a. latiif            'pleasant (m)'  
       b. latii/fa        'pleasant (f)'

We can explain the data above if we assume that the consonants which alternate in these examples between emphatic and nonemphatic--/l/, /n/, /f/--are not underlyingly emphatic, but appear as such when they share a syllable with an emphatic consonant. (/ṣ/, /r/ and /t/ are among the 'independent emphatics.')

ECA grammarians agree<sup>11</sup> that the Egyptian syllable takes one of the following forms:

- 119) CV  
       CVC  
       CVCC  
       CVV  
       CVVC

Thus, since three-consonant clusters are impossible in ECA, a syllable break will always fall between two adjacent consonants. A single consonant followed by a vowel always shares a syllable with that (following) vowel. The facts of emphasis, of course, confirm this analysis of syllabication.

The domain of emphasis is affected by the structure of adjacent words as well as by word-internal structure:

- 120) a. udit/sitt 'a woman's room'  
 b. udi/t issitt 'the woman's room'
- 121) a. raas 'head'  
 b. raa/s issana 'the new year' (lit: (the) head  
 (of)the year)
- 122) a. hissit 8arabi 'an Arabic class'  
 b. hissi/t il8arabi 'the Arabic class'
- 123) a. dakatra 'doctors'  
 b. kitiir 'many'  
 c. dakatra k/tiir 'many doctors'

As (123) shows, emphasis can be spread on to an adjacent word; (120)-(122) show that a consonant which is emphatic when sentence-final or when followed by a consonant-initial word is non-emphatic when followed by a word beginning with a vowel. These facts can be explained if we take into account the fact that syllables can span words. This is documented by Lehn and Abboud:<sup>12</sup>

- 124) a. ilgumla gidiida → ilgumla gdiida  
 is pronounced  
 b. ilgumla gdiida 'the sentence is new'
- 125) a. bint kibiira → binti kbiira  
 is pronounced  
 b. bintik biira 'a big girl'
- 126) a. wi izzayyak inta  
 is pronounced

b. wizzayya kinta? 'and how are you (m)?'

This pronunciation of syllables as units is a very real phonetic phenomenon; failure to pronounce the phrases above as specified results in a judgment by a native speaker that one's pronunciation is 'non-Egyptian'. Each grammar mentions this phenomenon as something the student of ECA must master:

In most cases word and syllable boundaries do not coincide. If we look at /ilgumla gdiida/ 'the sentence is new' in terms of syllable and word boundaries, we get #?il-gum-la//g-dii-da#. The most difficult part for a non-native speaker is the last syllable of the first word and the first syllable of the last word, which he hears as /-lag-/. At the beginning this is difficult to produce and recognize, particularly in rapid speech.<sup>13</sup>

#### 1.8.2 Representation of Syllable Structure.

Thus, whatever the phonetic correlates of syllabic boundaries which make their position recognizable, they play a significant role in the pronunciation of ECA and need to be represented in the grammar. The facts of ECA syllable structure can be described using the notation developed by Kahn (Kahn, 1975). Kahn proposes a list of syllabication rules--rules which assign syllable structure--ordered within the rules of English phonology. These syllabication rules are followed by other phonological rules which depend on syllable structure. In the case of ECA, syllabication rules must follow the rules of I Ep and HVD, as (124) and (125) show.

Syllabication rules, in Kahn's system, assign tree structures to words. Since each syllable in ECA--as, of

course, in every language--must contain a syllabic segment, the first syllabication rule of both English and ECA is the following, which assigns the node S(syllable) to each syllabic segment:

127) Syllable Rule I (SRI):

$$\begin{array}{c} \boxed{+syll} \rightarrow \boxed{+syll} \\ | \\ S \end{array}$$

Subsequent rules connect consonants with the proper syllabic segment, that is, assign them to the proper syllable. The second syllabication rule of ECA is the following:

128) Syllable Rule II (SRII):

$$\begin{array}{ccc} \dots C \boxed{+syll} \dots & \rightarrow & \dots C \boxed{+syll} \dots \\ | & & \diagdown \quad | \\ S & & S \end{array}$$

(C and V may be in different words; as in udit issitt 'the woman's room'.)

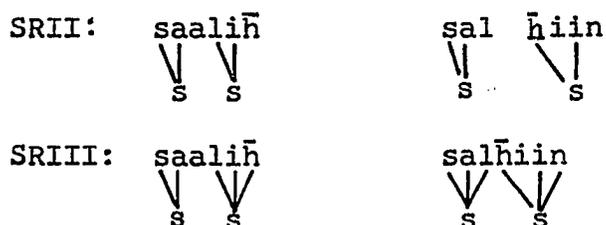
The next rule of syllabication is the one which applies in the case of (123), dakatra k/tiir:

129) Syllable Rule III (SRIII):

$$\begin{array}{ccc} \dots \boxed{+syll} C \dots & \rightarrow & \dots \boxed{+syll} C \dots \\ | & & \diagup \quad | \\ S & & S \end{array}$$

The rules given so far will apply as follows to the forms of (116):

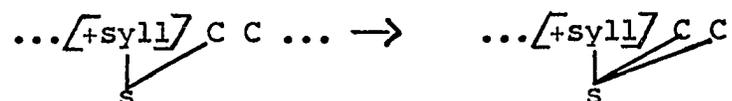
	130) <u>saaliḥ</u> 'good (m)'		salhiin 'good (p)'
SRI:	$\begin{array}{cc} \text{saa} & \text{lih} \\   &   \\ S & S \end{array}$		$\begin{array}{cc} \text{salhiin} \\   &   \\ S & S \end{array}$



The fact that /l/ is assigned to be second syllable in saali $\bar{h}$  but the first in sal $\bar{h}$ iin presumably accounts for the alternation between non-emphatic and emphatic /l/. /ṣ/ is one of the 'independent' emphatic segments.

An additional rule of syllabication is necessary to account for such words as bint 'girl':

131) Syllabication Rule IV (SRIV):



SRIV applies, of course, only when the rightmost consonant is previously unattached; it therefore won't apply, for example, to the /h/ of sal $\bar{h}$ iin. SRIV can apply only sentence-finally or before certain major constituent breaks, since the rule of I Ep ensures that a word ending in two consonants will be followed by a vowel, if by anything.

The combined effect of SRII, III, and IV is to ensure that each syllable has one and only one consonant preceding its vowel. This generalization accords with the generalization that #CC... is not a permissible sequence in ECA. The parallel with Kahn's analysis is possibly significant. Kahn argues that only those consonant clusters which can occur word-initially can occur syllable-initially; thus, 'Bo/ston'

but 'at/las' (#st... but \*#tl...). Kahn's arguments for this assumption concern the various rules which refer to syllable structure, and are laid out in his dissertation. The ECA parallel between word- and syllable-initial clusters suggests that this is a universal condition on syllabication.

Some illustration of the effects of the syllabication rules follows. In each case the domain of emphasis coincides with the syllable boundaries assigned by these rules:

- 132) a. hissit 8ara/bi 'an Arabic class'  
 b. hissi/t il/8ara/ bi 'the Arabic class'

SRI:	<u>hissit</u>	<u>8ara</u> bi	<u>hissit</u>	il <u>8ara</u> bi
	••	•	••	
	s s	s s s	s s	s s s s
SRII:	<u>hissit</u>	<u>8ara</u> bi	<u>hissit</u>	il <u>8ara</u> bi
	∨••∨	∨•∨∨	∨••∨	∨   ∨ ∨ ∨
	s s	s s s	s s	s s s s
SRIII:	<u>hissit</u>	<u>8ara</u> bi	<u>hissit</u>	il <u>8ara</u> bi
	∨••∨	∨•∨∨	∨••∨	∨   ∨ ∨ ∨
	s s	s s s	s s	s s s s
SRIV:	n/a		n/a	

Resulting structure:

- a. (h̄is) (s̄it) (8a) (ra) (bi)  
 b. (h̄is) (s̄i) (t il) (8a) (ra) (bi)

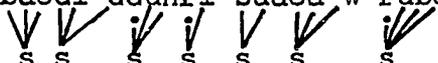
The emphatic-nonemphatic alternation of /t/ is explained by the fact that in (132a) it shares a syllable with emphatic /s/, which in (132b) is part of the next syllable. (The occurrence of emphasis in (8a) is discussed in section 1.8.4.)

Another example is the following phrase:

- 133) ba8di d/duhri saa8a w rub8  
 after the noon hour and quarter

'an hour and a quarter after noon'

from: ba8d ilduhr saa8a wi rub8 by L-Assim, I Ep, SA, HVD,  
SRI-IV produce the following structure:

134) a. ba8di dduhri saa8a w rub8  


b. (ba8)(did)(duh)(ri)(saa)(8aw)(rub8)

Again, the distribution of emphasis coincides with syllable boundaries, and each syllable contains an 'independent' emphatic, /d/, /r/, and /r/, respectively.

### 1.8.3. The Rule of Emphasis-Spread.

To assign emphatic articulation to segments sharing a syllable with an underlying emphatic, we need the following rules. All these rules apply without regard for word boundaries:

135)

Emp I:  $V \rightarrow \boxed{+CP} / \left\{ \begin{array}{c} \text{pause} \\ C \end{array} \right\} \left[ \begin{array}{c} C \\ +CP \\ -10 \end{array} \right] -$

Emp II:  $V \rightarrow \boxed{+CP} / - \left[ \begin{array}{c} C \\ +CP \\ -10 \end{array} \right] \left\{ \begin{array}{c} \text{pause} \\ C \end{array} \right\}$

(I and II can be combined as one mirror-image rule.)

136) Emp III:  $C \rightarrow \boxed{+CP} / \left\{ \begin{array}{c} \text{pause} \\ C \end{array} \right\} - \boxed{+CP}^V$

Emp IV:  $C \rightarrow \boxed{+CP} / \boxed{+CP}^V - \left\{ \begin{array}{c} \text{pause} \\ C \end{array} \right\}$

(Again, III and IV can be combined by use of the mirror-image convention.)

137) Emp V:  $C \rightarrow \boxed{+CP} / \boxed{+CP} / - C \left\{ \begin{array}{c} \text{pause} \\ C \end{array} \right\}$

All these rules do, of course, is to spell out the environment 'same syllable.' If we make use of the syllabication rules, which are independently necessary, we can write a single rule assigning syllabic emphasis:

138) Emphasis-Spreading (Emp-Sp):

$$\begin{array}{ccc}
 \left[ \left( \left[ +\text{seg} \right]_1 \right) \right. & \left[ \begin{array}{c} +\text{CP} \\ -\text{lo} \end{array} \right] & \left. \left( \left[ +\text{seg} \right]_1 \right) \right] \\
 \text{syll} & & \text{syll} \\
 1 & 2 & 3 \Rightarrow \\
 \left[ \begin{array}{c} 1 \\ +\text{CP} \end{array} \right] & 2 & \left[ \begin{array}{c} 3 \\ +\text{CP} \end{array} \right]
 \end{array}$$

The specification  $\left[ -\text{lo} \right]$  on term 2 prevents pharyngeal consonants from triggering the process of emphasis spreading.

#### 1.8.4 Further Domain of Emphasis-Spreading.

As yet unexplained is the emphatic articulation of the first syllable in ṣara/bi 'Arabic' in (122). There is no underlying emphatic consonant in this syllable; pharyngeals, though  $\left[ +\text{CP} \right]$ , don't cause emphatic articulation of surrounding segments, though they do somewhat lower a following vowel. Words containing pharyngeals but none of the 'independent' emphatics, however, are not transcribed with emphasis:

- 139) a. ṣala' 'on'  
 b. ṣeeb' 'shame'  
 c. ṣiid' 'feast'
- 140) a. ṣatas' 'thirst'  
 .....  
 b. ṣitiṣ' 'to be thirsty'  
 .....

Thus the emphatic articulation associated with the /8/ of 8arabi must result from the proximity of /r/: additional rules of emphasis-spreading must affect neighboring syllables in certain cases.

The facts concerning the spread of emphasis to syllables which do not contain underlyingly emphatic consonants are extremely confusing and are responsible for the conclusion of many grammarians that the occurrence of emphasis is not predictable. The only data available to me are my own judgments and the transcriptions of Lehn and Abboud, who provide the only grammar in which all surface emphatics are marked. (Other grammarians simply mark underlying emphatics.) Both these sources are quite subjective. Since it's quite difficult to detect the presence of emphatic articulation in any vowel but /a/ and on most consonants, there are, no doubt, many inaccuracies in the data; thus a conclusive theory of the spread of emphatic articulation can only be based on work done in a laboratory. I will attempt to account for the spread of emphasis, but my conclusions should be seen as a ground-breaking attempt, subject to later refinement and revision.

That emphasis does spread to syllables free of independently emphatic segments there can be no doubt. The argument for the spread of emphasis concerns certain morphemes which are emphatic only in conjunction with words containing emphatic segments. For example, the derivational prefix /ista/

is emphatic when it precedes the stem /xrag/ from the verb xarag; in conjunction with the stem /8mil/, from 8amal, /ista/ is not emphatic:

- 141) a. istaxrag      'he extracted'  
       b. ista8mil      'he used'

To set up two distinct derivational morphemes /ista/ and /ista/ would clearly be to miss a generalization. Similarly, the pronoun clitic /ak/ varies according to the word to which it is attached:

- 142) a. saḥbak      'your (m) friend'  
       b. kitaabak      'your (m) book'

Since the only independent emphatic in (142a) is /ṣ/, the emphatic articulation of /ak/ cannot be explained by the rule of Emphasis Spread already formulated. However, emphatic /ak/ occurs only on a word which contains an emphatic element. One would like to avoid the expedient of setting up two synonymous second person clitics which differ only in that one is emphatic, and happens to co-occur only with emphatic words.

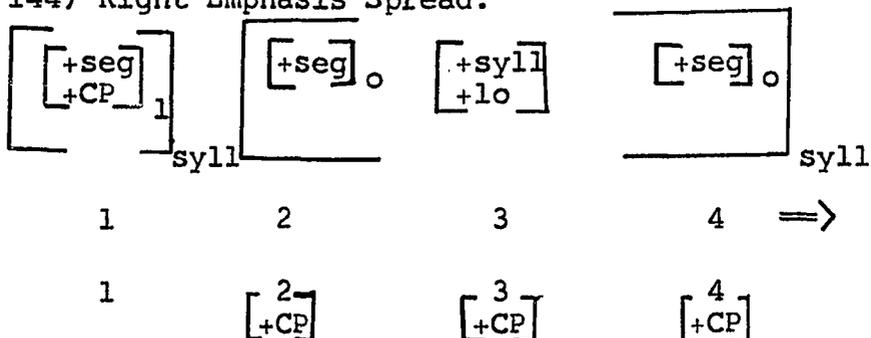
Thus a rule distributing emphasis beyond the syllable containing an emphatic segment is necessary. The rule does not however apply in every case, as these forms demonstrate:

- 143) saḥib      'friend'  
       saḥbi      'my friend'  
       saḥbak      'your (m) friend'  
       saḥbik      'your (f) friend'

saḥbu            'his friend'  
 .....

Low vowels seem to have a special affinity for emphatic articulation; the rule accounting for the facts of (143) is the following:

144) Right Emphasis Spread:



Rule (144) accounts also for the following forms:

145) a. min fadlak            'please (to m)'  
           .....  
       b. min fadlik            'please (to f)'  
           .....

However, Rule (144) makes incorrect predictions for the forms of (117) and (118), reproduced here:

146) a. ḥarraan            'hot (m)'  
           .....  
       b. ḥarraana           'hot (f)'  
           .....  
 147) a. latiif            'pleasant (m)'  
           .....  
       b. latiifa            'pleasant (f)'  
           .....

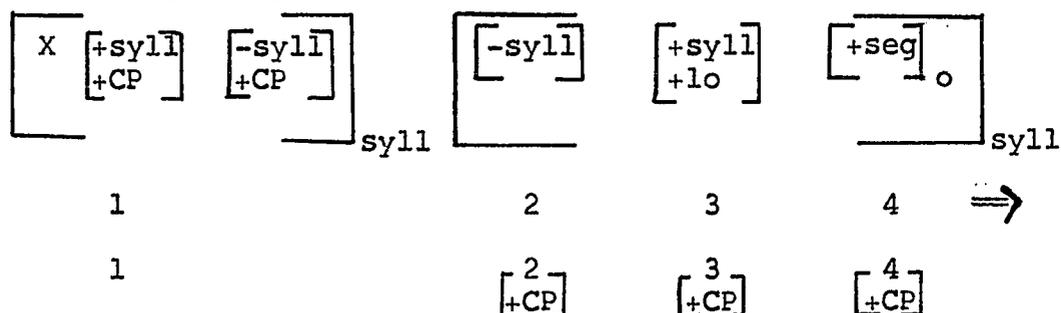
It seems fair to assume that both members of the geminate /r/ group are underlyingly emphatic, and one must assume that the /t/ of latiif is emphatic, since Rule (144) doesn't apply to high vowels, and the /ii/ of latiif does receive emphatic articulation. Thus the underlying shapes of (146b) and (147b) are the following:

148) a. ḥarraana  
           .....

## b. laṭiifa (or laṭiifa)

The final syllables of these forms meet the structural description of Rule (144), yet they are not pronounced with emphasis. This suggests that Rule (144) as it stands is too powerful. The final syllables of (148) differ from the final syllables of saḥbak and fadlak in that they are not preceded by a consonant. Rule (144) can be revised to account for these facts:

## 149) Right Emphasis Spread (final version) (RES):



This statement of the rule explains why in (134) 'ba8di dduhri saa8a w rub8' the syllable /saa/ is not pronounced with emphasis, though it follows the syllable containing emphatic /r/.

Left Emphasis Spread. The spread of emphasis leftward to syllables not containing independent emphatics is illustrated by these forms:

- |             |                |
|-------------|----------------|
| 150) ba8raf | 'I know'       |
| biti8raf    | 'you (m) know' |
| biyi8raf    | 'he knows'     |

The forms of (150) suggest that leftward spread occurs in the same environments in which spread of emphasis to the



the utterance.

#### 1.8.5 Problems.

The existence of a number of pairs of obviously related words, of which one has emphatic and one non-emphatic articulation, is a somewhat surprising phenomenon:

- |      |    |          |              |
|------|----|----------|--------------|
| 154) | a. | kibiir   | 'big'        |
|      | b. | kubaar   | 'big (p)'    |
| 155) | a. | kitiir   | 'much'       |
|      | b. | kutaar   | 'many'       |
| 156) | a. | humaar   | 'donkey'     |
|      | b. | himiir   | 'donkeys'    |
| 157) | a. | ma?bara  | 'tomb'       |
|      | b. | ma?aabir | 'tombs'      |
| 158) | a. | raagil   | 'man'        |
|      | b. | riggaala | 'men'        |
| 159) | a. | tigaara  | 'commerce'   |
|      | b. | tigaari  | 'commercial' |

(154)-(159) may seem to suggest that the pattern CuCaaC has something of emphasis inherent in it; however such pairs as gidiid/gudaad 'new s/p', latiif/lutaaf 'pleasant s/p', and such forms as su?aal 'question' contradict this. The answer seems to be that certain forms simply differ in one underlying segment in their lexical representation. Since Arabic plurals are notoriously irregular, it's not surprising that both singular and plural forms should appear in the lexicon in full.

### 1.8.6 ?-Insertion and the Syllable.

Every ECA syllable must begin with one and only one consonant. One effect of the rules of ?-Ins and Vowel-Deletion Across Word Boundaries, discussed in sections 1.6 and 1.7, is to ensure that syllables don't begin with vowels:

- 160) a. ?il8arabiyya ?iswiḍ.            'The car is black.'  
       or b. ?il8arabiyya swiḍ.

have the syllable structures

- 161) a. (?il) (8a) (ra) (biy) (ya) (?is) (wiḍ)  
       b. (?il) (8a) (ra) (biy) (yas) (wiḍ)

However, ?-Ins does not apply to those words which have an epenthetic initial vowel inserted by WIE, since the rule of WIE follows ?-Ins. When words with initial epenthetic /i/ follow other words, the consonant preceding the /i/ provides the first segment of the syllable:

- 162) a. Kallim ilmudarris. 'Speak to the teacher.'  
       b. (kal)(li)(mil)(mu)(dar)(ris)

But when /i/ is sentence-initial or follows a pause which the syllabication rules can't span, /i/ must be the first element of its syllable. It's precisely in these cases that /?/ shows up before epenthetic /i/:

- 163) a. ?Ilmudarris<sup>1</sup> saatir.            'The teacher is clever.'  
       b. ?ultu, "?iktib!"            'I said to him, "write!"'

This second rule of glottal stop insertion can be written quite simply if it's assumed to follow the Syllabication Rules:

164) Late Glottal Stop Insertion (L-?-Ins):

$$\emptyset \rightarrow ? / \left[ \begin{array}{c} \text{---} \\ \text{syll} \end{array} \right] \text{V...}$$

The existence of this rule allows for the very simple statement of ?-Ins presented in section 1.6; ?-Ins is optional in all cases, and Late ?-Ins provides for those cases in which a glottal stop must be present.

### 1.9 The Ordering of Syllabication Rules.

In the preceding sections Kahn's system of capturing syllable-related generalizations has been adopted. I'd like now to discuss an alternative approach, developed by Hooper (Hooper, 1972). Hooper also argues that the notion of the syllable should be represented in phonology. She proposes the following rule, which inserts syllable boundaries, represented by the symbol \$, into a string:

165) (Hooper's Rule 22):

$$\emptyset \rightarrow \$ / \left[ +\text{syll} \right] \left\{ \left[ -\text{syll} \right]_o \text{---} \left\{ \begin{array}{l} \left[ -\text{syll} \right]_o^1 \\ \left[ -\text{son} \right] \left[ +\text{son} \right] \\ \left[ +\text{cons} \right] \left[ -\text{nas} \right]_o \\ \left[ -\text{cons} \right]_o \end{array} \right\} \right\} \left[ +\text{syll} \right] \quad \begin{array}{l} \text{(a)} \\ \text{(b)} \\ \text{(c)} \end{array}$$

Rule 22 is universal, and therefore "operates in specific languages at no cost to the individual grammar." This rule "operates first among the readjustment rules inserting \$-boundaries in the strings before they enter the phonological component. Then, as the phonological rules alter the strings of segments, the conditions of Rule 22 re-apply to adjust the \$-boundaries."

It is further assumed that all languages make use of a universal rule inserting syllable boundaries at the beginning and end of a word. These boundaries too may later be changed: "It is possible that phonetic rules may adjust these \$-boundaries, just as \$-boundaries inside of words may be adjusted." The process of adjusting these rules, however, is different from that adjusting syllable boundaries inside words, since the latter adjustment is accomplished by the re-application of Rule 22 to derived structures; presumably later rules must actually move or delete syllable boundaries.

Thus Hooper's model embodies two major claims: there is a set of universal syllabication rules, and these rules apply before all phonological rules. They then continue to apply throughout the phonology as the phonological rules alter the makeup of the syllables.

The first claim presents some obvious problems. Syllable structure is quite simply not the same for all languages, as Hooper herself points out; she cites the cluster /sl/, which is a possible word- and therefore syllable-initial sequence in English, but not in Spanish, but which is assigned syllable-initial position by Rule 22. To account for such cases she proposes a list of possible exceptions to Rule 22, also in the metatheory, and allows a language to choose from that list of exception rules those applicable to its own syllable structure.

This produces absurd results in the case of ECA. For example, subrule (b) of Rule 22 will assign the following

syllable structure to abyad 'white':

- 166) a. ECA: a\$byad  
 b. Spanish: a\$lyento

Then an "exception" rule will be needed to derive the correct structure /ab\$yad/. All this cumbersome machinery serves to obscure the very simple fact that ECA never allows more than one  $\overline{[-\text{syllabic}]}$  segment to begin a syllable. The claim that Rule 22 must apply in every language means that the language with the simplest, most general set of syllabification rules has the most complicated representation of those rules.

The claim of universality runs into another problem in the case of assigning syllable boundaries coincident with word boundaries. Many languages, of which English is one, do have clear syllable breaks at word boundaries, and these boundaries result in the phonetic differences among these groups of words:

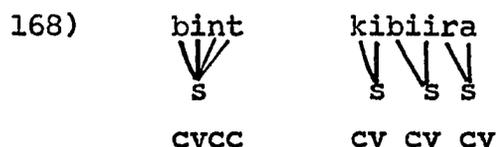
- 167) a. night rate/Nye trait/nitrate  
 b. it's praise/it sprays  
 c. grade A/gray day

However, even in careful speech syllable boundaries are assigned in ECA without regard for word structure. The expedient of assigning syllable boundaries which will all have to be readjusted must therefore be shown to have some advantage besides allowing one to squeeze ECA into the mold of the languages for which Hooper's theory was designed. Otherwise,

the claim that this convention is universal must be abandoned.

There is one fact of ECA, however, which might be construed as support both for the assignment of syllable boundaries at word boundaries, and the claim that these boundaries are assigned before the phonological rules apply. This is the connection between I Epenthesis, High Vowel Deletion, and the syllabication rules, all of which share the property of applying to strings larger than the word. All these rules interact--I Epenthesis feeds HVD, while both I Epenthesis and HVD apply to alter the structures to which the syllabication rules will apply by changing the distribution of consonants and vowels. I Epenthesis, by abolishing three-consonant sequences, permits the very simple formulation of the syllabication rules.

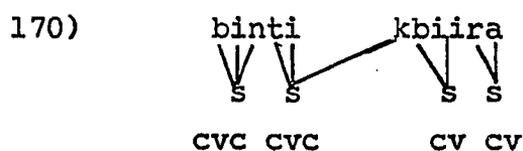
Thus it's no accident that these rules all apply across words. This fact could be made explicit by first assigning syllable structure within words, then by writing the rules of I Epenthesis and HVD in terms of syllable structure. The claim implicit in this method is that I Epenthesis and HVD apply simply in order to create the optimal syllable structure. For example, the sequence /bint kibiira/ ( → binti kbiira 'a big girl') would be assigned the following structure:



After I Epenthesis had applied, the structure would be this:

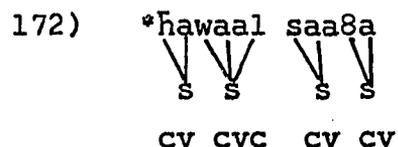
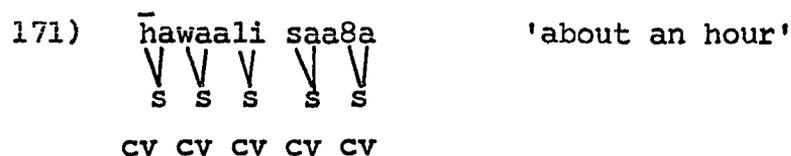


Then HVD would create this structure:



I Epenthesis would be viewed as a rule which applied in order to eliminate CVCC syllables, and HVD as a rule the function of which was to create CVC syllables.

Whether this adds anything to our knowledge of the grammar of ECA, however, is not clear. HVD, of course, is sensitive to more than the syllable structure of the string it is scanning--it only deletes high vowels. If this method allowed us somehow to explain the fact that HVD does not delete word-final vowels, it would have a considerable advantage over the present system, but deletion of a final vowel would also have the effect of creating CVC structures:



So the advantages of this approach are not obvious, although the topic certainly merits further research. At any rate we can make explicit the connection between the rules of

I Epenthesis and HVD and the syllabication rules by formulating some hypotheses about the place and nature of syllabication rules in a grammar:

HYPOTHESIS I: If a language has rules which alter syllable structure (that is, the distribution of consonants and vowels), then the syllabication rules will follow these rules.

HYPOTHESIS II: If a language has rules altering syllable structure, and these rules can scan strings larger than the word, then the syllabication rules of this language will also scan strings larger than the word.

#### 1.11 Summary of Rules.

The rules discussed in this chapter are ordered as follows:

L-Assimilation

?-Insertion

Word Initial Epenthesis

V-Deletion Across Word Boundaries

I Epenthesis

Stress Assignment

Stress Retraction

High Vowel Deletion

Vowel Shortening

Syllabication Rules I-IV

Emphasis Spread

Right Emphasis Spread

Left Emphasis Spread

Late ?-Insertion



While this list is by no means exhaustive, it provides a basis for further discussion of ECA.

## NOTES

## Chapter I

<sup>1</sup>The bases of this assumption are discussed in Chapter III.

<sup>2</sup>The theory doesn't specify an order of expansion for Rule (31), but so long as the longest expansion is taken first, the correct forms will be generated.

<sup>3</sup>One might attempt to explain the exceptional stress on /it/ as a device designed to protect the /i/ of /it/ from being deleted by High Vowel Deletion, since /it/ has this exceptional stress just when it precedes a vowel, i.e. when it would be subject to High Vowel Deletion. Deletion of the /i/ would cause an ambiguity between the first person singular and the third person feminine singular to arise:

	darabitak	→	*darabtak	'she beat you (m)'
cf.	darabitak		darabtak	'I beat you (m)'

But this can't be the explanation of the exceptionality of /it/, since the /i/ of /it/ is not subject to High Vowel Deletion anyway:

	targi <sup>1</sup> mit ilgum <sup>1</sup> la	'she translated the sentence'
vs.	fihm ilgum <sup>1</sup> la	'he understood the sentence'
	(from fihim ilgumla)	

The explanation of the origin of the exceptional stress on /it/ is given in Chapter II.

<sup>4</sup>Many of the ideas in this section arose from discussion of the problem with Alan Prince, to whom I'm greatly indebted.

<sup>5</sup>A different one-rule solution of the stress problem has been suggested by Neil Smith (class lecture, University College). Smith suggests the following rule:

$$V \rightarrow [+stress] / X\_C \begin{bmatrix} V \\ -tns \end{bmatrix}^1_0 \quad (C( \begin{bmatrix} V \\ -tns \end{bmatrix} (C)))$$

which abbreviates the rules

V — +stress / \_CVCVC  
 \_CVCV  
 \_CVC  
 \_CV  
 \_CCVC  
 \_CCV  
 \_CC  
 \_C

This rule fails to account for monosyllables ending in a vowel: lee 'why', ahoo 'voila', ma (a particle), etc. The rule also provides no natural way to explaining the exception facts.

<sup>6</sup>The glottal stop of ?uddamkum derives from CA [ʔ] (quddaam) and is underlying.

<sup>7</sup>With the possible exception of the pharyngeals: see Harrell, 1957.

<sup>8</sup>There are three possible exceptions to this. One is the word for water, transcribed mayya by Lehn and Abboud, but transcribed without emphasis by Abdel-Massih. The others are hamma 'boil' vs. hamma 'he bathed' and 8um? 'depth' vs. 8un? 'neck'.

<sup>9</sup>Aboul-Fetouh, page 4.

<sup>10</sup>Lehn, page 39.

<sup>11</sup>See Lehn and Abboud, Harrell, 1957, Abdel-Massih, and Mitchell.

<sup>12</sup>Lehn and Abboud, pp. 5, 270.

<sup>13</sup>Abdel-Massih, page 21.

C H A P T E R   I I  
LONG VOWELS AND CLITICIZATION

This chapter is concerned with cliticization phenomena in ECA. Certain phonological processes are shown to be sensitive to the presence of clitics, and the methods of best describing cliticization are discussed.

2.1 First Vowel Deletion.

2.1.1 Inflection of the Verb.

In Chapter I the assumption was made that the third plural masculine form of the verb in the perfect tense is the same as the verb stem. The perfect tense paradigm of katab 'to write' makes clear the various inflectional suffixes of the perfect tense:

1) Personal Pronoun	Verb	Infl. Suff.	Gloss
A. huwwa	kātab	-∅	he wrote
hiyya	kātabit	-it	she wrote
humma	kātabu	-u	they wrote
B. ana	katabt	-t	I wrote
iḥna	katabna	-na	we wrote
inta	katabt	-t	you (m) wrote
inti	katabti	-ti	you (f) wrote
intu	katabtu	-tu	you (p) wrote

Certain generalizations about the inflectional affixes are clear from these data:

- 1) /t/ is present in all the 2nd person forms

2) an /i/ after the 2nd person /t/ indicates that the form is feminine

3) a /u/ indicates plurality in both 2nd and 3rd person forms

Among the inventory of verb stem shapes in Egyptian Colloquial Arabic are many which are vowel-final. One such verb is /bana/ 'to build':

2)	Verb	Infl. Suff.	Gloss.
A.	bāna	-∅	he built
	bānit	-it	she built
	bānu	-u	they built
B.	banēet	-t	I built
	banēena	-na	we built
	banēet	-t	you (m) built
	banēeti	-ti	you (f) built
	banēetu	-tu	you (pl) built

The appearance of /ee/ in the forms of (2b) will be discussed in Chapter III. At present, we'll focus our attention on the forms of (2a). As (1) makes clear, the inflectional endings of these forms are vowel-initial. Thus the final /a/ of /bana/ disappears before a vowel, justifying the postulation of a rule of vowel deletion:

3) First Vowel Deletion (FVD):

$$V \rightarrow \emptyset / \_ + V$$

Further evidence for FVD is provided by the imperfective forms of certain verbs. The imperfective tense is formed by

addition to an imperfective stem of a prefix and in some persons a suffix as well.

4) A.	yiktib	yi-		he writes
	tiktib	ti-		she writes
	yiktibu	yi-	-u	they write
B.	aktib	a-		I write
	niktib	ni-		we write
	tiktib	ti-		you (m) write
	tiktibi	ti-	-i	you (f) write
	tiktibu	ti-	-u	you (p) write

For certain affixes, the relationship between the perfect and imperfect is transparent:

- 1) /-na/ of the perfect corresponds to /ni-/ of the imperfect
- 2) where /-t/ was suffixed to 2nd person forms in the perfect, /ti-/ is prefixed to all 2nd person forms in the imperfect
- 3) as in the perfect, a suffixed /-u/ indicates plurality; an /-i/ indicates the feminine of the 2nd person.

Since there are then two vocalic suffixes in the imperfect paradigm, we'd expect FVD to affect any verb with a vowel-final imperfective stem. The imperfective stem corresponding to /bana/ is /bni/:

5) A.	yibni	yi-	he builds
	tibni	ti-	she builds
	yibnu	yi- -u	they build
B.	abni	a-	I build
	nibni	ni-	we build
	tibni	ti-	you (m) build
	tibni	ti- -i	you (f) build
	tibnu	ti- -u	you (pl) build

The forms yibnu 'they build' and tibnu 'you (pl) build' not only demonstrate the effects of FVD, but also establish the ordering of FVD and the stress rules. The underlying form of yibnu must, if we are to assume a uniform system of inflectional affixes, be:

6) yi + bni + u

SA would assign stress to the penultimate syllable of form (6), that is, to the vowel which does not appear on the surface. If FVD applies before SA, however, stress will fall, correctly, on the vowel of the prefix:

7) yi + bni + u

FVD: yi + bni + u

SA: yí bn u

Thus FVD must precede SA; its ordering relative to I Ep is at this point undetermined.

### 2.1.2 Further Evidence for FVD.

There are two areas of the grammar in which the effects of FVD are apparent: in the formation of adjectives, and in

the construct state of the noun.

### 2.1.2.1 The Formation of Adjectives.

Adjectives may be derived from nouns in ECA by the addition of /-i/:

8)	maṣr	'Egypt'	maṣri	'Egyptian'
	tariix	'history'	tariixi	'historical'
	maḥall	'place'	maḥalli	'local'
	ḥarb	'war'	ḥarbi	'military'

When the noun ends in /a/, as most feminine nouns do, the /a/ drops before the /i/:

9)	ziraaṣa	'agriculture'	ziraaṣi	'agricultural'
	siyaasa	'politics'	siyaasi	'political'
	ḥukuuma	'government'	ḥukuumi	'governmental'

FVD allows us to explain these facts.

### 2.1.2.2 Construct Nouns.

The so-called construct phrase in Semitic languages is the construction used to express the relationship of possession between two nouns. Some examples are

10)	mudarris Fariid	'Fariid's teacher'
	mudarris ilbint	'the girl's teacher'

The properties of the construct phrase will be discussed in greater detail in section 2.2.1.2; the aspect of these constructions which interests us at present is the so-called construct state of certain nouns. All feminine nouns ending in /a/ display certain mutations when they occur as the first member of a construct phrase; the form they take in this

position is called the construct state of the noun. The construct state of mudarrisa 'teacher (f)' is illustrated below:

- 11) mudarris<sup>1</sup>it Fariid<sup>1</sup>            'Fariid's teacher'  
       mudarris<sup>1</sup>t ilbint<sup>1</sup>            'the girl's teacher'

The construct state is generally described by saying that the /a/ of the feminine noun becomes /t/ or /it/. But once we've added FVD to the inventory of rules, we can explain the shape of the construct state by postulating an augment /it/. The derivation of the forms of (11) would then proceed as follows:

- 12) mudarrisa+it##Fariid            mudarrisa+it##ilbint  
 FVD: mudarris it Fariid            mudarris it ilbint  
 SA: mudarris<sup>1</sup> it Fariid<sup>1</sup>            mudarris<sup>1</sup> it ilbint<sup>1</sup>  
 SR:                    n/a                                    n/a  
 HVD:                    n/a                                    mudarris<sup>1</sup>t ilbint  
 Surface: mudarris<sup>1</sup>it Fariid<sup>1</sup>            mudarris<sup>1</sup>t ilbint<sup>1</sup>  
           'Fariid's teacher'            'the girl's teacher'

### 2.1.3 Vowel Lengthening.

Evidence has been presented that FVD is motivated in several areas of the grammar, among which is the inflection of vowel-final verbs. We now turn our attention to another aspect of the verbal system, the expression of pronominal direct objects. Although pronominal subjects may be expressed either by the use of the pronoun form (huwwa katab, 'he wrote') or simply by the verb (katab 'he wrote'), a direct object

pronoun is never expressed by use of the full pronoun (\*darab huwwa, 'he beat him'). Instead there exists a set of particles more or less closely related to the subject pronouns, which are attached to the verb:

13)	darab	he beat	
	darabni	he beat me	-ni
	darabak	he beat you(m)	-ak
	darabik	he beat you(f)	-ik
	darabu	he beat him	-u
	darabha	he beat her	-ha
	darabna	he beat us	-na
	darabkum	he beat you(p)	-kum
	darabhum	he beat them	-hum

It's clear from the forms of (13) that the stress rules treat the verb plus object as a single unit. Now let's compare the forms of the vowel-final verb plus object:

14)	la?a	he found	vs.	la?it	she found
	la?aani	he found me		la?itni	she found me
	la?aak	he found you(m)		la?itak	she found you(m)
	la?aaki	he found you(f)		la?itik	she found you(f)
	la?aa	he found him		la?itu	she found him
	la?aaha	he found her		la?itha	she found her
	la?aana	he found us		la?itna	she found us
	la?aakum	he found you(p)		la?itkum	she found you(p)
	la?aahum	he found them		la?ithum	she found them

The forms of (13) indicate that several of the pronoun object particles are vowel-initial: /ak/, 'you (m)', /ik/, 'you (f)', /u/ 'him, it (m)'. We'd expect, then, when these forms were combined with la?a, to find:

- 15) \*la?ak        'he found you (m)'  
       \*la?ik        'he found you (f)'  
       \*la?u        'he found him'

by FVD. Instead we find the final /a/ of la?a becoming long; the first vowel of the pronoun disappears. (The appearance of the 2nd person singular feminine as /ki/ will be discussed in section 2.7.) We see the same phenomenon in verbs ending in /i/:

- 16) nisi            he forgot  
       nisiik          he forgot you (m)  
       nisiiki        he forgot you (f)  
       nisi            he forgot him  
       nisiiha        he forgot her  
       nisiina        he forgot us  
       nisiikum      he forgot you (p)  
       nisiikum      he forgot them

as well as in the imperfective forms:

- 17) a. yil?a        'he finds'  
       yil?aaha      'he finds her'  
       b. yibni        'he builds'  
       yibnii        'he builds it'

Thus in a sequence of two vowels, the first vowel deletes

before an inflectional affix, while the second vowel deletes where it is in a pronominal object. This is true even where the inflectional affix and the pronominal object are phonologically identical:

- 18) a.     $\begin{matrix} \text{d} \\ \cdot \\ \text{a} \end{matrix}$ rabu       'they beat'  
            $\begin{matrix} \text{d} \\ \cdot \\ \text{a} \end{matrix}$ rabu       'he beat him'  
       b.    la?u           'they found'  
           la?aa          'he found him'

We might attempt to describe the facts of (18) by hypothesizing that the underlying forms of the pronoun objects have some characteristic which will explain the behavior of the verb stem in their presence--thus we'd claim that the forms of (18a) and (18b) are actually not identical on a deeper level. Or we might assume that the relationship between the verb stem and the inflectional endings is different than the relationship between the verb and the pronoun objects, and that the rule of FVD and the process which explains the lengthening of vowels before pronoun objects is sensitive to this difference. Examination of the facts will make it clear that the second explanation is the correct one.

To determine how best to describe the relationship between a verb and a pronominal object, we might now ask whether the alternation between long and short vowels exemplified by the forms la?a ~ la?aa occurs in any other areas of the grammar. The next sections point out some additional instances of what for convenience's sake I'll call Vowel Lengthening, although

I don't at this point wish to commit myself to the position that it's the short vowel which is underlying.

## 2.2 Other Instances of Vowel Lengthening.

### 2.2.1 Before Pronouns.

#### 2.2.1.1 On Prepositions.

When a pronoun is the object of a preposition, as of a verb, the pronoun never appears as a separate word, but rather as a particle attached to the preposition. Thus:

- 19) a. ilkitaab taḥt ilmaktab.  
'The book (is) under the desk.'
- b. ilkitaab taḥtu.  
'The book (is) under it.'
- c. ilkitaab ʔuddaam ilmaktaba.  
'The book (is) in front of the library.'
- d. ilkitaab ʔuddamha.  
'The book (is) in front of it.'

Notice what happens when the preposition is vowel-final:

- 20) a. Fariid ma8a lmudarris.  
'Fariid (is) with the teacher.'
- b. Fariid ma8aa.  
'Fariid (is) with him.'
- c. Fariid ma8a lmudarrisa.  
'Fariid (is) with the teacher (f).'
- d. Fariid ma8aaha.  
'Fariid (is) with her.'

Thus Vowel Lengthening occurs in prepositions as well as in verbs.

#### 2.2.1.2 On Nouns.

ECA has no possessive pronouns; instead the pronominal particles used as direct object of a verb are attached to the possessed noun. Thus we find

- |     |    |             |                |
|-----|----|-------------|----------------|
| 21) | a. | beet Hala   | 'Hala's house' |
|     |    | bitha       | 'her house'    |
|     | b. | hissit Hala | 'Hala's class' |
|     |    | hissitha    | 'her class'    |

Nouns ending in a vowel lengthen that vowel before a pronoun ending:

- |     |    |            |                   |
|-----|----|------------|-------------------|
| 22) | a. | kursi Hala | 'Hala's chair'    |
|     |    | kursiha    | 'her chair'       |
|     | b. | mabna Hala | 'Hala's building' |
|     |    | mabnaaha   | 'her building'    |

It's clear then that a vowel before a pronoun particle is always long, whether the vowel is the final segment of a verb, a preposition, or a noun.

#### 2.2.2 Before /l/.

The reader may recall the form katabtilu 'I wrote to him'. In this form the preposition /l/ and the pronominal object have been attached to the verb and the entire unit treated as a single word by the stress rules. When the /l/-phrase is attached to a verb ending in a vowel, we find that the final vowel lengthens:

- 23) a. bāna bēet lirrāagil.  
'He built a house for the man.'
- b. bānaalu bēet.  
'He built him a house.'

The same phenomenon occurs when the final vowel is part of the inflectional ending:

- 24) a. katabt  
'you (m) wrote'
- b. katabtilu  
'you (m) wrote to him'
- c. katabti  
'you (f) wrote'
- d. katabtiilu  
'you (f) wrote to him'

Thus while the underlying vowel of katabti is lengthened, the epenthetic vowel is not long before /lu/.

A verb can take both a direct object pronoun and an indirect object pronoun:

- 25) katabhumlak.  
'He wrote them to you.'

In such forms Vowel Lengthening also occurs:

- 26) a. gablak sāa8a.  
'He gave to you a watch.'
- b. gabhaalak.  
'He gave it to you.'

2.2.3 Before /-s/.2.2.3.1 On Verbs.

The formation of the negative was mentioned in Chapter I to illustrate the effects of I Epenthesis. The forms given in Chapter I are reproduced here:

- 27) a. katab  
'he wrote'  
b. makatabs  
'he didn't write'  
c. katabt  
'I wrote'  
d. makatabtis  
'I didn't write'

We find that when /ma..s/ is added to a vowel-final verb, the vowel, be it of the stem or of the ending, lengthens:

- 28) a. bana  
'he built'  
b. mabanaas  
'he didn't build'  
c. katabti  
'you (f.s.) wrote'  
d. makatabtiis  
'you (f.s.) didn't write'

Comparison of (27d) and (28d) shows that, as in the case of Vowel Lengthening before /l/, only an underlying vowel is affected.

/Ma...s/ may also be affixed to verbs with attached pronoun clitics:

- 29) a. maḍarabnaas'  
       'he didn't beat us'  
       b. mabanuhalnaas'  
       'they didn't build it for us'

In the case of (29b), where the structure is

- 30) neg    verb    infl. suf.    d.o.    prep.    i.o.    neg  
       ma    ban            u            ha    l        na    s'  
                           ↑                    ↑                    ↑

we might expect to find lengthening of all the vowels marked by an arrow, since we've seen in the preceding sections that these vowels will undergo lengthening when followed by those items which actually do follow them in (29b). However, it may be recalled that the rule of Vowel Shortening, by shortening all unstressed vowels, ensures that each word reaches the surface with only one long vowel. If the structure of mabanuhalnaas' is actually

- 31) ma banuu haa lnaa s'

then SA will accent the final (strong) syllable, and Vowel Shortening will subsequently shorten all the unstressed vowels.

/Ma...s/ can be attached to other grammatical categories as well as to verbs. The same phenomenon of lengthening appears in these cases.

#### 2.2.3.2 On Prepositions.

/Ma...s/ alternates with another form mis' or mus' (either form is acceptable). The rules for determining the choice

between /ma...s̄/ and /mis̄/ are somewhat complicated and will be discussed in section 2.3.2; one case in which /ma...s̄/ is used, however, is on prepositions in certain constructions which have attached to them pronouns:

- 32) a. 8andi ktaab.  
           on, with me - a book  
           'I have a book.'
- b. ma8andiis̄ kitaab.  
           'I don't have a book.'

Once again, the long vowel shows up before /s̄/.

#### 2.2.3.3 On Subject Pronouns.

ECA has no present tense of the verb to be; so-called 'equational sentences' consist simply of subject followed by predicate nominal or predicate adjective:

- 33) Fariid gu8aan.  
           'Fariid is hungry.'
- huwwa duktoor.  
           'He is a doctor.'

Such sentences are negated by inserting mis̄ between subject and predicate:

- 34) Fariid mis̄ gu8aan.  
           'Fariid isn't hungry.'

When the subject of an equational sentence is a pronoun, the negative may be expressed in either of two ways:

- 35) a. huwwa mis̄ gu8aan.  
           'He is not hungry.'

b. mahuwwaas' gu8aan.

'He isn't hungry.'

Vowel Lengthening appears again, this time in a subject pronoun.

#### 2.2.4 Before Demonstratives.

One final area in which we find Vowel Lengthening is before the demonstrative particle. The demonstrative da (m), di (f), or dool (p) is used only with nouns which are preceded by the definite article il; the demonstrative itself follows the noun.

- 36) a. sana 'year'  
       issana 'the year'  
       issana di 'this year'
- b. raagil 'man'  
       irraagil 'the man'  
       irraagil da 'this man'
- c. haala 'case'  
       ilhaala 'the case'  
       ilhaala di 'this case'

The demonstrative forms in (36) may also be heard as the following:

- 37) a. issanaadi 'this year'  
       b. irragilda 'this man'  
       c. ilhalaadi 'this case'

Here the entire unit article-noun-demonstrative is treated as a single word. The internal changes are then explicable in terms of the rule of Vowel Shortening:

38)	irraagilda	il̄haalaadi
SA:	irraagilda	il̄haalaadi
SR:	n/a	n/a
VSh:	irragilda	ilhalaadi

#### 2.2.5 Summary.

Vowel Lengthening has been found in the following areas:

1. before pronoun objects
2. before /l/
3. before negative /...s'/
4. before the demonstrative

In each case in which Vowel Lengthening occurs, the element containing the long vowel and the element following it constitute a single word in terms of stress. Yet the last vowel of la?a, for example, has a different representation on the surface depending on whether it is word-final, pre-inflectional, or pre-pronominal object:

39)	a.	darab	'he beat'
		la?a	'he found'
	b.	darabu	'they beat'
		la?u	'they found'
	c.	darabu	'he beat him'
		la?aa	'he found him'
	d.	darabna	'we beat'
		la?eena	'we found'
	e.	darabna	'he beat us'
		la?aana	'he found us'

It's clear that each of the elements before which we find Vowel Lengthening is a clitic. Each one either can be found as an independent word (the demonstrative and the preposition /l/) or is in complementary distribution with some independent word (/ma...s' and the pronouns). Thus there is a distinction between the relationship between a clitic and the element to which it's cliticized, and the relationship between words and their inflectional and derivational affixes. The rules of the phonology are sensitive to this distinction, as well as to the distinction between a vowel which ends a word and a vowel which precedes a clitic; the three-fold distinction must be encoded into these structures in a form to which the phonological rules can refer.

### 2.3 The Cliticization Rules.

In order to determine the form of the rule of Vowel Lengthening, it is necessary to examine the rules encliticizing those elements before which Lengthening occurs and the structures created by these rules. In the following sections I'll use the word proclitic to refer to an element which is attached to a word on the left of the word, and enclitic to refer to an element attached on the right of a word.

#### 2.3.1 Pronoun Encliticization.

Pronoun clitics appear in five environments, each of which can contain a noun, but never a full pronoun:

1. on verbs: a. (huwwa) darab Kamaal.  
'He beat Kamaal.'

b. \*(huwwa) darab huwwa.

'He beat him.'

c. (huwwa) darabu.

'He beat him.'

2. on prepositions:

a. ilkitaab taḥt ilmaktab.

'The book is under the desk.'

b. \*ilkitaab taḥti huwwa.

'The book is under it.'

c. ilkitaab taḥtu.

'The book is under it.'

3. on nouns: a. beet Kamaal 'Kamaal's house'

b. \*beet huwwa 'his house'

c. beetu 'his house'

4. on 'modals':

a. ilustaaz Saawiz Kamaal yiigi.

'The professor wants Kamaal to come.'

b. \*ilustaaz Saawiz huwwa yiigi.

'The professor wants him to come.'

c. ilustaaz Sawzu yiigi.

'The professor wants him to come.'

5. on complementizers:

a. ?aalit inni Kamaal Sayyaan.

'She said that Kamaal is sick.'

b. \*?aalit inni huwwa Sayyaan.

'She said that he is sick.'

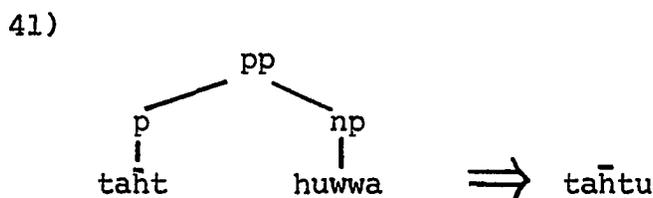
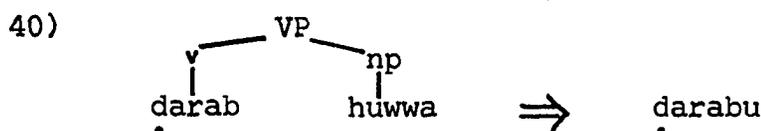
c. ?aalit innu 8ayyaan.

'She said that he is sick.'

These facts can be captured by allowing a full pronoun to be generated freely under the node NP and including among the transformations one or more rules cliticizing a pronoun to an element on its left. The following sections detail the structures to which these rules apply.

#### 2.3.1.1 On Verbs and Prepositions.

A pronoun which is the object of a verb or preposition is always a clitic on that verb or preposition:



#### 2.3.1.2 On Nouns: The Construct Phrase

The facts of (3) suggest that the deep structure of such constructions as beetu 'his house' is the same as that of construct phrases such as beet Kamaal 'Kamaal's house.' Additional evidence is abundant.

1. Feminine nouns ending in /a/ appear in the construct state in only two environments: in construct phrases and before pronoun clitics:<sup>1</sup>

- 42) a. ahee<sup>1</sup> saa8a.                    'Here's a watch.'
- b. ahee<sup>1</sup> saa8it Samiira.       'Here's Samiira's watch.'

c. ah̄ee sa8ītha. 'Here's her watch.'

2. Two masculine nouns have alternate forms which are used only in these two constructions:

43) a. h̄uwwa abb/ax̄x. 'He is a father/brother.'

b. h̄uwwa abu/ax̄u Samiira. 'He is Samiira's father/brother.'

c. h̄uwwa abuuha/axuuha. 'He is her father/brother.'

3. Neither the first noun in a construct phrase nor a noun with a pronoun clitic may take the definite article:

44) a. \*il̄humaar̄ Kamaal̄ 'Kamaal's donkey'

b. \*il̄humaarū 'his donkey'

Similarly, logically definite elements such as proper names may not appear as either the first element of a construct phrase or with a pronoun clitic:

45) a. \*Kamaal̄ ilmadiinā 'Kamaal of the city'

b. \*Kamaalhā 'our Kamaal'

4. Though a noun with pronoun clitic does not take a definite article, it nonetheless shares the syntactic characteristics of a definite noun:

a) any adjective modifying noun-plus-pronoun takes the definite article:

46) a. h̄umaar̄ gidiid̄ 'a new donkey'

b. il̄humaar̄ ilgidiid̄ 'the new donkey'

c. h̄umarnā lgidiid̄ 'our new donkey'

b) a relative clause on noun-plus-pronoun takes the complementizer illi, used only with definite nouns:

- 47) a. huwwa ṛaagil yistaḥa?? ittar?iya.  
'He is a man who deserves promotion.'
- b. huwwa ṛraagil illi yistaḥa?? ittar?iya.  
'He is the man who deserves promotion.'
- c. huwwa ṛagilna { # } ti8rafu...  
'He is our man whom you know...'

These facts follow from the assumption that these constructions are actually construct phrases, since the definiteness of a construct phrase is determined by the definiteness of its final noun, and personal pronouns, like proper names, are always definite. Thus, facts (a) and (b) are true of construct phrases with final element definite.

- 48) a. ḥumaar irraagil ilgidiid  
'the man's new donkey'
- b. 'sah Iran ilḥani  
'the wealthy Shah of Iran'
- 49) a. ḥumaar irraagil illi tirkabu...  
'The man's donkey which you rode...'
- b. 'sah Iran illi malak...  
'the Shah of Iran who owned...'

The structure of a noun-plus-pronoun-clitic is then at the deepest level that of a construct phrase. While detailed analysis of these constructions is beyond the scope of this work, I'll assume the following structure at some point in the derivation of the construct phrase:



preposition, or noun.<sup>3</sup>

### 2.3.1.3 On 'Modals'.

The following illustrate the forms classed as 'modals' or 'auxiliary verbs':

- 53) a. Nifsu ysaafir.  
'He longs to travel.'
- b. 8umru saafir li maṣr?  
'Has he ever traveled to Egypt?'
- c. ?azdu ysaafir.  
'He intends to travel.'
- 54) a. 8aleeha tzaakir.  
'She ought to study.'
- 55) a. il?ustaaz 8awzu yiigi.  
'The professor wants him to come.'
- b. Yareetu ?ara ddars.  
'I wish he had read the lesson.'

Each of these forms fits into the category verb, preposition, or noun, and thus is handled by the rule which handles the cases discussed above.

1. Nifs occurs as a noun with the meaning 'self' or 'soul'; 8umr as 'age'; ?azd is derived from the verb ?asad 'he intends,' by the common de-verbal noun pattern CVCC. Thus literal translations of (53) are possible:

- 56) a. 'His soul is to travel.'
- b. 'In his age (that is, in the length of his life) has he traveled to Egypt?'

c. 'His intention is to travel.'

2. The form 8ala ~ 8alee - before clitics is, of course, a common preposition having the meaning 'on'; in the case of sentence (54) it's used in the sense of 'incumbent on.'

3. 8aawiz is derived from the verb 8aaz 'to need', and its shape is that of all participles;<sup>4</sup> the basic structure of (55a) is therefore:

57)  $\left[ \begin{array}{c} \text{il} \\ \text{ustaa}z \\ \text{8aawiz} \end{array} \right]_s \left[ \begin{array}{c} \text{huwwa} \\ \text{yiigi} \end{array} \right]_s \left[ \right]_s$   
 $\left[ \text{the prof. is wanting} \left[ \text{he comes} \right]_s \right]_s$

Yareet seems also to be the verb of a higher sentence; its use is confined to the first person. The pronoun clitic is optional: yareetu ~ yareet ?ara ddars 'I wish he had read the lesson.' This is consistent with the fact that subject pronouns, from which the pronoun clitic is presumably derived, are normally optional.

#### 2.3.1.4 On Complementizers.

58) a. ?aalit innu 8ayyaan.

'She said that he (is) sick.'

b. raaḥit 8asaanu 'safha.

'She left because he saw her.'

c. kul madaamak gu8aan.

'Eat, since you (are) hungry.'

The elements inn 'that', 8asaan 'because', and madaam 'since' are alike in taking pronoun clitics which represent the subject of the lower sentence. At first glance this,

coupled with the facts outlined above, suggests that a pronoun simply encliticizes to any element; however, other subordinators can be followed by full pronouns:

59) a. raahit lahsan huwwa ysufha.

'She left lest he see her.'

b. zakirt wi huwwa naam.

'I studied and/while he slept.'

Were it not for the sentences of (59), it would appear that a full pronoun can't follow any element on the surface; that is, that cliticization operates without regard for either structure or grammatical category of the preceding element. However, it's clear that the rule distinguishes between certain subordinating elements.

Disregarding the case of complementizers, which I won't attempt to account for, the preceding sections demonstrate that a pronoun is cliticized onto a preceding verb, preposition, or noun. On the basis of the evidence presented so far, the structural description of the cliticization rule can be simply

60)

$$\dots \left. \begin{array}{c} V \\ P \\ N \end{array} \right\} \text{Pro} \dots$$

However, even this rule must be sensitive to the structure in which the pronoun occurs. In certain embedded clauses, the order of the elements is verb-subject rather than subject-verb:



demonstrated by the absence of Vowel Lengthening in (65a) and by the differing stress patterns of (65a) and (b).

Sentence (65b) may be generated in one of two ways:

1. By attaching /l/ to the verb, then allowing PRO-ENC to attach the pronoun to the verb, which now contains /l/:

66)  $\left[ \begin{array}{c} \text{katabu} \\ \text{v} \end{array} \right]$      $\left[ \begin{array}{c} \text{l} \\ \text{p} \end{array} \right]$      $\left[ \begin{array}{c} \text{huwwa} \\ \text{n} \end{array} \right]$

$\Rightarrow$  L-ENC:  $\left[ \begin{array}{c} \text{katabu\#l} \\ \text{v} \end{array} \right]$      $\left[ \begin{array}{c} \text{huwwa} \\ \text{n} \end{array} \right]$

$\Rightarrow$  PRO-ENC:  $\left[ \begin{array}{c} \text{katabuulu} \\ \text{v} \end{array} \right]$

2. By attaching the pronoun to /l/ by the sub-part of PRO-ENC which applies to prepositions, then attaching the unit l#PRO to the verb:

67)  $\left[ \begin{array}{c} \text{katabu} \\ \text{v} \end{array} \right]$      $\left[ \begin{array}{c} \text{l} \\ \text{p} \end{array} \right]$      $\left[ \begin{array}{c} \text{huwwa} \\ \text{n} \end{array} \right]$

$\Rightarrow$  PRO-ENC  $\left[ \begin{array}{c} \text{katabu} \\ \text{v} \end{array} \right]$   $\left[ \begin{array}{c} \text{l\#u} \\ \text{p} \end{array} \right]$

$\Rightarrow$  L-ENC:  $\left[ \begin{array}{c} \text{katabuulu} \\ \text{v} \end{array} \right]$

The second alternative is shown to be the correct one by some additional facts:

68) a.  $\text{istara}$      $\text{saa8a}$      $\text{gdiida}$      $\text{lsaḥbu}$ .  
           he bought watch (f) new            for friend (m)-him

'He bought a new watch for his friend.'

b.  $\text{istara}$      $\text{lsaḥbu}$              $\text{saa8a}$      $\text{gdiida}$ .

he bought for friend-him watch new

'He bought for his friend a new watch.'

69) a.  $\text{istarahaalu}$ .

'He bought it (f) for him.'

b. \*i<sup>1</sup>staraluha.

'He bought for him it.'

While (68b) is not very commonly used, it is acceptable. Sentence (69b), however, is indisputably bad. This suggests that the order of the elements underlying these sentences is verb-direct object-preposition-indirect object, and that the rule which optionally derives (68b) from (68a) is blocked from applying to (69a).

Sentence (68b) can be generated by a rule similar to the English rule of Dative Movement. The Arabic rule moves the entire prepositional phrase containing the indirect object next to the verb:

70) DATIVE MOVEMENT (DM):

V	NP	PP	
1	2	3	⇒
1	3	2	

This rule is optional when both the direct and the indirect objects are full nouns, but obligatory if the indirect object is a pronoun:

71) a. \*i<sup>1</sup>stara saa8a gdiida lu.

'He bought a new watch for him.'

b. i<sup>1</sup>stara<sup>1</sup>alu saa<sup>1</sup>8a gdi<sup>1</sup>ida.

'He bought for him a new watch.'

Dative Movement must not apply, however, when the direct object is a pronoun:

72) a. \*i<sup>1</sup>stara lsa<sup>1</sup>ḥbu ha.

'He bought for his friend it.'

b. i'staraaha lsah̄bu.

'He bought it for his friend.'

This restriction may be captured by ordering DM after PRO-ENC. When PRO-ENC has applied, the structural description of DM will no longer be met, since PRO-ENC will make the pronoun clitics part of the verb. L-ENC will then apply only to the unit l#PRO when that unit directly follows the verb:

73)	$\langle \bar{i}'stara \rangle$ v	$\langle \bar{ha} \rangle$ np	$\langle \bar{l}sa\bar{h}bu \rangle$ pp
PRO-ENC:	$\langle \bar{i}'staraaha \rangle$ v		$\langle \bar{l}sa\bar{h}bu \rangle$ pp
DM:		n/a	
L-ENC:		n/a	
74)	$\langle \bar{i}'stara \rangle$ v	$\langle \bar{saa}8a \text{ gdiida} \rangle$ np	$\langle \bar{l} \rangle \langle \bar{u} \rangle$ np pp
PRO-ENC:	$\langle \bar{i}'stara \rangle$ v	$\langle \bar{saa}8a \text{ gdiida} \rangle$ np	$\langle \bar{l}u \rangle$ pp
DM:	$\langle \bar{i}'stara \rangle$ v	$\langle \bar{l}u \rangle$ pp	$\langle \bar{saa}8a \text{ gdiida} \rangle$ np
L-ENC:	$\langle \bar{i}'staraalu \rangle$ v	$\langle \bar{saa}8a \text{ gdiida} \rangle$ np	
75)	$\langle \bar{i}'stara \rangle$	$\langle \bar{ha} \rangle$ np	$\langle \bar{l} \rangle \langle \bar{u} \rangle$ pp
PRO-ENC:	$\langle \bar{i}'staraaha \rangle$ v		$\langle \bar{l}u \rangle$ pp
DM:		n/a	
L-ENC:	$\langle \bar{i}'starahaalu \rangle$ v		

Thus the ordering PRO-ENC, DM, L-ENC explains the fact

that the indirect object may precede the direct object optionally when both are full noun phrases, obligatorily when only the indirect object is a pronoun, but never when the direct object is a pronoun.

### 2.3.2.1 An Argument from Morphology.

Additional evidence for this solution is provided by the clitic morphology. The pronoun clitics are the same on verbs, nouns, and prepositions, with the exception of the first person singular forms:

76)  $\dot{d}$ arab /  $\dot{d}$ arabni /  $\dot{d}$ arabak /  $\dot{d}$ arabha

'he beat/ -me / -you (m) / -her'

77) beet / beeti / beetak / bitha

'house/ my- / your (m)-/ her-'

78) ?uddaam / ?uddaami / ?uddaamak / ?uddamha

'in front of / -me / -you (m) / -her'

The first person is /ni/ on verbs, but /i/ on nouns and prepositions.<sup>6</sup> An early allomorphy rule will produce the proper alternation:

79) First Person Clitic Rule:

$$i \rightarrow ni/ \quad \underset{v}{\lceil} \quad \underset{v}{\lceil} \underset{v}{\lceil} Y \rceil \_ \rceil \underset{v}{\rceil}$$

The assumption that /i/ is underlying makes the rule simpler--the environment is  $v \lceil \_ \rceil v$  rather than

$\left. \begin{matrix} \{N\} \\ \{P\} \end{matrix} \right\} \lceil \_ \rceil \left. \begin{matrix} \{N\} \\ \{P\} \end{matrix} \right\}$ . This rule explains the form of the first

person clitic in such forms as istarahaali 'he bought it for me'. Because of the ordering PRO-ENC, L-ENC, and the

assumption that PRO-ENC attaches the pronoun to /1/, while L-ENC attaches the entire unit 1#PRO to the verb, the structure of this word is  $\text{istara}_{\text{v}} \text{ha}_{\text{v}} \text{li}_{\text{v}}$  rather than  $\text{istara}_{\text{v}} \text{ha}_{\text{v}} \text{l}_{\text{v}} \text{i}_{\text{v}}$ . Thus the First Person Clitic Rule can't apply.

An additional fact which shows that L-ENC must follow PRO-ENC is that L-ENC is sensitive to the structure of the verb; if the verb has a pronoun object clitic attached, L-ENC may apply only if the clitic is third person:

- 80) a.  $\text{?addimhaalu}$ .  
       'He introduced her to him.'  
       b.  $\text{?addimni lu}$ .  
       'He introduced me to him.'

I can see no more insightful way to capture this fact than by placing a condition on the rule of L-ENC:

- 81) L-ENC:     V     1#PRO  
                    $\begin{matrix} 1 & 2 \\ 1\#2 \end{matrix} \Rightarrow$   
                   condition: if there is a direct object,  
                                   it is third person

#### 2.3.2.2 Implications for the Theory.

The solution outlined above is interesting in terms of the general theory of cliticization. In an attempt to constrain the theory, it's been suggested that all cliticization rules follow all other transformations.<sup>7</sup> Yet the claim is made here that the transformation moving a dative prepositional phrase leftward over a noun phrase must be ordered between

two cliticization rules. This ordering explains the fact that encliticization of  $l\#PRO$  directly onto a verb occurs only when there is no direct object or when the direct object is a full noun:

- 82) a.  $i\acute{s}tara\ sa\acute{a}8a\ gdiida\ lsa\bar{h}bu \Rightarrow$   
 $i\acute{s}tara\ lsa\bar{h}bu\ sa\acute{a}8a\ gdiida.$   
 'He bought for his friend a new watch.'
- b.  $i\acute{s}tara\ sa\acute{a}8a\ gdiida\ lu \Rightarrow$   
 $i\acute{s}tara\ lu\ sa\acute{a}8a\ gdiida.$   
 'He bought for him a new watch.'
- c.  $i\acute{s}tara\ ha\ lsa\bar{h}bu \Rightarrow$   
 $*i\acute{s}tara\ lsa\bar{h}bu\ ha.$   
 'He bought for his friend it.'
- d.  $i\acute{s}tara\ ha\ lu \Rightarrow$   
 $*i\acute{s}taraluuha.$   
 'He bought for him it.'

Dative Movement could be ordered before the cliticization rules if one added to it the condition that term 2 may not contain  $\overline{[+PRO]}$ . But this merely encodes into the rule what is handled naturally by ordering Dative Movement after PRO-ENC. Alternatively, one might assume that Dative Movement is irrelevant to the pronouns, and that L-ENC is itself capable of moving the element  $l\#PRO$  across a noun phrase. Thus the rule L-ENC would look like this:

- 83)           V           (NP)            $l\#PRO$   
               1           2           3  $\Rightarrow$   
                $l\#3$          2

Ordered after PRO-ENC, this rule would generate the proper order of elements, but it simply duplicates the function of Dative Movement, which is needed to handle the cases in which both objects are full nouns. Furthermore, this formulation of L-ENC violates a generalization of wider scope. It has been noticed that languages which permit cliticization processes seem to fall into two categories. There are those, like French, which permit the movement of clitics over intervening elements, as in Elle n'aime pas Paul  $\Rightarrow$  Elle ne l'aime pas. Languages of the second sort, however, allow cliticization only onto adjacent elements, as in English I have gone  $\Rightarrow$  I've gone, I did not  $\Rightarrow$  I didn't. All the examples of ECA cliticization rules thus far presented fall into the second category; in each case lexical elements corresponding to clitics are generated next to the element to which the clitics are attached. If L-ENC is able to move a clitic across a noun phrase, ECA must be considered to have rules of both types, and the typology of cliticizing languages is shown to be invalid. Thus it's significant that the extension of the rule of L-ENC to cover movement of l#PRO over a noun phrase fails to capture the generalization that Dative Movement performs this function.

The facts of ECA, therefore, support the separation of cliticizing languages into two types, those which permit only cliticization onto adjacent elements, and those which combine movement and cliticization. The hypothesis that all

cliticization rules follow all transformational rules, however, is not borne out in this case.

### 2.3.3 Negative Cliticization.

#### 2.3.3.1 On Verbs.

84) huwwa mi<sup>1</sup>s 8ayyaan.

'He (is) not tired.'

85) a. magab<sup>1</sup>s ilko<sup>1</sup>osa lSami<sup>1</sup>ira.

'He didn't bring the squash to Samiira.'

b. magabha<sup>1</sup>as li Sami<sup>1</sup>ira.

'He didn't bring it to Samiira.'

c. magabla<sup>1</sup>haas ilko<sup>1</sup>osa.

'He didn't bring her the squash.'

d. magabhal<sup>1</sup>haas.

'He didn't bring it to her.'

The negative is expressed by the particle mi<sup>1</sup>s (~ mu<sup>1</sup>s) in sentences without a verb--the equivalent of copular sentences in English. When a verb is present, the negative is expressed as ma-verb-<sup>1</sup>s. The entire unit ma-verb-<sup>1</sup>s receives a single stress.

A rule of negative cliticization ordered after the rules of PRO-ENC and L-ENC will account for these facts. The rule need only mention the category verb in its structural description; at the time it applies, all the clitics will have been incorporated into the verbs preceding them. One may assume that both /ma/ and /<sup>1</sup>s/ become cliticized onto the verb, or that only /<sup>1</sup>s/ is a clitic--as it must be, to explain

lengthening of the vowel before /s/--and that /ma/ remains as an independent particle in the position originally occupied by /mis/. Since a solution which views /ma/ as the remnant of /mis/ must solve the problem of the stresslessness of /ma/ alongside the stress of /mis/, I'll assume that /ma/ is a clitic on the verb. It should be noted, however, that this represents an extension of the notion of Chomsky-adjunction, which generally attaches an element on either the right or the left, but not both.

86) NEG-CL:

$$\begin{array}{ccc} \dots & \text{mis}' & V & \dots \\ & 1 & 2 & \Rightarrow \\ & \emptyset & \text{ma}\#2\#s' & \end{array}$$

This rule produces the following sort of structure:

87)            ma # katab # s'

The shortcoming of this formulation of the rule of NEG-CL is that it treats as sheer accident the phonological resemblance between /mis'/ and /ma...s'/. I don't see how to capture such a resemblance in this framework.

NEG-CL is blocked for some speakers when one of the tense elements /ḥa/ or /bi/ is present:

88) a. mis' biyiktib ~ mabyiktib'  
           'He is not writing'  
       b. mis' ḥayiktib ~ maḥayiktib'  
           'He will not write'

Both these tense elements are reflexes of full words, /bi/ of

the preposition /bi/, and /ħa/ of the verb /raaħ/ 'he goes', with which it alternates:

89) raaħ yil8abu ~ ħayil8abu

'they are going to (will) play'

Thus these forms are for some speakers attached to the verb as clitics by the following rule:

90) PRE-VERB CL

$$\dots \left\{ \begin{array}{l} bi \\ \hbar a \end{array} \right\}^V \dots$$

$$\begin{array}{cc} 1 & 2 \Rightarrow \\ & 1\#2 \end{array}$$

For those speakers whose grammar does not contain this rule, or for those for whom the rule is optional, the preservation of /bi/ and /ħa/ or /raaħ/ as independent words prevents the application of NEG-CL to verbs which are separated from the negative particle by one of these words.

#### 2.3.3.2 On Prepositions.

The interpretation of certain prepositions depends on the structure of the sentences containing the prepositions:

91) a. ilħimiiir 8and ilfallaħiin.

the donkeys- on, with - the farmers

'The donkeys are with the farmers.'

b. ilfallaħiin 8anduhum ħimiiir.

the farmers - on, with them - donkeys

'The farmers own donkeys.'

- 92) a. ilkitaab da lSamiira.  
The book - that- to Samiira.  
'That book is for Samiira.'
- b. Samiira laha ktaab.  
Samiira - to her - book.  
'Samiira owns (has) a book.'
- 93) a. ilkalbi ma8aaya.  
the dog - with me.  
'The dog is with me.'
- b. (ana) ma8aaya kalb.  
I - with me - dog.  
'I own a dog.'

This difference in meaning is paralleled by a difference in the expression of negation in these sentences:

- 94) a. ilhimiir miṣ 8and ilfallaḥiin.  
'The donkeys are not with the farmers.'
- b. illfallaḥiin ma8anduhumṣi ḥmiir.  
'The farmers don't own donkeys.'
- 95) a. ilkitaab da miṣ li Samiira.  
'That book is not for Samiira.'
- b. Samiira malhaas ktaab.  
'Samiira doesn't own, have a book.'
- 96) a. ilkalbi miṣ ma8aaya.  
'The dog isn't with me.'
- b. (ana) mam8ayiiṣ<sup>9</sup> kalb.  
'I don't own a dog.'

In this section I'll attempt to motivate structures for the sentences of (91-93) which will allow us to explain the applicability of a rule of negative cliticization to the (b) sentences but not to the (a) sentences.

Sentences of the type (91-93b) share certain properties not shared by those of type (a):

1. They are of the form (NP) - prep + pro - NP.
2. The pronoun clitic agrees in number, gender, and person with the first NP, if one is present.
3. Past or future tense is expressed by the appropriate form of the verb kaan 'to be.' In (a) sentences, kaan agrees with the first NP, but in (b) sentences kaan is always third person masculine singular.

97) a. ilħimīir kaanu/ ħaykuunu 8and ilfallaħiin.

'The donkeys were/will be with the farmers.'

b. ilfallaħiin kaan/ħaykuun 8anduhum ħimīir.

'The farmers owned/will own donkeys.'

The structure of the (a) sentences is transparently subject-verb-P-NP. (The absence of the verb in (91-93a) is a result of the fact that the copula is never realized in the present tense.) The (b) sentences are somewhat more problematic. Lehn and Abboud call them 'topical sentences,' and the assumption that the initial NP of the (b) sentences is the result of a rule of topicalization (TOP) which leaves a pronoun copy in the original position of the NP will explain the facts listed above. TOP must precede PRO-ENC, which

attaches the pronoun to the preposition. The non-agreement of kaan in (97b) with the NP preceding it is expected, since the first NP is not the subject of the verb.

However, the (b) sentences can't simply be derived from the (a) sentences by a rule of TOP, since they differ in other important respects: the (b) sentences have no surface subject, and the NP following the prep + pro is always indefinite:

- 98) a. ilfiluus guwwa l8ilba.  
       the money - in - the box  
       'The money is in the box.'
- b. il8ilba guwwaaha fluus.  
       'The box has money in it.'
- c. \*il8ilba guwwaaha lfiluus.  
       'The box has the money in it.'

Furthermore, many sentences exist which have cliticization of the negative onto the preposition but do not lend themselves to analysis as topicalized constructions:

- 99) mi<sup>1</sup>si min hina ma<sup>1</sup>luus nussi saa8a.  
       he left - from here - not to it - half hour  
       'He left here not half an hour ago.'
- 100) ma<sup>1</sup>fi<sup>1</sup>hums<sup>1</sup> hadd<sup>1</sup> yi?dar yi8mil kida.  
       not in them-one-he is able-he does that  
       'There is not one among them who can do that.'

These facts suggest that it is not the fact that TOP has applied which leads to the (b) interpretation of certain

prepositions and the cliticization of the negative, as Lehn and Abboud assume. Rather, some underlying structure meets the structural description of both TOP and Negative Cliticization, and this structure is the one associated with the (b) interpretation of prepositions.

The (b) sentences show many characteristics of English there-sentences: the NP, the existence or location of which is being discussed, must be indefinite, and there is no surface subject with semantic content. Such sentences are called existential sentences by Kuno, who examines these constructions in a number of languages in The Structure of Japanese Language. Kuno claims that in languages with basic word order S-V-O, existential sentences have the structure

LOC	-	V	-	NP	at some pre-surface level.
		exist		indef	

Thus, for example, English contains a rule of Locative Postposing, the effect of which is illustrated by the following:

101) On the table are two books.

102) There are two books on the table.

The rule of LOC POST leaves there as a trace of the original locative. The deep structure of (101), LOC-V-NP, coexists with the deep structure S-V-LOC which underlies

103) The two books are on the table.

The normal word order in ECA is S-V-O; therefore, Kuno's hypothesis predicts that ECA existential sentences derive from the structure LOC-V-NP. The assumption that this order underlies the (b) sentences, while the normal

order S-V-LOC underlies the (a) sentences, allows us to explain the facts of negative cliticization on these sentences.

I've argued above that the negative originates to the left of the verb, where it shows up in such sentences as

104) miš<sup>1</sup> ḥayiktib 'he will not write'

I've also assumed that the rule of NEG-CL attaches the negative particle to a verb on its right. This rule can be seen to operate in both (a) and (b) sentences containing kaan:

- 105) a. ilḥimiir makanuus<sup>1</sup> 8and ilfallaḥiin.  
'The donkeys weren't with the farmers.'  
b. ilfallaḥiin makans<sup>1</sup> 8anduhum ḥimiir.  
'The farmers didn't own donkeys.'

A first attempt at a solution might be to extend NEG-CL to apply not only to a verb, but also to a preposition to the right of the negative; that is, when kaan is not present. However, this would give the wrong results for the (a) sentences:

- 106) a. \*ilḥimiir ma8andis<sup>1</sup> ilfallaḥiin.  
'The donkeys are not with the farmers.'  
b. or \* ilḥimiir ma8anduhums<sup>1</sup>.  
'The donkeys are not with them.'  
c. ilfallaḥiin ma8anduhums<sup>1</sup> ḥimiir.  
'The farmers don't own donkeys.'

If, however, we assume the two deep structures proposed by Kuno

- 107) a. subj-(neg)-(v)-LOC  
 b. LOC-(neg)-(v)-NP

it becomes clear how to distinguish the two environments: cliticization onto prepositions occurs only when the preposition is to the left of the negative. Thus, there is a second rule of negative cliticization:

- 108) Left-Neg-Cl:

$$\begin{array}{ccc} \dots P & \text{Neg} \dots & \\ & 1 & 2 \Rightarrow \\ \text{ma\#l\#s} & & \emptyset \end{array}$$

Independent evidence for a rule of leftward negative movement is provided by the following:

- 109) a. huw<sup>1</sup>wa mi<sup>1</sup>s ta8baan.  
 b. mahuw<sup>1</sup>waas<sup>1</sup> ta8baan.  
 'He is not tired.'

In a sentence consisting of PRO-ADJ, when kaan is not present, mi<sup>1</sup>s may optionally cliticize onto the pronoun.

This suggests that for some speakers, the structural

description of Left-Neg-Cl is  $\left\{ \begin{array}{l} \text{Prep} \\ \text{pro} \end{array} \right\} \text{Neg}$ .

Left Neg-Cl must follow Neg-Cl; thus, in the deep structure of (97b) ilfalla<sup>1</sup>fiin makansi<sup>1</sup> 8anduhum himiir, Neg-Cl will apply to attach mi<sup>1</sup>s to kaan, and the structural description of Left Neg-Cl will no longer be met.

Left Neg-Cl must also follow the rule of TOPIC and the

rule of PRO-ENC, since the negative particle cliticizes onto the preposition plus pronoun clitic. Since Neg-Cl also follows PRO-ENC (madarabhum's 'he didn't beat them'), the following ordering is established:

- 110) TOP  
 PRO-ENC  
 Neg-Cl  
 Left Neg-Cl

This will allow the following derivations:

- 111) 8and ilfallaḥiin mi's kaan ḥimīir =>  
 TOP, PRO-ENC: ilfallaḥiin 8anduhum mi's kaan ḥimīir =>  
 Neg-Cl: ilfallaḥiin 8anduhum makans' ḥimīir'  
 Left Neg-Cl: n/a

- 112) 8and ilfallaḥiin mi's ḥimīir =>  
 TOP, PRO-CL: ilfallaḥiin 8anduhum mi's ḥimīir ==>  
 Left Neg-Cl: ilfallaḥiin ma8anduhums' ḥimīir

Still to be accounted for is the discrepancy between the output of the rules in (111) and the actually occurring sentence

- 113) ilfallaḥiin makansi 8anduhum ḥimīir

This can be handled by a rule of locative postposing exactly parallel to the rule proposed for English by Kuno. LOC POSTPOSING follows L Neg Cl; thus another syntactic transformation is found to follow a cliticizing transformation.

#### 2.3.4 Demonstrative Cliticization.

Demonstrative constructions consist of the noun, preceded by the definite article and followed by the demonstrative particle di (f) da (m), or dool (pl):

- 114) a. ilhāa<sup>l</sup>ala di  
       b. ilhāalaa<sup>l</sup> di  
           'this thing'
- 115) a. irraagil da  
       b. irragil<sup>l</sup> da  
           'this man'

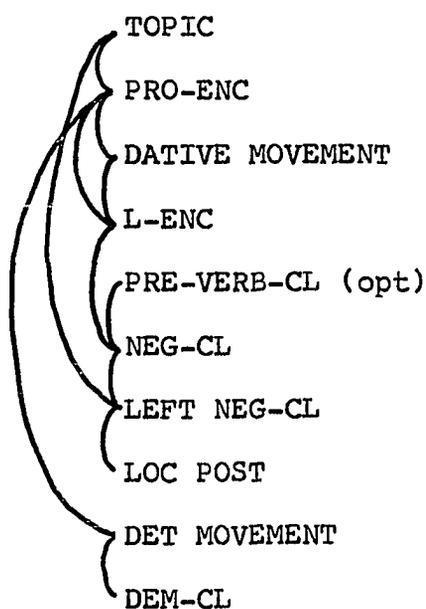
Both (a) and (b) forms occur. In the (a) forms, the demonstrative is treated as a separate word and receives stress; in the (b) forms the entire construction is treated by the stress rules as a single word. These facts can be captured by an optional rule:

- 116) DEM ENC: ...N DEM...  
           1 2 ⇒  
           1#2

This rule must follow the rule which moves the article to the left of the noun.

#### 2.3.5 Summary.

The rules discussed in the preceding sections are:



As this list shows, there is evidence that cliticization rules do not follow all other syntactic transformations; therefore the hypothesis that cliticization takes place in the readjustment component is incorrect.

#### 2.4 Vowel Lengthening: Environment.

In section 2.1.3, a final vowel was seen to behave differently in three different environments:

117) a. in absolute word final position:

katab ilgawaab 'he wrote the letter'

vs. bana lbeet 'he built the house'

b. before an inflectional or derivational suffix:

katabu lgawaab 'the wrote the letter'

vs. banu lbeet 'the built the house'

c. before a clitic

katabu/katabha 'he wrote it, m/f.'

vs. banaa/banaaha 'he built it, m/f.'

It's possible to distinguish these environments, given the theory of cliticization outlined in Selkirk (1974) and the conventions on word boundary assignment outlined in Chomsky and Halle (1968) and Selkirk (1972) and (1974).

Following Selkirk, I've assumed that cliticization rules Chomsky-adjoin a clitic to a word, and that the derived structure consisting of word-plus-clitic is of the same category as the original word. The cliticization rules discussed in the preceding section have as their output a structure corresponding to one of the following:

- 118) a.  $\left[ \begin{array}{c} \_ \\ x \end{array} \right] \left[ \begin{array}{c} \_ \\ x \end{array} \right] \left[ \begin{array}{c} W \\ \_ \\ x \end{array} \right] \# \left[ \begin{array}{c} \_ \\ x \end{array} \right] C \left[ \begin{array}{c} \_ \\ x \end{array} \right]$
- b.  $\left[ \begin{array}{c} \_ \\ x \end{array} \right] C \# \left[ \begin{array}{c} \_ \\ x \end{array} \right] \left[ \begin{array}{c} W \\ \_ \\ x \end{array} \right] \left[ \begin{array}{c} \_ \\ x \end{array} \right]$
- c.  $\left[ \begin{array}{c} \_ \\ x \end{array} \right] C \# \left[ \begin{array}{c} \_ \\ x \end{array} \right] \left[ \begin{array}{c} W \\ \_ \\ x \end{array} \right] \# \left[ \begin{array}{c} \_ \\ x \end{array} \right] C \left[ \begin{array}{c} \_ \\ x \end{array} \right]$

where C = clitic

W = the word to which the clitic is attached

x = the category of W

In each case in which W ends in a vowel, that vowel is long when a clitic follows it in surface structure; the only exceptions to this statement occur when the W-final vowel is in the environment for application of the rule of Vowel Shortening (V Sh).

The conventions governing insertion of word boundaries are, from Selkirk (1974):

119) a. The boundary # is automatically inserted at the beginning and end of every string dominated by a major

category; that is, by one of the lexical categories 'noun', 'verb', 'adjective', or by a category such as 'sentence', 'noun phrase', 'verb phrase', which dominates a lexical category.

b. In a sequence 
$$W \# \left. \right]_x \quad \# \left. \right]_y \quad Z$$

or

$$Z \left[ \right]_y \quad \# \quad \left[ \right]_x \quad \# \quad W$$

where  $y \neq S$

delete the 'inner' word boundary

The net effect of these conventions will be to assign two word boundaries between the verb and noun in (117a):

120) 
$$\left[ \left[ \left[ \text{bana} \right]_v \right]_v \right]_{vp} \quad \left[ \left[ \left[ \text{beet} \right]_n \right]_n \right]_{np} \quad \left[ \right]_{vp}$$

by (119a): 
$$\left[ \# \left[ \# \text{ bana} \# \right] \left[ \# \left[ \# \text{ beet} \# \right] \# \right] \# \right]$$

by (119b): 
$$\left[ \# \left[ \text{bana} \# \right] \left[ \# \left[ \text{beet} \right] \right] \# \right]$$

Thus by employing these conventions, and by making the generally accepted assumption that inflectional affixes are attached by a morpheme boundary, we can distinguish the three environments in which the final vowel of bana is found:

121) a. bana + u                      a → ∅ / - + v  
 b. bana # u                         a → aa/ - #  
 c. bana ##(il) beet                a → a / -##(v)

These facts are consistent with the prediction made by the word boundary conventions that the distinction between # and ## is sufficient to express the boundary-related generalizations of any language; it's predicted that no language will need to make the distinction between, for example, ## and ###.

### 2.5 Vowel Lengthening vs. Vowel Shortening.

The first of the processes in (117) is described by the rule of First Vowel Deletion,  $V \rightarrow \emptyset / \_ + V$ . This rule is distinct from the rule deleting vowels across word boundaries, which applies only between words, and is sensitive to the height of the vowels involved. FVD takes the first of two vowels, regardless of their quality.

The behavior of the final vowel in (117b) and in (117c) may be explained in one of two ways. Either vowels are lengthened before clitics (or before a single word boundary), or long final vowels are shortened before two word boundaries--that is, word-finally--but not before a single word boundary. Since almost any word--noun, pronoun, verb, or preposition--can appear with a clitic element attached, the latter alternative requires that all final vowels be underlyingly long. This solution therefore presupposes a rule of Final Vowel Shortening (FVSh).

That such a rule played a role in the history of ECA is evident when one compares the verbal paradigms of Classical Arabic with those of ECA:

122)

	CA	ECA	
he wrote	kataba	katab	a→∅
she wrote	katabat	katabit	
they wrote	katabuu	katabu	uu→u
I wrote	katabtu	katabt	u→∅
we wrote	katabnaa	katabna	aa→a
you (m) wrote	katabta	katabt	a→∅
you (f) wrote	katabti	katabti	
you (p) wrote	katabtum	katabtu	

A final long vowel in CA corresponds to a final short vowel in ECA, while a final short vowel never appears in ECA, except in the case of the second person feminine singular, where /i/ has been analyzed as the second person feminine morpheme. Addition of this morpheme preserves the distinction between the second person masculine and feminine forms which would be obliterated by an across-the-board application of the vowel deletion rule. The same phenomena are apparent in the imperfect paradigms:

123)

	CA	ECA	
he writes	yaktubu	yiktib	u→∅
she writes	taktubu	tiktib	u→∅
they write	yaktubuuna	yiktibu	uu→u
I write	aktubu	aktib	u→∅
we write	naktubu	niktib	u→∅

you (m) write	taktubu	tiktib	u-→ ∅
you (f) write	taktubiina	tiktibi	ii-→ i
you (p) write	taktubuuna	tiktibu	uu-→ u

Suffixal /na/ has been dropped, and the rule shortening final long vowels and deleting final short ones applied throughout. If it's assumed that CA long vowels consist of two identical vowels, these two processes can be handled by a single rule:

124) CA Final Vowel Rule: V--→ ∅/ \_\_##

This rule seems to have applied in CA to the so-called pausal forms (those occurring in isolation or at the end of a phrase). It would have been a simple matter to generalize the rule in the Egyptian dialect to apply to all forms.<sup>10</sup>

Thus there is evidence that a rule shortening final vowels was a reality at some stage in the development of ECA. The alternations long vowel before clitic/short vowel word-finally may be taken as evidence that some such rule persists in the synchronic grammar; however, these alternations can be explained equally well by a rule lengthening vowels before clitics. Unless one subscribes to the view that in grammar ontogeny recapitulates phylogeny, it's necessary to find additional evidence for a synchronically viable rule of Final Vowel Shortening in ECA.

#### 2.5.1 Verbal Nouns.

One area which provides relevant data is that of deverbal nouns. A certain class of derived verbs, discussed in

connection with the rule of Word Initial Epenthesis, begin in /ista-/.; the corresponding verbal nouns begin in /isti-/:

- 125) a. ista?bil 'to welcome'  
       b. isti?baal 'welcome'
- 126) a. istafhim 'to question'  
       b. istifhaam 'inquiry'
- 127) a. ista?all 'to become independent'  
       b. isti?laal 'independence'

Verbal nouns derived from verbs of either the form /istaCCiG/ or the form /istaCaCC/ are of the same shape: /istiCCaaC/. This suggests that /istiCCaaC/ is the basic pattern for all nouns derived from /ista-/. verbs. Thus one would expect nouns derived from verbs with no third consonant, such as istaḥla 'to consider nice', to have the shape /istiCCaaC/. In fact, however, the pattern of these nouns is /istiCCa/. If these are considered to be derived from the shape /istiCCaaC/ by a rule shortening final vowels, the hypothesis that verbal nouns derived from /ista-/. verbs are all formed on a single pattern can be maintained.

There are two problems with this argument. First, although Lehn and Abboud mention the pattern /istiCCa/ as the one associated with the verbal noun of verbs of the shape /istaCCa/, neither their text nor any other text on ECA cites a single example of such a form, and informants confirm the suspicion that such forms are exceedingly rare.

This fact considerably weakens the utility of these forms as evidence for a rule of FVSh. Secondly, the assumption that they are rule-derived from forms which exactly parallel those of other /isti/-prefixed verbal nouns depends on the assumption that all verbal nouns of this class must share one basic pattern. This assumption is weakened by the existence of another noun shape corresponding to verbs with only two consonants:

- 128) a. ista?aal        'to resign'  
       b. isti?aala     'resignation'

Thus the advisability of positing a single uniform pattern for all these nouns can't be taken for granted. This consideration actually bears on more general questions about the morphological system of ECA, which will be taken up in Chapter III.

#### 2.5.2 High Vowel Deletion.

A second argument for considering all final vowels to be long involves the fact that final vowels are not deleted by the rule of High Vowel Deletion. Since HVD affects only short vowels (see the discussion of HVD, Chapter I), the assumption that final vowels are long at the time HVD applies would seem to supply a ready-made explanation of this fact. Thus FVSh should apply after HVD.

This ordering, however, presents problems for the rule of Stress Assignment formulated in Chapter I:

- 129) SA:  $V \rightarrow \overset{!}{V} / \_ C ( \check{V} ( C ) ) \# \#$

Since SA was seen to precede HVD, to prevent the deletion of stressed vowels, as in libisa → \*libsa, huwwa fihim → \*huwwa fhim, stress must be assigned before final vowels are shortened. Thus, for example, the final vowel of underlying /banaa/ → bana 'he built' should receive stress by SA. Instead stress falls on the penultimate vowel. This case could be handled by removing the feature  $\left[-\text{long}\right]$  on the vowel in parentheses in the rule of Stress Assignment. This would put stress on the first vowel in /banaa/, and the independently motivated rule of Vowel Shortening would shorten the unstressed vowel. However, this formulation of the stress rule would produce the wrong results in such forms as kitaab 'book'. To handle the forms /banaa/ (→ bana), kitaab, and /nisii#u/ (→ nisii 'he forgot him'), we'd need the following rule:

$$130) \quad v \rightarrow \dot{v} / \_ \_ c_0 \quad \left( \left\{ \bar{v} \right\} \right) \#\#$$

This rule is clearly less highly valued than the original rule of SA.

Thus the assumption that all final vowels are underlyingly long does not provide for overall simplification of the grammar; if final vowels are long at the time HVD applies, then SA will have to be complicated to prevent final vowels from receiving stress. This complication is highly unnatural, whereas the statement of HVD proposed in Chapter I, which ensures that the rule does not delete final vowels, is quite simple; the strategic placement of word boundaries in the

rule accounts for the facts. The failure of HVD to delete final vowels becomes quite intelligible when one realizes that such deletion would result in a great number of ambiguities, for example, in the following pairs, the members of which would be rendered identical by the application of HVD:

- |      |        |                |                          |
|------|--------|----------------|--------------------------|
| 131) | a.     | katab gawaab   | 'he wrote a letter'      |
|      | b.     | katabu gawaab  | 'they wrote a letter'    |
|      | by HVD | *katab gawaab  |                          |
| 132) | a.     | tiktibi gawaab | 'you (f) write a letter' |
|      | by HVD | *tiktib gawaab |                          |
|      | b.     | tiktibu gawaab | 'you (p) write a letter' |
|      | by HVD | *tiktib gawaab |                          |

Furthermore, any solution providing for the non-stressing and shortening of final vowels must contend with those forms which do have long final vowels:

- |      |       |             |
|------|-------|-------------|
| 133) | ahoo  | 'voila (m)' |
|      | ahée  | 'voila (f)' |
|      | ?ée   | 'what'      |
|      | lee   | 'why'       |
|      | laa   | 'neither'   |
|      | ḥayaa | 'life'      |

While these words are few in number, they're used constantly, and no alternations exist to suggest that their underlying forms contain any segment following the long vowel.<sup>11</sup> The long vowel is stressed, just as the rule of SA predicts.

These forms provide the strongest argument against a rule of Final Vowel Shortening.

### 2.5.3 First Person Clitics and Nisba Adjectives.

Additional data which might be taken to argue for a rule shortening final vowels are provided by the first person singular clitic form, which is /ya/ (from underlying /ia/) after a vowel:

- 134) a. mabna 'building' mabnaaya 'my building'  
 b. abbwabu 'father' abuuaya 'my father'  
 c. wayya 'with' wayyaaya 'with me'

The First Person Clitic Rule (formulated in section 2.3.2.1) is then actually

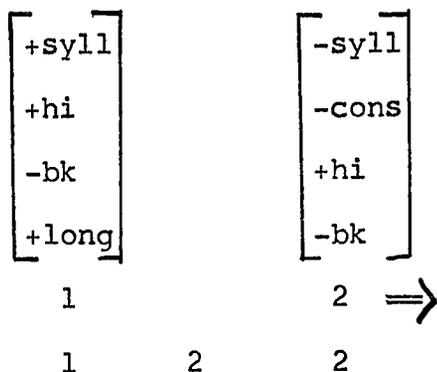
- 135)  $i \rightarrow ni/ \int_v \_ \int_v$   
 $ia/ v \int_x \_ \int_x$

However, when a noun or adjective ending in /i/ takes the first person clitic, the surface form is slightly different than expected:

- 136)
- |                  |       | expected form | actual form |
|------------------|-------|---------------|-------------|
| 'chair/my chair' | kursi | *kursiia      | kursiyya    |
| 'in/in me'       | fi    | *fiiya        | fiyya       |

Where one predicts, by analogy with the forms mabnaaya and wayyaaya, long /i/ followed by /y/, one finds /i/ followed by geminate /y/. Since the sequence /iyy/ never occurs, we may set up the following rule to handle these cases:

## 137) Y-Gemination:



The rule of Vowel Shortening, which shortens vowels which precede two non-syllabic segments, will subsequently apply to the long /i/.<sup>12</sup>

While these forms reveal nothing about final long vowels, they do suggest an approach to another set of forms, an approach involving a rule of Final Vowel Shortening. The relevant forms are the adjectives known as Nisba adjectives, which contain the suffix /i/ discussed in connection with FVD. This /i/ is added to a noun to make an adjective:

138) tariix      'history'  
       tariixi    'historical'

The feminine and plural forms of these adjectives consist not simply of the stem plus /a/ and /iin/, as do the feminine and plural of nouns. Instead they have the endings /iyya/ and /iyyiin/:

139) tarixiyya    'historical (f)'  
       tarixiyyiin 'historical (p)'

vs. 140) saaḥib    'friend (m)'

saḥba 'friend (f)'

saḥbiin 'friend (p)'

This could be explained by the assumption that the Nisba ending is not /i/ but /iyy/. Then these forms will meet the structural description of Y-Gemination:

141) tariix+iyy+a

Y-Gem: tariix+iyy+a

Rules deleting a word-final glide and shortening a final vowel will be necessary to handle the masculine form:

142) tariix+iyy

Final Glide Del: tariix+ii

Final Vowel Sh: tariix+i

surface: tariixi

Thus, runs this argument, one can account for both the Nisba adjectives and the first person clitic forms by postulation of the rules of Y-Gemination, Final Glide Deletion, and Final Vowel Shortening.

An alternative approach, of course, is simply to set up allomorphy rules spelling out the shape of the feminine and plural suffixes of Nisba adjectives. It's reasonable to assume that this is what the language learner does unless provided with evidence for the requisite phonological changes. We have seen that the language learner is confronted with evidence contradicting the effects of FVSh in the form of the words with long final vowels. The question then is whether the forms kursiyya, fiyya, etc.

are enough to offset this evidence. In fact, nouns ending in /i/ are extremely rare; kursi is the only one I've been able to discover. As for prepositions, there are three very common ones ending in /i/, but their case is not as convincing as it first appears. The preposition li 'to', for example, is /l/ as a clitic but always li before a full noun (except where the /i/ is deleted by HVD). When li appears with a pronoun clitic but is not itself attached to a verb,<sup>13</sup> the form is for some speakers /li+clitic/, for the majority /l+clitic/:

- 143) laha ~ liiha        'to her'  
       lina ~ liina        'to us'  
       luhum ~ liihum     'to them'

The long vowel in the forms on the right is the expected concomitant of the underlying vowel in /li/, while the forms on the left show the vowels associated with the clitics themselves, and which appear when attachment of the clitic would result in an unacceptable sequence of segments.<sup>14</sup> For these speakers the form of the preposition is clearly /l/; even these speakers, however, have only the form liyya for the first person singular. To explain this in terms of the phonology we'd have to derive liyya 'to me' from /l+i/, not an easy task. This fact must be morphological, and therefore cannot be used to support a phonological derivation of the Nisba forms.<sup>15</sup>

#### 2.5.4. Methodological Considerations.

The lengthening/shortening question illustrates a common dilemma. The effects of a rule are evident in many derived forms, even after the rule itself has dropped out of the grammar. Derived forms, particularly, tend to be entered in the lexicon in the form which is the output of a rule, even when that rule no longer operates; thus one finds such forms as the English pairs broad/breadth, long/length. The effects of a rule of umlaut are preserved although the rule itself no longer is a part of English phonology. Yet a generalization exists.

The decision as to whether this generalization is part of the phonology or is a morphological rule--one which applies to a restricted class of items not necessarily united by any shared phonological characteristics--is or should be made on the basis of an examination of the entire grammar of a language. The prospective rule is judged in terms of its productivity and its ability to effect simplification at one or more points in the grammar. The underlying assumption is that the language learner makes his or her decision on the same basis.

The case for a rule of Final Vowel Shortening was found to be weak on both counts. While the alternation long vowel before clitic/short vowel word-finally is pervasive, it is handled equally well by either a shortening or a lengthening rule. It was suggested that a rule shortening final vowels



single word boundary. Thus while VL II embodies the claim that lengthening is a phenomenon related to cliticization, and to only one type of cliticization at that (cliticization on the right), VL I implies that the factor conditioning lengthening is the relationship between elements characterized by a single word boundary, of which the cliticization examples are simply one sub-case.

The obvious task is to determine whether there exist any empirical differences between the rules VLI and VLII.

One area in which the two rules make different predictions is in the case where words are separated by a single word boundary. Later revisions of the word boundary conventions<sup>16</sup> specify that non-lexical items of more than one syllable will be flanked by word boundaries, but that monosyllabic non-lexical items do not have word boundaries associated with them. Thus a monosyllabic preposition will be separated from a following noun by a single word boundary, the one associated with the noun.

This seems correct for ECA, since monosyllabic prepositions don't receive stress, while bi-syllabic ones do:

- 146) a. ma8a Samiira                    'with Samiira'  
       b. min il beet                    'from the house'

The lack of stress on monosyllabic prepositions is confirmed by the fact that a high vowel in a monosyllabic preposition can be deleted by HVD when it is in the proper environment:

147) rigi8t min il?agaaza  
 IEp: rigi8ti min il?agaaza  
 SA: rigi8ti min il?agaaza  
 HVD: rigi8ti mn il?agaaza

'I returned from (the) vacation.'

Since stressed vowels are not subject to HVD, the vowel of min can't be stressed. This can be explained if we assume that stress assignment analyzes strings flanked by two word boundaries.

Sentence (147) has the following configuration of word boundaries:

148) rigi8ti ## min # il # ?agazza ##

SA will thus assign stress to the units 'min il?agaaza' and 'rigi8ti.'

Thus if VLI is the correct rule, a monosyllabic preposition which ends in a vowel should lengthen that vowel before a noun. Lengthening should show up on the surface only when the vowel of the preposition receives stress; that is, when it precedes a vowel consisting of one or two short syllables. In this case, if the stress rules simply scan leftward from two word boundaries, stress should fall on the preposition by SA if it precedes a monosyllabic noun and is therefore penultimate, or by SR if it precedes a noun consisting of two weak syllables. No nouns which are weak monosyllables exist in ECA. However, there are quite a few nouns consisting of two weak syllables. These should

provide crucial evidence for either VLI OR VLII. Stress retraction should place stress on the antepenultimate syllable--in this case, the preposition. Thus the long vowel will not be affected by the rule shortening stressless vowels.

Unfortunately, the language once again defies the attempt to decide between VLI and VLII. Stress does not move leftward onto a monosyllabic preposition:

149) bi#?alam 'in pencil, with a pencil'

Apparently the rule of stress retraction can't move stress onto a monosyllabic preposition; this fact can be expressed by the following formulation of the rule of Stress Retraction:

150) SR:      ... V C V C (#) V (C)##  
   [-lg]  
   [+str]  
   1 2 3      4    ⇒  
   [ +str ]<sup>1</sup> [ -str ]<sup>2 3</sup>    4

The form bi?alam no longer meets the structural description of Stress Retraction; thus the /i/ of bi, even if lengthened, will be shortened by the rule of Vowel Shortening, which affects unstressed vowels.

A second case in which VLI and VLII make different predictions is in the case of proclitics; if a final vowel of a proclitic is lengthened, then the environment of VL must be simply /\_\_#(+seg). Thus VLI predicts lengthening of the /a/ in /ma/:

151) ma#katab#s' → maakatabs' by VLI

'he didn't write'

This case is no more decisive than the case involving monosyllabic prepositions, since the rule of Vowel Shortening will always prevent the vowel of /ma/ from reaching the surface as a long vowel. Putative /maa/ could never receive stress, since it always occurs in conjunction with suffixed /s'/. Any word to which /ma..s'/is added can end either in a vowel, a consonant, or two consonants; in each case, the addition of /s' or the operation of VL make it impossible for /ma/ to be followed by one or two weak syllables, the only pattern which would allow stress to fall on /ma/:

- 152) a. ma bana s'  
 VLI: maa banaa s'  
 SA: maabanaas' (final strong syllable receives stress)  
 VSh: mabanaas' 'they didn't build'
- b. ma katab s'  
 VLI: maa katab s'  
 SA: maa katabs'  
 VSh: makatabs' 'he didn't write'
- c. makatabt s'  
 VLI: maakatabt s'  
 IEp: maa katabti s'  
 SA: maa katabtis'  
 VSh: makatabtis' 'I didn't write'

Though the proclitics /ħa/ and /bi/ don't necessarily

occur in conjunction with an enclitic element, the facts of ECA verb morphology ensure that they also never receive stress. They occur only with the imperfect of the verb, which consists of an inflectional prefix and a stem of the form CCV(C), CVVC, CVCC, or CVCCVC. They are never followed only by either one or two weak syllables, the condition necessary to allow stress to fall on them, and therefore to allow them to retain their length.

Thus it's impossible to find a long vowel occurring before a single word boundary. However, there is one case which reveals a difference between the final vowel of a proclitic and the final vowel of a word which is followed by an enclitic--vowels which, according to VLI, should behave identically. The sequence i#a is found when a verb ending in /i/ is followed by the second person singular pronoun clitic:

153) nisi#ak → nisiik

'he forgot you (m)'

In this case the /i/ is lengthened and the /a/ deleted. We should then predict the same results when the clitic /bi/ precedes the first person singular imperfect verb, which begins in /a/:<sup>14</sup>

154) bi#aktib

VL:           bii#ktib           (vide nisiik)

VSh:          \*biktib

The actual form, however, is baktib 'I'm writing'. This

is the form which will result from application of the rule Vowel Deletion Across ##, if this rule is allowed to apply across either one or two word boundaries. Vowel Deletion Across ## does not, however, apply in the case of nisiik. The appearance of different surface reflexes of the two sequences which are identical, except for the fact that one involves a clitic on the left and one involves a clitic on the right, indicates that the rule of VL is sensitive to the structure of a word, not simply to the number of word boundaries involved. Thus VLII, rather than VLI, accurately describes the facts of ECA. The final formulation of this rule and the derivation of nisiik are discussed in the next section.

VLII, the rule lengthening vowels before clitics, has been seen to precede the rule of Stress Assignment, to explain the presence of stress on the lengthened vowel in, for example, mabanuus' 'they didn't build' (vs. banu' 'they built'). VLII must also precede I Epenthesis, since epenthetic vowels are not lengthened:

- 155) a. katabt'/makatabtis'  
           'you (m) wrote/didn't write'  
       b. katabti'/makatabtiis'  
           'you (f) wrote/didn't write'

VL therefore is ordered quite early in the list of rules.

## 2.7 Form of the Clitics.

### 2.7.1 After a Consonant.

Certain of the pronoun clitics have allomorphs which

occur in easily specified environments:

156)	ḍarab	he beat	ḍarabt	I beat
a.	ḍarabak	-you (m.sg )	ḍarabtak	-you (m.sg )
	ḍarabik	-you (f. sg)	ḍarabtik	-you (f.sg)
	ḍarabu	-him	ḍarabtu	-him
b.	ḍarabni	-me	ḍarabtini	-me
	ḍarabna	-us	ḍarabtina	-us
	ḍarabha	-her	ḍarabtaha	-her
	ḍarabkum	-you (pl.)	ḍarabtukum	-you (p)
	ḍarabhum	-them	ḍarabtuhum	-them

The (b) forms exhibit the following alternations:

157)	ni ~ ini
	na ~ ina
	ha ~ aha
	kum ~ ukum
	hum ~ uhum

Since a sequence of three consonants is never permitted, the appearance after a consonant cluster of an initial vowel in the otherwise consonant-initial clitics is not surprising; what is surprising is the variety of initial vowels. If each clitic took initial /i/ after two consonants, we could employ IE<sub>p</sub> to generate the correct forms; if each took either /i/ or /u/, we could delete the underlying initial vowel by HVD. Because of the nature of ECA stress, both solutions would work equally well. If the endings are CV(C), IE<sub>p</sub> will apply only when they follow two consonants. If they're VCV(C), the

stress rules will ensure that stress falls on the initial vowel only when it follows two consonants; that is, when it appears on the surface. If the clitic follows a single consonant, SR will move stress leftward off the clitic, allowing HVD to delete the initial vowel:

158)	darab # ni	darab # ni
	ḍarab # ni	ḍarab # ni
IEp:	n/a	n/a
SA:	darab <sup>1</sup> ni	ḍarab <sup>1</sup> ni
SR:	n/a	ḍarab <sup>1</sup> ni
HVD:	n/a	ḍarabni
surface:	ḍarab <sup>1</sup> ni	ḍarab <sup>1</sup> ni
	'he beat me'	
159)	darabt # ni	darabt # ni
	ḍarabt # ni	ḍarabt # ni
IEp:	ḍarabtini	n/a
SA:	ḍarabt <sup>1</sup> ni	ḍarabt <sup>1</sup> ni
SR:	n/a	n/a
HVD:	n/a	n/a
surface:	ḍarabt <sup>1</sup> ni	ḍarabt <sup>1</sup> ni
	'you (m) beat me'	

Either approach requires some morphological rule producing the correct vowels in the clitic forms. The epenthesis approach requires a rule, applying after I Epenthesis, which assimilates /i/ to the vowel of the clitic, and which applies in /ini/, /aha/, /ukum/, and /uhum/, but not in /aha/. The deletion approach requires a rule applying after HVD to change underlying /iha/ to /aha/, the only form with a non-high initial vowel. These rules are straightforward; their only interesting property is that they must

apply after some "true" phonological rule (a rule which is not sensitive to the morphological identity of the rules in the string it is scanning). This is counter to the claims that all morphologically conditioned rules must precede all rules which are entirely phonologically conditioned. A third solution which avoids this problem is to make use of the deletion approach for all the clitics but /aha/, that is, to set up /ini/, /ina/, /ukum/, and /uhum/, and to have an early morphological rule which takes /aha/ to /ha/ after the sequence VC#. Thus this case does not decide for or against claims about the ordering of morphologically conditioned rules.

#### 2.7.2 After a Vowel; Final Statement of Vowel Lengthening.

The behavior of the clitics following a vowel is fairly straightforward:

160)	' ' saafu	they saw
a.	' ' safuuk	-you (m.s.)
	' ' safuuki	-you (f.s.)
	' ' safuu	-him
b.	' ' safuuni	-me
	' ' safuuna	-us
	' ' safuuha	-her
	' ' safuukum	-you (pl.)
	' ' safuuhum	-them

The (b) forms are as expected. The long vowel in (a) forms is always that of the verb, unaffected by the vowel of

the clitic:

- 161) a. la<sup>ʔ</sup>a            he found  
           la<sup>ʔ</sup>aak            -you (m.s.)  
           la<sup>ʔ</sup>aaki            -you (f.s.)  
           la<sup>ʔ</sup>aa            -him
- b. nisi            he forgot  
           nisiik            -you (m)  
           nisiiki            -you (f)  
           nisi            -him

The loss of the clitic vowel is unrelated to the rule Vowel Deletion Across ##, since it has nothing to do with the quality of the vowel, and must precede VD Across ##. Since there is no evidence of any need elsewhere in the grammar for a rule deleting a vowel in this environment, the deletion of the clitic vowel can be incorporated in the rule of Vowel Lengthening:

162) Vowel Lengthening (final version):

$$\begin{array}{cccc} \dots W & \boxed{V} & (V) & \boxed{Y} \\ & \downarrow_x & & \downarrow_x \\ 1 & 2 & 3 & 4 \Rightarrow \\ 1 & \boxed{\begin{array}{c} 2 \\ +\text{long} \end{array}} & \emptyset & 4 \end{array}$$

The possibility of considering all pronoun clitics to be vowel-initial might be taken to suggest that VL is actually a coalescence of two vowels. However, the reader will recall that VL occurs before other clitics which can't be analyzed as vowel-initial; the /s/ of the negative, for

example, does show up as /i<sup>h</sup>/, but only when it is in an environment which meets the structural description of IEp:

makatabt<sup>h</sup>i<sup>h</sup>s 'I didn't write.' Forms appear without /i/

which do not meet the structural description of HVD:

163) makatab<sup>h</sup>s (gawabaat). 'He didn't write (letters).'

Here, where the consonant following /i/ is either sentence-final or followed by a second consonant, HVD could not have applied.

### 2.7.3 Additional Alternations.

The alternation /ik~ki/ is yet to be explained. /ki/ occurs after a vowel, or before /s<sup>h</sup>/:

164) a. la<sup>h</sup>?aaki 'he found you (f.s.)

b. madarab<sup>h</sup>kiis 'he didn't beat you (f.s.)'

These facts can be expressed by a morphological rule:

165) /ki/ rule:  $ik \rightarrow ki/ \quad \begin{array}{c} \overline{v} \\ x \end{array} - \begin{array}{c} \overline{j} \\ x \end{array}$   
 $\begin{array}{c} \overline{j} \\ x \end{array} \quad \begin{array}{c} \overline{s} \\ x \end{array}$

The effect of the first part of this rule is to eliminate the ambiguity between the second person m. and f. singular which would arise if VL operated in the normal manner. The ki rule must precede VL, since the /i/ is lengthened before /s<sup>h</sup>/ and would otherwise be deleted by VL.

A similar alternation is the one which occurs in the following forms:

166) a. darabu<sup>h</sup> 'he beat him'

madarabu<sup>h</sup>us 'he didn't beat him'

- b. nisii 'he forgot him'  
 mansihuus 'he didn't forget him'
- c. katabu 'he wrote it'  
 katabhulha 'he wrote it for her'

The alternation /u~hu/ is more comprehensible when one notes that some speakers have /uh/ as the pronoun clitic, especially in formal or very slow speech. /uh/ seems to have been the older form, altered by a rule dropping final /h/.<sup>18</sup> Harrell gives the pair

- 167) a. nada 'he called'  
 b. nadahli 'he called to me'

but more recent grammars have

- 168) a. naada  
 b. nadaali

indicating a restructuring of the form without /h/. The rule of h-deletion is no longer viable; a few of the many forms which always retain final /h/ are: minabbih 'alarm clock', naziih, a proper name, nabiih, 'intelligent', gineeh, 'guinea'.

For more conservative speakers, then, the rule producing /hu/ is (169a), for others (169b):

- 169) a. Uh-Met:  
 uh → hu/
- $$\left\{ \begin{array}{l} \dots \underset{x}{\text{v}} \text{ ] } \text{ — } \text{ ] } \text{ 's } \text{ ] } \text{ } \\ \text{ — } \text{ ] } \text{ } \text{ 1... } \text{ ] } \text{ } \\ \underset{x}{\text{ — } \text{ ] } } \text{ } \end{array} \right\}$$

b. Hu-Rule:

$$u \rightarrow hu / \left\{ \begin{array}{l} \dots \frac{V}{x} - \frac{J}{x} \frac{s}{x} \\ \frac{J}{x} 1 \dots \frac{J}{x} \end{array} \right\}$$

This rule must also precede  $\mathcal{L}$  (cf. mansihuus 'he didn't forget him').

The alternations /ik~ki/ and /u~hu/ shed some light on the origin of the exceptions to the rule of Stress Retraction discussed in Chapter I. Recall that the third feminine singular ending /it/ is immune to Stress Retraction, and that the only instance in which SR could shift stress off /it/ is when /it/ is followed by one of the vowel-initial pronoun clitics /ak/, /ik/, or /u/. The forms of these clitics in Classical Arabic are /ka/, /ki/, /hu/, and if this were their shape at some point in the development of ECA, stress would fall on /it/ as the penult by the regular rule of stress assignment: \*darabitka, \*darabitki, \*darabitku, 'she beat you (m.)/-you (f.) /him.' Given the very restricted environments in which /ki/ and /hu/ are found and the fact that /ak/ never alternates, it does not seem justified to propose underlying CV forms as a synchronic solution, but these facts do provide an explanation of how the odd restriction on the stress rule came about.

#### 2.7.4 Ordering.

The rules discussed in this section are

- 170)      ki rule  
           hu rule  
           First P. Clitic Rule  
           VL

The first three rules feed VL and must precede it:

- 171) mansikiis      (< ma # nisi # ik # s'<sup>1</sup>)  
       'he didn't forget you (f)'
- 172) katabhuulak (< katab # u # l # ak)  
       'he wrote it to you (m)'
- 173) a. madarabniis' (< ma # darab # i # s)  
       'he didn't beat me'  
       b. mafiyyaas' (< ma # fi # i # s)  
       'not in me'

## NOTES

## Chapter II

<sup>1</sup>Feminine nouns also take the construct state in the dual. The dual form consists of the noun plus the suffix /een/:

	walad	'boy'
	waladeen	'two boys'
but:	saa8a	'watch'
	sa8teen	'two watches'

It's very likely that the dual is itself at least historically a construct phrase, deriving from the noun plus the numeral two, litneen.

<sup>2</sup>Another possibility is to move the NP into the specifier position.

<sup>3</sup>Many of the ideas developed in this section are those of Elan Dresher, who has worked on Hebrew construct phrases.

<sup>4</sup>In ECA, participles of 'hollow verbs', i.e., verbs of the form CaaC, are always Caayic. Though 8aayiz is also heard, the retention of the classical Arabic form (8aawiz) suggests that this is a frozen form.

<sup>5</sup>Of course, if the post-posed subject is a member of the verb phrase, this solution will not work. However, the claim that the derived structure of subject post-posing is



seems intuitively correct.

<sup>6</sup>The rule is actually more complicated; it's given in full in section 2.5.3.

<sup>7</sup>Selkirk, personal communication.

<sup>8</sup>Selkirk, personal communication.

<sup>9</sup>This is a suppletive form.

<sup>10</sup>See Birkeland for an argument that the Egyptian dialect developed from the Classical Arabic pausal forms. In generative terms, of course, this means simply that the

rules applying only to pausal forms were extended in Egyptian to apply everywhere.

<sup>11</sup>These forms probably ended in /h/ at some earlier period, but loss of the rule deleting final /h/ has caused them to be restructured as vowel-final. They contrast with newer forms such as gineeh 'Egyptian pound', which always retain the final /h/. More evidence for this view of the history of the h-drop rule is given in section 2.7.3.

<sup>12</sup>Birkeland transcribes the pronouns huwwa and hiyya as huuwa, hiyya. Perhaps the rule of Y-Gemination applied in the history of these forms, or perhaps this merely illustrates the difficulty of hearing differences between long vowel-glide sequences and short vowel-geminate glide sequences.

<sup>13</sup>As discussed in section 2.3.2.

<sup>14</sup>See section 2.5 for a fuller discussion of the pronoun clitic alternations.

<sup>15</sup>The passive participles of final weak verbs, discussed in Chapter III, are also relevant.

<sup>16</sup>Selkirk, class lectures, Univ. of Mass. 1975.

<sup>17</sup>Even when the tense prefix bi is not a clitic on the verb--i.e., when it is not Chomsky-adjoined to the verb--the word boundary conventions ensure that it will still be separated from the verb by only one word boundary.

<sup>18</sup>Birkeland, page 18: "Arabic scholars in Egypt whom I questioned, admitted that the /h/ (of -uh) only exists filfikr 'in the mind.'"

C H A P T E R    I I I  
MORPHOLOGY OF THE VERBAL SYSTEM .

This chapter is concerned with the ECA verbs and their dependence on the root and pattern system of morphology characteristic of classical Semitic languages. It is argued that this system is no longer viable in ECA, and alternative methods of capturing generalizations are discussed.

3.1 Terminology: Root and Pattern System

Most Arabic words are built on a skeleton of consonants, traditionally called the radical consonants, or radicals. The radicals together make up the root. Each root is associated with some core of meaning, although the relationship between words sharing a root is not always obvious. The root d-r-s is one which is fairly productive:

1) daras	'he studied'
yidris	'he studies'
daaris	'studying'
darris	'he taught'
dars	'lesson'
madrasa	'school'
mudarris	'teacher'
diraasi	'academic'

Each of these words has some connection with the idea of study; therefore, we can assign this root the core meaning of 'study.'<sup>1</sup>

Roots occur in conjunction with patterns, or arrangements of vowels. A pattern specifies the position and number of the radical consonants with which it may combine. The notion of pattern may best be understood by comparing forms containing the root k-t-b with those in (1):

2) katab	'he wrote'
kattib	'he caused (someone) to write'
maktab	'office; desk'
maktaba	'library'

Comparison of the words darris 'he taught' and kattib 'he caused to write' reveals a common pattern C aC C iC as-  
1 2 2 3  
 sociated with the causative meaning.

The root and pattern together make up the stem; C<sub>1</sub> C<sub>2</sub> V C<sub>3</sub>, for example, is the pattern of the imperfective stem of trilateral verbs. This stem always occurs with inflectional affixes:

3) yidris	'he studies'
tidrisu	'you (p) study'
asrab	'I drink'
nisrab	'we drink'

The stem plus any inflectional affixes which may occur make up the word.

Certain affixes and infixes also play a role in the formation of words; in such cases, it's not clear whether these affixes are part of the pattern--in which case a pattern must be redefined to optionally include (non-radical)

consonants as well as vowels--or are separate elements. One such case is illustrated by the words beginning in /ma/ above: madrasa, maktab, maktaba. As the glosses of these words indicate, /ma/ is generally associated with nouns of place.<sup>2</sup> It always precedes (or is part of) the pattern  $C_1 C_2 aC_3$ .

The question of how word formation proceeds in ECA and in Semitic languages in general is an interesting one and will be taken up below. At this point, I'll examine the integrity of the roots and patterns themselves with respect to the verbal system of ECA.

### 3.2 The Uniform Root and Pattern Hypothesis.

While the majority of basic (that is, non-derived) verbs of ECA are of the form CvCvC in the third person masculine singular perfect--the form used by the Arabic lexicographers and grammarians as the citation form--there are several verbs which contain four consonants, and many others, traditionally called 'defective verbs', which are bi-consonantal:

4) targim	'translate'
bana	'build'
nisi	'forget'
'saal	'carry'
ḥabb	'love'
kal	'eat'

The simplest morphological system would be one in

which it were possible to set up one or two basic patterns underlying the various surface shapes of the basic verbs, rather than establishing a pattern for each of the basic verb types illustrated in (4). In such a system any deviation from the underlying pattern would be explained by the applications of phonological rules. Support for this system would be provided by evidence that such phonological rules were required independently to explain alternations in other areas of the grammar.

The first sort of system is the one assumed in Brame's description of MSA, which is presumably quite close to the ancestor of ECA. The assumption implicit in Brame (1970) I'll call the Uniform Root and Pattern Hypothesis; it consists of the following assumptions:

1. All verb roots consist of either three or four non-syllabic elements.

2. All surface bi- or tri-consonantal verbs are underlyingly formed on the pattern CvCvC.

3. Any verb which is defective (that is, bi-consonantal on the surface) has as one member of its tri-consonantal root a /y/ or a /w/. Phonological rules which delete these segments in certain environments explain the failure of these roots to conform to the standard shape.

In the following sections, I'll examine the arguments for a similar approach to the verb system of ECA.<sup>3</sup>

### 3.3 The Tri-Consonantal Verb

The first step in discovering the parallels or lack of them between tri-consonantal and bi-consonantal verbs is to identify the characteristics of the tri-consonantal verbs. All perfect stems of these verbs are of the form CaCaC or CiCiC. Choice of vowel pattern is, in the main, an arbitrary lexical fact, not determined by the phonological shape of the root:

- 5) a. ?ala8            'he undressed'  
       b. tili8            'he went up'
- 6) a. dafa8            'he paid'  
       b. nifi8            'he succeeded'
- 7) a. 8amal            'he made, did'  
       b. 8irif            'he knew'

The imperfect stem, which always co-occurs with an inflectional prefix, is of the form CCvC. The stem vowel is again not predictable:

- 8) a. a/i            katab/ktib            'write  
                       daras/dris            'study'
- b. i/i            libis/lbis            'dress'  
                       nizil/nzil            'descend'
- c. a/a            kasar/ -ksar            'break'  
                       fataḥ/-ftaḥ            'open'
- d. a/u            sakan/-skun            'live'  
                       xaṛag/-xṛug            'go out'
- e. i/a            rigi8/ -rga8            'return'  
                       8irif/-8raf            'know'

There are certain regularities, however, in the distribution of perfect and imperfect stem vowels:

1. Perfect stem vowel /a/ may correspond to either /a/, /i/, or /u/ in the imperfect.

2. The perfect stem vowel /i/ always corresponds to imperfect stem vowel /a/ or /i/.

3. The imperfect stem vowel is /a/ when either the second or the third radical is one of the following:

ṭ, ḍ, ṣ, ẓ, x, ʔ, h, ħ, ʕ, r. I suspect that this fact reflects a historical rather than synchronic generalization. All these sounds, except /r/, involve articulation in the back of the vocal tract. /r/ is a flap /r/ in ECA, as well as in MSA, but may be either a flap or a uvular in Modern Hebrew; thus it's possible that /r/ of ECA was historically further back.

The radicals of the perfect stem and the corresponding imperfect are always the same and appear in the same order; only the pattern differs. Any consonant may occur as a radical, except /y/, which is never found in non-derived verbs. /w/ is found only as the first radical, or as the second radical of certain verbs:

- 9) a. waga8            'he hurt'  
       b. wisil            'he arrived'  
       c. kawa            'he ironed'

We can now turn our attention to the various classes of bi-consonantal verbs, in order to determine the feasibility

of forming them on the same pattern on which the tri-literal verbs are formed.

### 3.4 Final Weak Verbs.

Bana 'he built' and nisi 'he forgot' are examples of the two sorts of verbs called final weak verbs. The URP Hypothesis predicts that these should be derived from underlying /bana<sup>{w}</sup><sub>y</sub>/ and /nisi<sup>{w}</sup><sub>y</sub>/. The parallelism of the vowel patterns of the final weak verbs and the regular triliteral verbs is a consequence of this assumption; this parallelism extends to the patterns found in the imperfect stems:

- 10) a. bana / -bni                    'build p/i'  
       b. mala / -mla                   'fill p/i'
- 11) a. nisi / -nsa                    'forget p/i'  
       b. mi<sup>1</sup>si / -m<sup>1</sup>si                'go, walk p/i'

To explain the surface forms nisi and bana, a rule deleting word-final glides is necessary. No high glides appear in the surface environment V\_\_#, although post-consonantal final glides do exist and are pronounced as such, as in tamy 'silt'. Thus, the rule deleting final glides must look like this:

- 12) Final Glide Deletion (FGD):

$$\left[ \begin{array}{l} \text{-cons} \\ \text{-syll} \\ \text{+hi} \end{array} \right] \rightarrow \emptyset \quad / \quad \left[ \text{+syll} \right] \_ \#$$

Evidence for this rule can be found in the formation of comparatives. Although positive adjectives can have various

shapes, comparatives are invariably formed on the pattern

$aC_1C_2aC_3$ :

- 13) a. sahl / ashal 'easy / easier'  
 b. kibiir / akbar 'big / bigger'  
 c. ṭawiil / aṭwal 'long / longer'  
 d. wihiṣ' / awhaṣ' 'ugly / uglier'  
 e. suṣayyar / aṣṣar 'small / smaller'

However, when the final radical of the positive form of the adjective is a high glide, the comparative takes the form

$aC_1C_2a$ :

- 14) ḥilw / aḥla 'sweet / sweeter'

The rule of FGD allows us to maintain the generalization that all comparatives have the shape  $aC_1C_2aC_3$  by converting underlying /aḥlaw/ to the actual form aḥla.

FGD also explains the shapes of certain members of the class known as adjectives of color and defect. The shape of the masculine form of these adjectives is the same, coincidentally, as that of the comparatives. They form the feminine and plural forms not by suffixation of /a/ and /iin/, as most adjectives do, but by a change in pattern:

15)	masculine	feminine	plural	
	$aC_1C_2aC_3$	$C_1aC_2C_3a$	$C_1uC_2C_3$	
a.	aḥdar	ḥadra	ḥudr	'red'
b.	azra?	zar?a	zur?	'blue'
c.	aṭraṣ'	ṭarṣa'	ṭurṣ'	'deaf'
d.	axraṣ	xarṣa	xurṣ	'dumb'

One adjective deviates from this pattern:

16) a8ma            8ama            8umy            'blind'

The three consonants of the feminine and plural forms are 8-m-y, but /y/ does not appear in the masculine form--precisely that form which meets the structural description of FGD.

Additional sets of forms whose shapes can be explained by FGD are adjectives ending in /i/. These form the feminine and plural forms in the usual manner:

- 17) a. 8aali            'high (m)'  
       b. 8alya            'high (f)'  
       c. 8alyiin        'high (p)'  
       d. a8la            'higher'
- 18) a. ʎaali            'expensive (m)'  
       b. ʎalya            'expensive (f)'  
       c. ʎalyiin        'expensive (p)'  
       d. aʎla            'more expensive'

Assuming an underlying final /y/, these forms can be derived by FGD and other rules motivated in Chapter I:

19)	8aaliy	8aaliy + a	8aaliy + iin
FGD:	8aali	n/a	n/a
SA, SR:	8aali	8aaliy + a	8aaliy + iin
HVD:	n/a	8aalya	8aalyiin
VSh:	n/a	8alya	8alyiin

Similar facts obtain in participles:

- 20) a. miʎanni            'singing (m)'  
       b. miʎanniya        'singing (f)'  
       c. miʎanniyiin      'singing (p)'

### 3.4.1 Before Vowel-Initial Endings.

The following are the forms of nisi and bana before the vowel-initial endings of the perfect:

- 21) a. nisyit ~ nisit            'she forgot'  
       b. nisyu ~ nisu            'they forgot'
- 22) a. banit                    'he built'  
       b. banu                    'they built'

These can be compared with the corresponding trilateral forms:

- 23) a. katabit                'she wrote'  
       b. katabu                'they wrote'

On the basis of the forms in (23), the URP hypothesis demands that we set up underlying forms

- 24) a. /nisiy + it/  
       b. /nisiy + u/  
 25) a. /banay + it/  
       b. /banay + u/

The assumption that bana has underlying /y/ rather than /w/ will be justified below.

Thus, for the minority dialect which has nisit, nisu, it's necessary to account for deletion of a high glide in the following environments:

- 26) i\_i                    a\_i  
       i\_u                    a\_u

(nisyit, nisyu are discussed below.)

There are no words of ECA in which a high glide appears in these environments. However, high glides do occur between certain vowels, both within simple words:

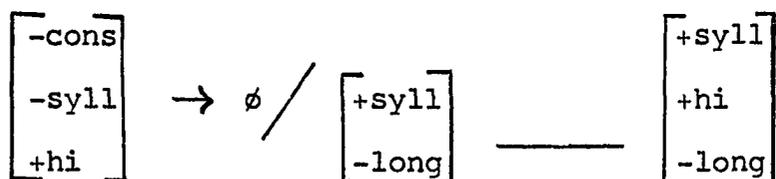
- 27) a. 'saayil                    'carrying'        aa\_i  
       b. ḥiyali                'shrewd'         i\_a  
       c. fayadaaṅ            'flood'          a\_a

and across morphemes, as the forms of (17-19) illustrated:

- 28) a. ṣalya                ( ṣaaliy + a)     'high (f)'  
       b. ṣalyiin            ( ṣaaliy + iin)   'expensive (p)'  
       c. miṣanniyiin      ( miṣanniy + iin) 'singing (p)'

A rule which will delete a high glide only in the environments specified in (26) is this one:

- 29) Intervocalic Glide Deletion (IGD):



Notice that IGD does not apply to forms such as

- 30) biyiktib 'he is writing'

This can be explained by the fact that a word boundary follows bi. Once again the presence of word boundaries in rules is shown to be crucial.

If the rule of IGD precedes First Vowel Deletion, it will generate the correct forms of the verbs under consideration:

- |                |            |           |           |
|----------------|------------|-----------|-----------|
| 31) nisiy + it | banay + it | nisiy + u | banay + u |
| IGD: nisi it   | bana it    | nisi u    | bana u    |
| FVD: nisit     | banit      | nisu      | banu      |

The imperfect forms of these verbs are also accounted for by these two rules. The forms are:

- 32) a. tinsa 'you (m) forget'  
 b. tinsi 'you (f) forget'  
 c. tinsu 'you (p) forget'
- 33) a. tibni 'you (m) build'  
 b. tibni 'you (f) build'  
 c. tibnu 'you (p) build'

Parallel forms of trilateral verbs reveal that the endings are / $\emptyset$ /, /i/, and /u/:

- 34) a. tiktib 'you (m) write'  
 b. tiktibi 'you (f) write'  
 c. tiktibu 'you (p) write'

Thus the following derivations must be handled:

- 35) a. /tinsay + i/  $\rightarrow$  tinsi  
 b. /tinsay + u/  $\rightarrow$  tinsu  
 c. /tibniy + i/  $\rightarrow$  tibni  
 d. /tibniy + u/  $\rightarrow$  tibnu

Each of the forms on the left satisfies the structural description of IGD. Subsequent application of FVD produces the correct surface forms.

Nisyit and nisyu are problematic, since they retain a glide in the identical environment in which a glide is presumably deleted in the imperfect forms: /tibniy + i/, /tibniy + u/. One might at first assume that High Vowel Deletion has applied in these forms, to give /nisiy+u/  $\rightarrow$  nisyu. HVD would be blocked in the imperfect forms, for example, /tibniy+u/, by the presence of the consonant cluster

before /i/; it will be recalled that HVD applies in the environment V(♯)C\_C(♯)V.

However, this presents a problem. This solution requires the ordering HVD, IGD:

36) nisiy+u

HVD: nisy+u

IGD: n/a

Such forms as /tibniy+u/ require the ordering IGD, FVD:

37) tibniy+u

IGD: tibni +u

FVD: tibnu

If the principle of transitivity is valid, then the following ordering must obtain: HVD, FVD. But this is impossible, since HVD must follow the stress assignment rules, to explain the immunity to deletion of stressed vowels (huwwa fihim → \*huwwa fhim). FVD must precede SA, to explain stress on, for example, ibnu 'build (p)!' (from /ibniy+u/). FVD must also precede HVD, to explain the deletion of /i/ in, for example, /mudarrisa+it ilbint/ → mudarrist ilbint 'the girl's teacher'. (/a/ must be deleted for the environment of HVD to be met.)

This situation might be taken as an argument that the principle of transitivity (and therefore the principle of linear ordering in general) is invalid, but in fact a solution of this problem using the ordering already established will be outlined below, and this solution seen to be superior. At present, however, we might simply mark perfect verbs in

/i/ [-IGD]. This is an unpleasant result, since the forms with /y/ are by far the more common ones.

### 3.4.2 Before Consonant-Initial Endings.

The forms of nisi and bana before consonant-initial endings are these:

38)	niseet ~ nisiit	'I forgot'
	niseena ~ nisiina	'we forgot'
	niseet ~ nisiit	'you (m) forgot'
	niseeti ~ nisiiti	'you (f) forgot'
	niseetu ~ nisiitu	'you (p) forgot'
39)	baneet	'I built'
	baneena	'we built'
	baneet	'you (m) built'
	baneeti	'you (f) built'
	baneetu	'you (p) built'

(No consonant-initial suffixes are associated with the imperfect stem.) These forms can be compared with the corresponding forms of a trilateral verb:

40)	katabt	'I wrote'
	katabna	'we wrote'
	katabt	'you (m) wrote'
	katabti	'you (f) wrote'
	katabtu	'you (p) wrote'

The URP hypothesis predicts that the forms of nisi and bana are derived from the following bases:

- 41) a. nisiy + C...  
 b. banay + C... (or /banaw + C.../ )

Evidence for the occurrence of a coalescence of vowel-glide sequences into long mid-vowels in the history of ECA was discussed in the Introduction. The forms of nisi and bana before consonants seem to provide evidence that such a change is a fact of the synchronic grammar of ECA as well.

Further alternations involving diphthongs and long vowels show up in a few adjectives of color and defect:

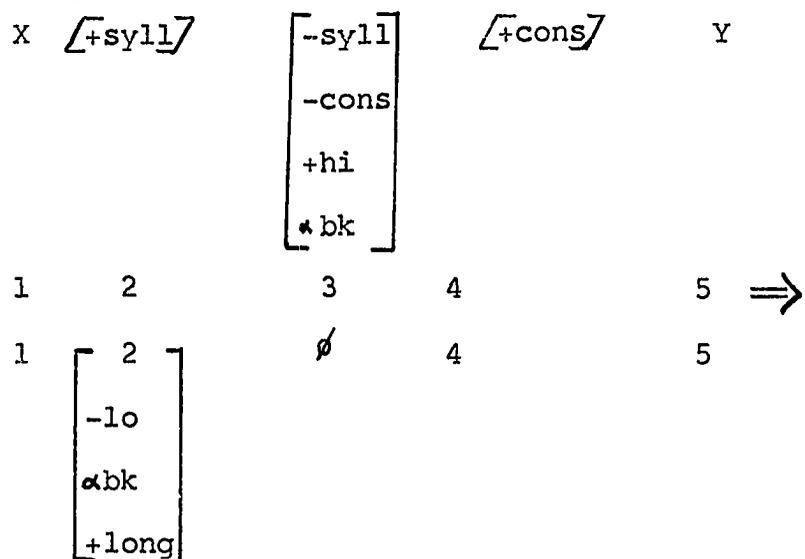
42)	masculine	feminine	plural
	$aC_1C_2aC_3$	$C_1aC_2C_3a$	$C_1uC_2C_3$
	a. a8war	8oorā	8uur 'one-eyed'
	b. abyad	beeda	biid 'white'
	c. iswid	sooda	suud 'black'

If these adjectives are to be derived from the regular color and defect patterns, we must accomplish the following changes:

- 43) aw → oo  
 ay → ee  
 uw → uu  
 uy → ii

The long vowel on the right has the backness of the glide on its left. When both vowel and glide are high, the resulting long vowel is high; when the vowel is low and the glide high, the result is a long mid-vowel. These facts may be expressed in the following rule:

44) Coalescence:



The feature  $\overline{+cons}$  of term 4 is necessary to prevent the rule from applying to such forms as sayyaal 'porter' and sawa 'together.' Coalescence must precede HVD, so that it may not apply, for example, to the form sayla 'carrying (f)', from /saayil + a/by HVD and VSh.

The rule of Coalescence will successfully derive the forms nisii + C... and banee + C..., although the alternate forms nisee + C... are so far inexplicable. Addition of the feature  $\overline{-hi}$  to term 2 of the structural change of Coalescence would generate the forms of nisi with /ee/, but would then no longer account for /8uwr/ → 8uur, /buyd/ → biid.

There are additional problems for the analysis of the forms of nisi and bana before consonant-initial endings as derived by Coalescence. Many forms exist which should undergo the rule but which retain their diphthongs:

45)	dayman	'always'
	fayda	'benefit'
	malayka	'angels'
	saydala	'pharmacy'
	ʔayraan	'jealous'
	ʔayban	'by heart'
46)	qawmi	'national'
	sawra	'revolution'
	kawkab	'planet'
	mugawharaat	'jewelry'
	ṭawla	'backgammon'
	fawda	'disorder'
	tawfii?	proper name

The effect of these forms and the others like them is to make the rule of Coalescence extremely opaque; the number and variety of these exceptions make unavoidable the question whether Coalescence is really a rule of ECA. This question is essentially one concerning the validity of the URP hypothesis with respect to final weak verbs. The rule of Coalescence allows one to maintain the hypothesis that final weak verbs are derived from forms parallel to those underlying the triliteral verbs. But since more evidence is required to maintain this analysis than merely the demonstration that it's possible to write a rule producing the correct surface forms from the desired underlying forms, further evidence for the rule is necessary. The diphthong/long vowel alternations

in the three adjectives of color and defect of (42) were claimed to provide this independent motivation for the rule of Coalescence. However, the assumption that these forms exhibit diphthong/vowel alternations at all depends on the prior assumption that they are formed on the same pattern as the other adjectives of color and defect. Thus, in effect, one is using the assumptions of the URP hypothesis to argue for the URP hypothesis.

In view of the fact that the relevant adjectives of color and defect are only three in number, and that one of these three, ?iswid, is exceptional anyway in taking /i/ rather than the /a/ found in all other adjectives of this class, the evidence for a synchronic rule of Coalescence is not compelling in the face of the numerous counter-examples to this rule. The very fact that one never finds final weak verbs with /oo/ or /uu/ before consonant-initial endings is contrary to the predictions of the strong form of the URP hypothesis; /w/ can be the final member of a root (as in hilw 'sweet') and if Coalescence applies regularly, we'd expect forms such as \*banoot or \*nisuuna from /banaw + t/ and /nisiw + na/.

What the massive influx of forms with diphthongs shows is that at some earlier stage in the development of ECA, forms which had undergone the rule of Coalescence were reanalyzed as having underlying long vowels, and the rule dropped out. When new forms with diphthongs were

introduced, they were preserved intact.<sup>4</sup> This explains the following:

- 47) a. law 'if'  
 b. la? 'no'  
 c. loola ~lawla 'but for' or 'were it not for'

The coexistence of the forms lawla and loola suggests that loola is a 'frozen' form, no longer analyzed as a compound, while lawla is analyzed as a combination of law and la?.

(Law, by the way, provides one of the two counterexamples I'm aware of to FGD. The second is aw 'or'.)

None of this proves, however, that Coalescence can't have been maintained as a minor rule applying only in verbs and adjectives of color and defect. This is what I propose has happened for those speakers who retain glides in the underlying representations of these verbs. These speakers have the following rules, in addition to those discussed in Chapter I:

- 48) Final Glide Deletion  
 Coalescence  
 Intervocalic Glide Deletion  
 First Vowel Deletion

The derivation of various forms in this system has been discussed above; I'll review sample derivations:

- 49) a. nisiy → nisi (FGD)  
 b. nisiy + t → nisiit (COAL)  
 c. banay + t → baneet (COAL)

- d.  $nisiy + u \rightarrow nisu$  (IGD, FVD)  
 e.  $tinsay + u \rightarrow tinsu$  (IGD, FVD)  
 f.  $\text{ʃaaliy} + a \rightarrow \text{ʃalya}$  (IGD, HVD)

The more common alternants nisyit, nisyu, and nisee + Cx can be derived more efficiently, however, if we assume that the underlying forms of nisi and bana are identical to their surface forms. The only place where a /y/ appears in the paradigms of nisi and bana is before a vowel-initial ending added to nisi. If we assume that there is a rule which takes /i/ to /y/ before a vowel, we can explain the perfect forms:

50)	nisi + it	nisi + u	bana + it	bana + u
Y-form:	nisyit	nisyu	n/a	n/a
FVD:	n/a	n/a	banit	banu

The imperfect forms appear at first glance to present problems, since forms like tibnu (from /tibni + u/) have no /y/ on the surface. The only possibly relevant phonological difference between the forms /tibni+u/ and /nisi + u/ is the fact that the /i/ of the first follows two consonants while that of the second follows a single consonant. This difference provides a solution: the rule of I Ep will apply to /tibny + u/ but not to /nisy + u/. The /y/ of /tibniy + u/ will then be in an environment which allows it to undergo IGD--a rule which is necessary to explain the non-occurrence of any sequence V-High glide-high V in ECA. The derivations of the imperfect forms proceed as follows:

51)	nisi + u	bana + u	tinsa + u	tibni + u
Y-Form:	nisyu	n/a	n/a	tibnyu
I Ep:	n/a	n/a	n/a	tibniyu
IGD:	n/a	n/a	n/a	tibniu
FVD:	n/a	banu	tinsu	tibnu
surface:	nisyu	banu	tinsu	tibnu
	'they forgot'	'they built'	'you (p) forget'	'you (p) build'

These rules will serve to derive all the forms previously accounted for by the assumption that their underlying forms have final glides:

52)	ʔaali + a	8aali + iin	miʔanni + a
Y-F:	ʔaalya	8aalyiin	miʔannya
I Ep:	n/a	n/a	miʔanniya
IGD:	n/a	n/a	n/a
FVD:	n/a	n/a	n/a
SA, SR, HVD, VSh:	ʔalya	8alyiin	miʔanniya
	'expensive(f)'	'high (p)'	'singing (f)'

The rule of Y-Formation is as follows:

$$53) \text{ Y-F: } \left[ \begin{array}{l} +\text{syll} \\ +\text{hi} \\ -\text{bk} \\ -\text{long} \end{array} \right] \rightarrow \left[ -\text{syll} \right] / \_ \left[ +\text{syll} \right]$$

Y-Formation will also derive the first person clitic form /ya/ from /ia/, thus preserving the parallels between the three allomorphs of the first person clitic /i/, /ni/, and /ya/.

Speakers with this grammar have the following rules:

54) Y-Formation

I EP

IGD

FVD

SA

⋮

Although arguments were advanced in Chapter II that both FVD and IEP preceded SA, the relative ordering of FVD and IEP was at that point not determinable. The forms of (52) establish the ordering I Ep, FVD.

Therefore, in this system no post-vocalic final glides need be posited in underlying representations; the rule of FGD, though possible, is no longer necessary, unless it be to account for the two words añla, the comparative of ñilw 'sweet,' and a8ma 'blind.' These forms can be listed in the lexicon, although the rule of FGD can be included in the grammar just as well.

The persistence of nisit, nisu in the dialects of some speakers--definitely in the minority--argues that not everyone has abandoned the URP analysis of final weak verbs. However, the simplest grammar for the dialect of the majority is the one which provides a natural explanation for the occurrence of /y/ in nisyu but not in tibnu. This is the grammar without underlying glides. The proliferation of

alternate forms suggests that ECA is at present in a stage of transition, in which the generalizations of the root and pattern system are becoming opaque.<sup>5</sup>

Still unaccounted for is the appearance of /ee/ in the perfect paradigm of nisi. Examination of the doubled verbs shows conclusively that a morphological rule creating /ee/ is independently required in the grammar.

### 3.5 Doubled Verbs

Examples of the doubled verbs are

- |     |    |             |                     |
|-----|----|-------------|---------------------|
| 55) | a. | ḥabb/yihibb | 'he loved/loves'    |
|     | b. | kabb/yikubb | 'he poured/pours'   |
|     | c. | da??/yidu?? | 'he knocked/knocks' |

These verbs have traditionally been classed as bi-consonantal because they are pronounced /ḥab/, /kab/, /da?/ in isolation, but their final consonants are geminate before a vowel:

- |     |    |         |               |
|-----|----|---------|---------------|
| 56) | a. | ḥabbit  | 'she loved'   |
|     | b. | kabbu   | 'they poured' |
|     | c. | yidu??u | 'they knock'  |

A rule degeminating word-final consonants will account for these facts: it's very likely that such a rule is present in all languages which have final geminates, since such a sequence seems to be impossible to pronounce. For purposes of clarity, I'll include final geminates in surface representations.

The assumption that ḥabb is derived from underlying /ḥabab/ is consistent with the dictates of the URP hypothesis, and provides an explanation of the fact that there are no

verbs of the form  $CaCaC_{\bar{x}}C_{\bar{x}}$  or  $CaC_{\bar{x}}C_{\bar{y}}$  where  $x \neq y$ . This analysis requires a means of deriving ḥabb from /ḥabab/, and the following data suggest that such a process would be useful elsewhere in the grammar:

- 57) kibiir / akbar 'big/bigger'
- 58) a. gidiid/agadd (\*agdad) 'new/newer'
- b. xafiif/axaff (\*axfaf) 'light/lighter'
- c. saḥiiḥ/asaḥḥ (\*aḥaḥ) 'true/truer'
- d. muhimm/ahamm (\*ahmam) 'important/more important'

Akbar illustrates the common comparative pattern  $aC_1 C_2 aC_3$ , which was introduced in (13). The comparative is  $aC_1 aC_2 C_3$ , however, when the second and third radical consonants are identical.

This can be taken as independent motivation for a rule of Metathesis, and although this argument involves the same sort of circularity discussed in connection with the final weak verbs--it uses the assumptions of the URP hypothesis to argue for the hypothesis itself--it's a stronger argument, since there are many more forms involved than were involved in Coalescence, and there are no surface forms which are counterexamples to the proposed rule.

Thus we can assume a rule of Metathesis which effects the changes /ḥabab/ → ḥabb and /agdad/ → agadd. Metathesis doesn't apply when a long vowel separates the two identical consonants, nor when a long vowel precedes the first of two consonants:

- 59) a. gidiid 'new'  
 b. ḥaabib 'loving (m)'

The rule can be written as follows:

- 60) Metathesis (MET):

$$\begin{array}{ccccccc}
 x & \left\{ \begin{array}{c} \check{V} \\ C \end{array} \right\} & C & \check{V} & C & Y & \\
 & & x & & x & & \\
 & & 1 & 2 & 3 & 4 & \Rightarrow \\
 & & 1 & 3 & 2 & 4 &
 \end{array}$$

Metathesis must precede FVD to allow its output /ḥaabb/ to be converted to ḥabb.

### 3.5.1 Participles

The participles of the doubled verbs are exactly parallel to the participles of regular trilateral verbs:

- 61) a. kaatib 'writing (m)'  
 b. katba ( kaatib + a) 'writing (f)'  
 c. katbiin ( kaatib + iin) 'writing (p)'
- 62) a. ḥaabib 'loving (m)'  
 b. ḥabba ( ḥaabib + a) 'loving (f)'  
 c. ḥabbiin ( ḥaabib + iin) 'loving (p)'
- 63) a. maktuub 'being written (m)'  
 b. maktuuba 'being written (f)'  
 c. maktubiin 'being written (p)'
- 64) a. maḥbuub 'being loved (m)'  
 b. maḥbuuba 'being loved (f)'  
 c. maḥbubiin 'being loved (p)'

The form maḥbubiin 'being loved (p)' from /maḥbuub + iin/)

shows that Metathesis must precede VSh, since the length of the /u/ is what prevents the form from undergoing Metathesis. This ordering is consistent with the ordering Metathesis, FVD established above, since FVD precedes VSh.

Thus the doubled verbs are consistent with the predictions of the URP hypothesis. The only factor which the URP hypothesis fails to explain is the non-existence of perfect stems of the form  $CiC_xC_x$ ; one might say that roots with identical second and third radicals do not enter into word formation with the pattern CiCiC which is available to regular trilateral roots. Or one might simply have morpheme structure conditions which allow verbs of the form  $CiC_x^aC_y^a$ , where  $x \neq y$ , or  $CaC_xC_x$ . These forms can be generated equally well in the URP system and in a system which allows a variety of underlying shapes for verbs.

### 3.5.2 Appearance of /-ee-/

One aspect of the doubled verbs is surprising--their form before consonant-initial inflection suffixes:

65) ḥabbeet	'I loved'
ḥabbeena	'we loved'
ḥabbeet	'you (m) loved'
ḥabbeeti	'you (f) loved'
ḥabbeetu	'you (p) loved'

Insertion of a vowel before the consonant-initial endings is in accordance with ECA's absolute ban on three-consonant sequences, but one would expect the mechanism already established

to deal with such sequences, the rule of I Epenthesis, to be invoked. There is no phonological explanation for the appearance of /ee/ rather than /i/ (or, for that matter, rather than any other other vowel) in this position; thus an ad hoc morphological rule is required to account for this phenomenon. Once such a rule is present in the grammar, it is available to account for the appearance of /ee/ in final weak verbs as well. The presence of /ee/ in the doubled verbs goes a long way toward obscuring any connections between /ee/ in the bana paradigm and a rule of Coalescence which a child learning ECA might make.

I'll assume then that speakers with /ee/ in both bana and nisi forms treat the appearance of /ee/ in ḥabb forms as a manifestation of the same phenomenon. The following are the types of verbs which do and do not take /ee/:

- |     |    |             |               |
|-----|----|-------------|---------------|
| 66) | a. | katab       | 'he wrote'    |
|     | b. | katabu      | 'they wrote'  |
|     | c. | katabt      | 'I wrote'     |
| 67) | a. | nisi        | 'he forgot'   |
|     | b. | nisyu ~nisu | 'they forgot' |
|     | c. | niseet      | 'I forgot'    |
| 68) | a. | bana        | 'he built'    |
|     | b. | banu        | 'they built'  |
|     | c. | baneet      | 'I built'     |
| 69) | a. | ḥabb        | 'he loved'    |
|     | b. | ḥabbu       | 'they loved'  |
|     | c. | ḥabbeet     | 'I loved'     |

There are several ways to handle these facts. One way is to insert /ee/ (or /ay/) in these environments:

- 70) a.  $CC\_+Cx\bar{]}_v$   
 b.  $V(\text{glide})\_+Cx\bar{]}_v$

A simpler solution would be to assume that the apparently consonant-initial endings actually begin with /ee/, which is deleted in the following environment:

- 71)  $\bar{[+syll]} \quad \bar{[+cons]} \quad +\_ Cx\bar{]}_v$

A third possibility is one which allows us to capture the qualities which both doubled and final weak verbs share. This solution involves a rule which applies after I Epenthesis. At this point the stems of both doubled and final weak verbs end in a vowel; this analysis contains a rule taking this vowel to /ee/:

- 72) /ee/ Rule:

$$\bar{[+syll]} \rightarrow \left[ \begin{array}{l} -hi \\ -lo \\ -bk \\ +long \end{array} \right] / \_ +Cx\bar{]}_v$$

Rule (72) applies also in derived final weak verbs:

- 73) a. naada            'he called'  
       b. nadeet        'I called'
- 74) a.  $\Upsilon$ anna        'he sang'  
       b.  $\Upsilon$ anneet      'I sang'

It is ordered after I Ep and before SA, to ensure the placement of stress on the long vowel /ee/; therefore, it is clearly ordered among the phonological rules. This may

appear to contradict the claim made most recently by Aronoff (1974) that all morphological rules precede all phonological rules. The EE Rule has some characteristics of what are generally called morphological rules: it applies only to a certain class of items, it is not a "natural" process (that is, we would not expect to find the change  $V \rightarrow ee/ \_C$  with any frequency in other languages of the world), and its function is clearly to preserve the distinction between morphologically distinct but phonologically identical elements, such as  $/nisi\#na/ \rightarrow \underline{nisiina}$  'he forgot us' and  $/nisi+na/ \rightarrow \underline{niseena}$  'we forgot'. However, the rule is in form similar to the rule of Vowel Lengthening, in that it makes use of labelled bracketings, but mentions no more narrow class than 'verb'. Thus Aronoff's claim can be maintained in this case if we define a morphological rule as one which mentions some morpheme or word or some group of morphemes or words. Considering the form of the EE Rule in light of this definition, it's not surprising to find it ordered within the phonological rules.

### 3.6 Hollow Verbs

Both the perfect and the imperfect stems of the hollow verbs--again, a term adopted from the Arabic grammarians--are of the form  $C\bar{V}C$  ( $CV_xV_xC$ ). While the vowel of the perfect is invariably /aa/, the vowel of the imperfect stem may be either /aa/, /ii/, or /uu/:

- 75) a. naam/yinaam 'he slept/sleeps'  
 b. xaaf/yixaaf 'he feared/fears'
- 76) a. 'saal/yisiil 'he carried/carries'  
 b. ?aam/yi?uum 'he got up/gets up'

In the next sections I'll consider the arguments for setting up underlying /y/ or /w/ as the second radical of hollow verbs.

### 3.6.1 Causatives.

The pairs daras 'he studied' / darris 'he taught' and katab 'he wrote' / kattib 'he caused to write' illustrate one type of derived verb, the causative, built on the pattern  $C_1aC_2C_2^iC_3$ . There are many causative verbs which correspond to hollow verbs; each of these causatives has /y/ or /w/ in the position of the second radical:

- 77) a. nayyim 'he put to sleep'  
 b. xawwif 'he frightened'
- 78) a. 'sayyil 'he loaded'  
 b. ?awwim 'he made (someone) get up'<sup>6</sup>

The obvious inference to be drawn from these facts is that the glide of the causative is present in the non-derived verb as well, where it is deleted by a rule from which it is protected when geminate. According to this theory, the following forms underlie the verbs of (75) and (76):

- 79) a. /nayam/  
 b. /xawaf/
- 80) a. /'sayal/  
 b. /?awam/

The second argument for this hypothesis is the fact that, without exception, a long /i/ in the imperfect stem of the non-derived verbs corresponds to a geminate /y/ in the causatives, while long /u/ in the non-derived imperfect stems corresponds to geminate /w/ in the causative. Furthermore, the fact that imperfect tri-literal verbs have the choice of two vowel patterns,  $C_1C_2iC_3$  and  $C_1C_2aC_3$  ( $C_1C_2uC_3$  is quite rare) provides a way to explain the different imperfect stem patterns of the hollow verbs: yinaam and yixaaf may be seen as reflections of underlying  $C_1C_2aC_3$ , while yisiil and yi?uum may be seen as derived from  $C_1C_2iC_3$ .

A third argument that the underlying glide of the basic verb is the same as the glide which appears in the corresponding causative concerns the change of the perfect stem vowel before a consonant-initial inflectional ending. In this environment the long /a/ of the perfect shows up as either /i/ or /u/, and again without exception verbs taking /i/ are those with causatives in /y/, while verbs taking /u/ are those with causatives in /w/:

- |     |    |                   |             |
|-----|----|-------------------|-------------|
| 81) | a. | nimt              | 'I slept'   |
|     | b. | xuft              | 'I feared'  |
| 82) | a. | <sup>i</sup> silt | 'I carried' |
|     | b. | ?umt              | 'I got up'  |

It should be noted that this change takes place only before an inflectional ending. When a following consonant is contained within a clitic, the regular rule of VSh applies:

- 83) a. xaaf + na → xufna 'we feared'  
 b. xaaf # na → xafna 'he feared us'

These facts represent generalizations which must be explained. It's no accident that no verb of the following form will be found in ECA:

- 84) a. CaaC 'he\_\_\_\_' (perfect)  
 b. CiC+t 'I\_\_\_\_' (perfect)  
 c. yiCuuC 'he\_\_\_\_' (imperfect)

This fact is part of the speaker's knowledge of his language.

The URP hypothesis is one way to explain these facts. The strongest possible case for the validity of this hypothesis with respect to the hollow verbs would include the following arguments:

1. There is evidence for setting up underlying forms of hollow verbs which correspond exactly to underlying forms of tri-literal verbs.
2. The rules which convert these underlying forms into the surface forms of the hollow verbs are independently motivated and apply throughout the grammar whenever their structural description is met.
3. Derived forms are consistent in having glides in those environments in which the rule or rules deleting glides can't apply; the glide which appears in these forms is the same one which has been posited in the underlying form of the basic verb.

Unfortunately, none of these arguments can be maintained

in the face of additional evidence. First, while tri-literal perfect stems can be either CaCaC or CiCiC, there is no evidence that hollow verbs have two types of perfect stems.

Second, the rules needed to account for the shape of the hollow verbs cannot be general phonological rules. For example, one approach to the derivation  $Ca\{y\}aC \rightarrow CaaC$  is to posit a rule deleting /y/ or /w/ in the environment a\_a. But many forms contradict this rule:

85) dawa	'medicine'
fayadaan	'flood'
gawahirgi	'jeweler'
gawanti	'gloves'
hawa	'air'
mayadiin	'squares'
mustawa	'standard'
mutawassit	'middle'
sawa	'together'

Thus the rule would have to be restricted to verbs, and only to verbs of the shape  $Ca\{y\}aC$ , since kawa 'he ironed' is not affected.

The rule taking /aa/ to /i/ or /u/ before a consonant-initial inflectional ending is also restricted to verbs of this class. Derived verbs don't undergo this rule, although the phonological environment they provide is identical, as can be seen from the following examples involving addition of the passivizing prefix /it/:

- 86) a. garaḥ̄                    'he wounded'  
       b. garaḥ̄t                   'I wounded'  
       c. itgaraḥ̄                  'he was wounded'  
       d. itgaraḥ̄t                'I was wounded'
- 87) a. 'saal                        'he carried'  
       b. 'silt                       'I carried'  
       c. 'itsaal                    'he was carried'  
       d. 'itsalt                    'I was carried'

Finally, not all derived forms are as cooperative as the causatives. Participles of tri-literal verbs take the form CaaCiC:

- 88) a. kaatib                    'writing'  
       b. daaris                    'studying'

Participles of hollow verbs also have this shape, but the glide which appears on the surface is invariably /y/, even in verbs with putative underlying /w/:

- 89) a. naayim                    'sleeping'  
       b. xaayif                    'fearing'  
       c. 'saayil                    'carrying'  
       d. ?aayim                    'getting up'

The sequence CaaWiC is permitted on the surface, for one sort of derived verb is formed on the same pattern as the participle; /w/ may appear in these verbs:

- 90) a. gaawib                    'he answered'  
       b. ḥaawil                    'he attempted'

3.6.2 Solutions

To derive the hollow verbs from forms with the underlying glides, rules along this order are needed:

91) HV Rule I:  $\begin{array}{cccc} \sqrt{C} & a & \begin{bmatrix} -\text{syll} \\ -\text{cons} \\ +\text{hi} \end{bmatrix} & a C + C \underbrace{x}_{\underline{v}} \\ v & & & v \\ 1 & 2 & 3 & 4 \end{array} \Rightarrow$

$\begin{array}{cccc} 1 & \emptyset & \begin{bmatrix} 3 \\ +\text{syll} \end{bmatrix} & 4 \end{array}$

/nayam + t/ → nimt  
/xawaf + t/ → xuft

92) HV Rule II:  $\begin{array}{cccc} \sqrt{(x+)} & C & (a) \begin{bmatrix} -\text{syll} \\ -\text{cons} \\ +\text{hi} \end{bmatrix} & a C (+x) \underbrace{\quad}_{\underline{v}} \\ v & & & v \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array} \Rightarrow$

$\begin{array}{cccc} 1 & 2 & \emptyset & \emptyset & \begin{bmatrix} 5-6 \\ +\text{long} \end{bmatrix} \end{array}$

/nayam/ → naam  
/(yi) + nyam/ → (yi)naam

93) HV Rule III:  $\begin{array}{cccc} \sqrt{(x+)} & C & \begin{bmatrix} -\text{syll} \\ -\text{cons} \end{bmatrix} & i C (+x) \underbrace{\quad}_{\underline{v}} \\ v & & & v \\ 1 & 2 & 3 & 4 & 5 \end{array} \Rightarrow$

$\begin{array}{cccc} 1 & 2 & \begin{bmatrix} 3 \\ +\text{syll} \\ +\text{long} \end{bmatrix} & \emptyset & 5 \end{array}$

/(yi)'syil/ → (yi)'siil  
/(yi)?wam/ → (yi)?uum

This solution is not particularly insightful. The glides merely serve the function of diacritics, indicating whether

a given verb takes /i/ or /u/ in various environments. The imperfect stem vowels (/a/ or /i/) again are essentially diacritics, indicating whether the verb is a member of the class which takes long /a/ in the imperfect (yinaam, yixaaf) or whether it is one of those which takes a high vowel in the imperfect (ysiil, yi?uum).

An analysis in which underlying stems of the shape CvvC are posited has the advantage in efficiency, since it does not require the spurious step of eliminating the glide (which never appears on the surface). The following readjustment rule will convert underlying CiiC or CuuC to CaaC:

94) Hollow Verb Rule:

$$\left[ \begin{array}{l} +\text{syll} \\ +\text{long} \end{array} \right] \rightarrow \left[ \begin{array}{l} \pm\text{lo} \\ \end{array} \right] / \langle x \rangle \left[ \begin{array}{l} \text{C\_C (+v)} \\ \text{V, \&A} \end{array} \right]$$

The angle bracket convention allows Rule (94) to apply to the imperfect of verbs marked  $\left[ \begin{array}{l} \text{+A} \end{array} \right]$ ; that is, verbs such as naam/yinaam and xaaf/yixaaf. The rule of Vowel Shortening applies when a consonant-initial ending follows the verb stem.

One is still obliged to capture the generalization that the quality of the causative glide is predictable given the quality of the vowel of the basic verb stem, as well as the fact that all participles of hollow verbs have /y/. Means of expressing these sorts of facts are discussed below.

### 3.6.3 Summary.

Arguments have been presented in this section that the facts of ECA make an analysis of hollow verbs as derived from tri-literal roots less efficient than an analysis which sets

up verb stems with underlying long vowels. This solution necessitates the addition of another item to the inventory of possible verb shapes.

### 3.7 Initial Weak Verbs.

There are two initial weak verbs, kal 'he ate' and xad 'he took':

95)	kal	'he ate'
	kalit	'she ate'
	kalna	'we ate'
	yaakul	'he eats'
	taakul	'she eats'
	?aakul	'I eat'
96)	xad	'he took'
	xadit	'she took'
	xatna	'we took'
	yaaxud	'he takes'
	taaxud	'she takes'
	?aaxud	'I take'

The participles of these verbs are of the same pattern as those of the tri-literal verbs, CaaCiC. /w/ appears in the position of the third radical:

97)	waakil	'eating (m)'
	wakla	'eating (f)'
	wakliin	'eating (p)'

- 98) waaxid            'taking (m)'  
       waxda            'taking (f)'  
       waxdiin        'taking (p)'

The verb kal clearly corresponds to the causative wakkil 'he fed.'

These facts and the presence of /aa/ in the imperfect stem suggest a glide in the first radical position of the verb. To explain the facts of the verb paradigms, one needs rules accomplishing the following changes:

- 99) #WaCaC  $\Rightarrow$  #CaC  
       to derive kal from /wakal/

- 100) CV+ WC...  $\Rightarrow$  CaaC...  
       to derive yaakul from / yi + wkul/

Any rule effecting the change described in (99) must, however, contend with a great number of counterexamples, among them verbs:

- 101) a. walad            'boy'  
       b. wara?            'paper'  
 102) a. waga8            'he hurt'  
       b. wagad            'he found'  
       c. waṣal            'he arrived'

Rule (100) is also contradicted by many forms:

- 103) a. yiwga8            'he hurts'  
       b. tiwṣal            'she arrives'<sup>7</sup>

Since rules (99-100) must be minor rules applying only to these two verbs, the simplest solution involves setting up the stems kal/kul and xad/xud. Then only one rule is

required:

104) kal, xad Rule:

$$[\text{+syll}] \rightarrow \begin{bmatrix} \text{+lo} \\ \text{+long} \end{bmatrix} / \text{---} + \left\{ \begin{array}{l} \text{kul} \\ \text{xud} \end{array} \right\}$$

Rule (105) performs the following sorts of changes:

105) a. yi + kul  $\rightarrow$  yaakul

b. ni + xud  $\rightarrow$  naaxud

### 3.8 Summary.

In the preceding sections I've examined five classes of verbs and investigated the hypothesis that all are derived from identical underlying patterns. The five sorts of verbs are:

106) a. trilateral: katab, fihim

b. final weak: bana, nisi

c. doubled: ḥabb

d. hollow: naam

e. initial weak: kal

A demonstration that it is possible to write rules deriving (106b-c) from the pattern underlying (106a) was not considered to constitute evidence for this hypothesis. Rather, evidence that such rules were independently motivated or that they provided the simpler grammar was taken to confirm the hypothesis.

Only in the case of doubled verbs was it clear that derivation from a more abstract form was justified, since the rule accomplishing such a derivation was productive in

another area of the grammar. No strong arguments could be found, however, for deriving hollow and initial weak verbs from underlying triliteral stems. The final weak verbs can be treated as underlyingly triliterals, but the facts of the more common dialect, that containing the forms nisyit, nisyu, are most easily explained if one assumes no underlying final glide.

It's probably not an accident that those verbs which do not lend themselves to analysis in terms of the Uniform Root and Pattern Hypothesis are those which require under that analysis the postulation of underlying glides. While ample evidence for underlying glides appears in MSA, such evidence was obscured by changes in the language. Representative forms from MSA are these:

107)	da8aa	'he called' ( da8aw + a)
	da8awnaa	'we called' ( da8aw + naa)

vs.

108)	kataba	'he wrote'
	katabnaa	'we wrote'

The rule of Coalescence eliminated the surface occurrence of glides. The shortening of final long vowels and the deletion of final non-long vowels destroyed evidence for deletion of a glide in the environment a\_\_a, thus making the morphology of the hollow verbs less obvious.

Presumably, the loss of evidence for underlying glides in one set of verbs weakened the language learner's motivation to set up underlying glides in other classes of verbs.

If the URP solution necessitated a more costly set of rules in only one class of verbs, it might be argued that the more highly valued grammar was still the one which preserved the URP generalization, even at the cost of including several ad hoc rules. But the proliferation of cases in which evidence for trilateral roots is weak suggests that the URP hypothesis is simply not accepted by the language-learner or, at least, is not applied to the so-called defective verbs. Since a glide never appears in any of these verbs and evidence for rules deleting or mutating glides in the appropriate environments is weak or absent, the child learning ECA has no reason to set up underlying glides.

This argument depends on one assumption which needs justification. Glides do appear on the surface, not in the paradigmatic alternations of the basic verbs, but in words related to the verbs. If one assumes that basic words and those derived from them must share at the underlying level a common, phonologically identical stem, the facts of the derived words--for example, the appearance of glides in causatives corresponding to hollow verbs--constitute strong evidence for the URP hypothesis. However, if one assumes that there are other ways of expressing relatedness between words, the presence of glides in derived forms does not provide an argument for setting up glides in the basic verbs. One way of expressing the facts of the derived forms is presented in Section 3.9.

### 3.9 Derived Verbs.

The conception of the lexicon assumed in this section is roughly that formulated by Aronoff (1974). In this model any derived word the shape or meaning of which is not totally predictable as the sum of its parts is entered in the lexicon. Word formation rules (WFRs), also in the lexicon, express the correspondences between basic and derived words. An example is the English WFR providing for the addition of /ness/ to adjectives:

$$109) \quad \left[ x \right]_A \Rightarrow \left[ \left[ x \right]_A \quad \text{ness} \right]_N$$

#### 3.9.1 Participles.

As noted above, the active participles of all basic tri- or biliteral verbs (except for final weak verbs) are of the form CaaCiC. Hollow verbs have /y/ in the position of the second consonant, while initial weak verbs have /w/ in the first consonantal position. Final weak verbs have no final consonant, though /y/ appears before the feminine and plural suffixes.

These facts can be explained by postulation of a single participle pattern and of a triliteral root underlying each verb. It's then assumed that the word-formation process consists of the combination of various roots with various patterns. This solution necessitates

- a. a rule deleting final glides
- b. a rule converting the /w/ in 'hollow' participles to /y/

- c. rules explaining loss of /w/ in non-participial forms of initial weak verbs.

An alternative is simply to provide several WFRs predicting the shape of a participle given the shape of the basic verb. These rules are

- 110) For Triliteral and Final Weak Verbs:

$$\left[ \text{CvCv (C)} \right]_{\text{v}} \Rightarrow \left[ \text{CaaCi (C)} \right]_{\text{part.}}$$

- 111) For Hollow Verbs:

$$\left[ \text{C}\bar{\text{v}}\text{C} \right]_{\text{v}} \Rightarrow \left[ \text{Caayic} \right]_{\text{part.}}$$

- 112) For Initial Weak Verbs:

$$\left[ \text{CvC} \right]_{\text{v}} \Rightarrow \left[ \text{WaaCiC} \right]_{\text{part.}}$$

### 3.9.2 Causative Verbs.

Causatives associated with all the types of basic verbs can be found:

- 113) a. katab 'he wrote'  
 b. kattib/yikattib 'he caused/causes (someone) to write'
- 114) a. misi 'he walked/went'  
 b. massa/yimassi 'he walked/walks someone'
- 115) a. xaaf 'he feared'  
 b. xawwif/yixawwif 'he frightened/frightens (someone)'
- 116) a. kal 'he ate'  
 b. wakkil/yiwakkil 'he fed (someone)'



for the maintenance of the URP hypothesis to explain the facts of the ECA verb system are not tenable.

This conclusion raises the question of the status of the entities root and pattern in ECA. An ideal root and pattern language would have a regularly productive system of word formation, in which only roots and patterns were listed in the lexicon, with any root allowed to combine with any pattern. The results of combining a root and a pattern would be completely predictable: the meaning of the word would be entirely a function of the meaning of the root plus the meaning of the pattern. This sort of language would be most efficiently described by the sort of system proposed in Halle (1973), which lists only stems and morphemes, along with rules for combining them, and provides for any deviation from the expected result in a huge exception filter which lists the idiosyncrasies of each word.

Needless to say, ECA doesn't work this way--in fact, it seems that no human language has a word formation system which operates with such sterile efficiency. While the relationship between, for example, the noun kilma 'word' and the causative-pattern verb kallim 'to address' has a certain logic, the meaning of the verb can't be said to be predictable from knowledge of the root k-l-m and the causative pattern. Words are more than the sum of their parts, and therefore a word-based system of morphology such as the one outlined by Aronoff (1974) is more to the point than one based solely

on roots and patterns. In this sort of system, those words whose meanings are completely predictable, such as the English nouns formed by addition of /ness/ to an adjective, are not listed in the lexicon, but any derived word whose properties are not totally predictable from the properties of its parts (such as revolution, which means more than one would predict from consideration of revolve + /tion/) does appear in the lexicon. Word Formation Rules (which, for example, allow the addition of /tion/ to a verb) describe the generalizations of word formation, but it's not predicted, as it is in Halle's system, that most derived words will be limited to the information contained in the entries of the basic words plus the information provided by the Word Formation Rules. Morphemes, such as sub, ad, mit, sume, are not treated as items associated with any constant core of meaning: what is the common meaning of permit, submit, admit, remit?

This model can be extended to handle the facts of ECA word formation. ECA roots may be treated as analogous to the morphemes mit, sume, etc., recognized as distinct entities but not assigned a single meaning. The patterns may be represented as Word Formation Rules, which operate on full words, rather than on roots. These Word Formation Rules are often associated with a meaning (such as, for example, causative verb), but since the derived words are listed in the lexicon, their idiosyncratic properties are listed there. Thus the ECA system of word formation, which appeared to be

a candidate for an alternative to the word-based system of morphology proposed for English, is described quite adequately by the same devices developed to explain English word formation.

### 3.11 Summary.

In this chapter I've argued that the classical root and pattern system has gradually broken down, and that a word-oriented system of morphology has begun to take its place. This was shown to have been accomplished by the increasing opacity of certain phonological rules (notably Coalescence and Final Glide Deletion), which made an analysis of certain forms as composed of underlying roots and patterns more difficult, destroying the language learner's motivation for positing the root as the basis of all forms. The effect of the weakening of the root and pattern system on the phonology has been pervasive, leading to the replacement of many purely phonologically conditioned rules by a series of morphologically conditioned ones. ECA provides an interesting example of very basic changes in a language and the repercussions of these changes throughout the system.

## NOTES

## Chapter III

<sup>1</sup>Arabic grammarians assigned d-r-s the meaning of "investigate".

<sup>2</sup>/Ma/ may also be associated with nouns of agent. Thus, kawa 'to iron', makwa 'an iron'.

<sup>3</sup>The Uniform Root and Pattern Hypothesis is essentially the assumption underlying the works of the classical Arabic grammarians. The concept of deep structure is by no means a new one, though its rigorous formulation is new.

<sup>4</sup>See Birkeland for a discussion of this matter and evidence that forms with diphthongs are later introductions. Also see Prince (pp. 50, 208-9) for a discussion of coalescence rules in Tiberian Hebrew.

<sup>5</sup>The passive participles of these verbs are as follows:

maCCi:	mabni	'being built (m)'
maCCiyya:	mabniyya	'being built (f)'
maCCiyyiin:	mabniyyiin	'being built (p)'

These can be compared with the participles of sound verbs:

maCCuuC:	maktuub	'being written (m)'
maCCuuCa	maktuuba	'being written (f)'
maCCuCiin:	maktubiin	'being written (p)'

The first step in deriving the final weak forms from underlying /maCCuuy/, parallel to the sound forms, would be a rule converting /uu/ to /ii/ before /y/. However, this rule is contradicted by such forms as buuya 'paint'. Thus these forms may be accounted for most simply by setting up underlying /maCCi/ and applying the allomorphy rule needed independently for Nisba adjectives (section 2.4), which converts /i+a/ to /iyya/ and /i+iin/ to /iyyiin/.

<sup>6</sup>I've chosen examples in which the semantic relationship is especially clear; the correspondence between basic and derived verb is by no means always as consistent as it is in these forms.

<sup>7</sup>These forms are also counterexamples to the rule of Coalescence.

C H A P T E R I V  
RULE TYPE AND RULE ORDER

In this chapter the phonology of ECA is examined in light of some hypotheses about the organization of a grammar.

4.1 Overview.

The following are the rules which have been motivated in the course of this work, and the ordering relationships which obtain between them:

- Kal, Xad Rule (p. 173) (> SA)
- Hollow Verb Rule (p. 170) (> VSh)
- Hu/Ki Rules (p. 129, 130-131) (> VL)
- First Person Clitic Rule (p. 113) (> VL)
- L-Assimilation (p. 1)
- Vowel Lengthening (p. 128) (> VDA#, SA, I Ep)
- ?-Insertion (p. 25) (> WIE, VDA#, I Ep)
- Word Initial Epenthesis (p. 23) (> I Ep, SA)
- Vowel Deletion Across # (p. 31) (> Syll Rules)
- Y-Formation (p. 155) (> I Ep, FVD)
- I Epenthesis (p. 2) (> EE Rule, HVD, Syll Rules)
- EE Rule (p. 162) (> SA)
- Intervocalic Glide Deletion (p. 145) (> FVD)
- First Vowel Deletion (p. 59) (> SA)
- Metathesis (p. 159) (> FVD)
- Stress Assignment, Stress Retraction (p. 12) (> HVD, VSh)
- High Vowel Deletion (p. 20) (> VSh, Syll Rules)

Vowel Shortening (p. 19)

Syllabication Rules (p. 37-38) (>Emp Spr, I-?-Ins)

Emphasis Spreading Rules (p. 41, 45, 46)

Late ?-Insertion (p. 49)

An examination of these rules suggests some generalizations about types of rules and their position in a grammar.

#### 4.2 Cliticization Rules.

The cliticization rules are not listed above, since they are not part of the phonology per se. The assumption that these rules are actually part of the readjustment component, along with its corollary that no cliticization rule may precede a syntactic transformation, has been demonstrated to be inaccurate for ECA, where certain transformations must be ordered among the cliticization rules.

A division of cliticizing languages into two sorts--those in which cliticization takes place only onto adjacent elements, and those in which clitics may originate at a remove from the element to which they will eventually be attached--was defended, and ECA found to belong to the former category.

I have argued that the structures resulting from cliticization rules are these:

- 1) a.  $\left[ \left[ \underset{x}{W} \right] \right] \# \left[ \underset{x}{C} \right]$
- b.  $\left[ C \right] \# \left[ \left[ \underset{x}{W} \right] \right] \underset{x}{\phantom{C}}$

c.  $\left[ C \right] \# \left[ \underset{x}{W} \right] \# \left[ \underset{x}{C} \right]$

Information both about the number and placement of word boundaries and about labelled bracketing is necessary and can be referred to by rules of the phonology. The presence of the word boundary between the clitic bi and the verb to which it is attached is necessary to explain the non-application of the rules of Intervocalic Glide Deletion and High Vowel Deletion to forms in which bi forms a crucial part of the environment. The rule of Vowel Lengthening is sensitive to the finer distinctions between cliticization and single word boundaries allowed by the use of labelled bracketing.

#### 4.3 The Phonological Rules.

One interesting aspect of the phonology of ECA is that the stress rules are ordered quite late in the grammar. This is an unusual situation; stress rules generally apply quite early, and the ideas that stress rules are always the first rules of the phonology, or even that stress is assigned in the lexicon, have been in the air for some time. However, the ECA stress rules are unusual in more than just their position in the grammar. These rules are unusually insensitive to the structure of a string. Stress Assignment merely scans leftward from a double word boundary; this fact is illustrated by the case discussed in Chapter II involving

the following sentence:

2) 'ana rgi8ti mn il agaaza mbaarih

'I returned from vacation yesterday.'

Here the /i/ of the preposition min 'from' has been deleted by High Vowel Deletion. Since High Vowel Deletion only affects unstressed vowels, Stress Assignment must not have applied to min; this is explained by the fact that monosyllabic prepositions are separated from the nouns following them by only one word boundary, and therefore the entire unit min il agaaza receives only one stress.

The stress rules are also oblivious to the internal structure and complexity of a word, assigning the same stress to darabu 'they beat' (from darab+u) and to darabu 'he beat him' (from darab#u). Each such complex forms as the following receive a single stress:

3) a. makatabhumlukum's

'he didn't write them for you (p)'

b. katabhumlukum

'he wrote them for you (p)'

Stress is assigned to forms like these according to the same principles by which it's assigned to simple words.

My contention is that there is a relationship between the insensitivity of ECA stress rules to certain sorts of information and their relatively late ordering in the grammar, and that the position of stress rules early in the grammar of many languages--English for one--is due not to

the fact that they are stress rules, but to the fact that they tend to be sensitive to these sorts of information. Thus my general hypothesis is that there is a tendency for rules which are more sensitive to structure to be ordered earlier in the grammar.

To understand what I mean by a rule's being sensitive to structure, consider the sorts of information to which a rule may have access:

- 4) a. identity of words or morphemes, expressed by mention of specific words or morphemes in the rule.

Example: First Person Clitic Rule.

- b. identity of classes of words or morphemes, expressed by mention of diacritic features which identify such classes.

Example: Hollow Verb Rule.

- c. category of words or morphemes, expressed by labelled bracketing.

Example: Vowel Lengthening, EE Rule.

- d. word structure, expressed by the placement of word boundaries.

Example: High Vowel Deletion.

- e. phonological structure, expressed by feature specifications.

Example: almost any rule.

- f. syllabic structure, expressed by syllable boundaries.

Example: Emphasis Spread.

Rules may make use of any of these sources of information. When included in the structural description of a rule, each sort of information has the effect of limiting the range of strings to which a rule may apply. The list above is arranged from most to least specific; thus, for example, every pronounceable string has syllable structure, and since the inventory of syllable types is limited, a rule of ECA which refers only to syllable boundaries can apply to the widest possible range of forms, regardless of the identity, category, or internal structure of the forms. (In languages where syllabication rules are sensitive to the presence of word boundaries, of course, the situation is a bit more complicated.)

My assumption is that rules have a tendency to be ordered according to the sort of information they make use of, with rules using information which is higher on the list ordered earlier in the grammar. Thus in the assertion that rules are ordered according to the extent to which they are sensitive to structure, sensitivity to structure should be defined as the ability to distinguish between strings which are in some respect identical. Thus any two words, for example, are identical with respect to word structure, but are distinct along other dimensions (phonological structure,

possibly category, syllabic structure, etc.) This definition predicts, of course, that a rule which refers only to the category of an element is less sensitive to structure--therefore ordered later--than a rule which refers to the phonological composition of a string, since a rule which applies, for example, to all verbs, (that is, in the environment  $\text{---}\overline{\text{V}}$ ), will apply to at least as many forms as a rule which applies to all vowels which precede nasals. Thus by this definition rules using labelled bracketing should be ordered fairly late in the grammar. But of course we'd never expect to find a phonological rule which applied just to any verb, without regard for either the phonology or the class of the verb. The types of information found higher on the list in (4) are almost always accompanied by other sorts of information. Thus the EE Rule applies only to vowel-final verbs, and this only when these verbs are followed by a consonant-initial inflectional ending:

5) EE Rule

$$V \rightarrow ee/ \text{---}\overline{+CX}\overline{\text{V}}$$

We'd never expect to find a rule like the following one:

$$6) \quad X + Y \overline{\text{V}}$$

$$1 \quad 2 \Rightarrow$$

$$\left[ \begin{array}{l} 1 \\ +\text{syll} \\ +\text{hi} \\ -\text{lo} \\ +\text{long} \end{array} \right]^2$$

Furthermore, labelled bracketing conveys information not only about category but also about word structure, since a bracket serves as an indication of the beginning or end of a word. Rules which make use of the distinctions higher on the list are more sensitive, then, than rules which consider, for example, only the phonological feature content of a string, since the former will always use more than one sort of information. The ultimate sensitivity to structure in this sense is of course the use of the first sort of information on the list, actually naming an item, since this involves distinguishing a string from other strings on all levels.

This principle explains why the EE Rule, alone among the rules whose function is morphological, must be ordered after certain phonological rules. While the other morphological rules mention diacritic features or specific morphemes, information which implicitly includes the information conveyed by labelled bracketing, this rule uses only labelled bracketing. This principle also predicts the early ordering of Vowel Lengthening, which refers to labelled bracketing, and the late ordering of the stress rules, which do not.

Previous observations about the relationship between rule typology and rule ordering can now be seen to be explained by the principle of sensitivity to structure. A division of rules into three types--morphological, phonological, and phonetic--is almost universally accepted. The view

that rules are ordered according to type--morphological rules first, phonological rules next, and phonetic rules last--is so pervasive that it's rarely even argued for directly, but simply assumed. Even Anderson, who contends (Anderson, 1974) that this ordering should not be considered a hard and fast rule governing the organization of grammars agrees that rules do exhibit a tendency to be ordered in this manner. Differences arise in matters of definition, however. Lightner defines morphological rules (from Aronoff, 1974) as rules whose "environment always contains a reference to some morphological category". Aronoff argues that this definition is too broad, and that only those rules which spell out "the form of particular morphemes in specific morphological environments" necessarily precede all phonological rules. Cearley defines morphological rules (Cearley, 1974) as minor rules: "All forms subject to the application of a particular morphological rule are marked for its application"; thus morphological rules are rules which have many exceptions. Anderson defines rules (Anderson, 1974) in terms of form: "Morpholexical rules are those which involve essential reference to the identity of specific morphemes, lexical items, or classes of morphemes"; phonological rules "are those whose environments involve reference only to the phonological composition of a string, including boundary elements and possibly reference to major lexical classes"; phonetic rules "specify non-categorical values or non-distinctive features."

All these definitions have in common that they consider morphological rules to be more restricted in their area of application than phonological rules--they apply only to a certain class of items. Thus their early ordering can be seen as a result of their form: a wider use of the devices listed in (4) creates a greater sensitivity to the structure of a string. Aronoff's argument for the earlier ordering of rules which are sensitive to the morphological identity of both the environment and the focus of the rule, rather than rules which simply specify the morphological category of one of these elements, is essentially an argument for this principle.

The question now arises of how best to capture the generalization about the connection between rule ordering and rule sensitivity. One possibility is provided by the hypothesis that certain sorts of information are eliminated as the derivation proceeds. Thus at some point in the derivation, labelled bracketings would be removed; at some later point, word boundaries would be removed. In ECA, labelled bracketings are not needed in any rule later than Vowel Lengthening, and could be erased at some time after that rule had applied. Word boundaries could be erased directly before the syllabication rules applied. This latter course provides a way of describing the fact that syllabication rules are oblivious to the presence of word boundaries.

Crucial to this hypothesis, then, is the question

whether any of the rules following the syllabication rules are sensitive to word structure. It was seen that the rule spreading emphatic articulation leftward beyond the syllable containing the underlyingly emphatic segment (Left Emphasis Spread) appeared to be inhibited by the occurrence of a word boundary, although one example of leftward spread beyond the word was adduced in section 1.8.4. Further work must be done in this area.

#### 4.4 Summary.

The traditional division of rules into morphological, phonological, and phonetic has been generally accompanied by an implicit assumption about the ordering of these rules. The evidence from ECA suggests that this tendency is a manifestation of a more general principle, the principle that rules which are more sensitive to the structure of a string tend to be ordered earlier in the grammar.

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