

THE PHONOLOGY AND MORPHOLOGY
OF TIBERIAN HEBREW

by

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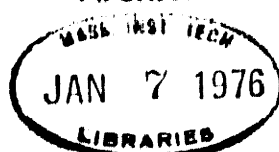
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ABSTRACT

This thesis investigates the phonology and certain of the morphological structures of the Hebrew of the Biblical period. Principal attention is focussed on the network of stress-related mutations of syllable structure. The SPE theory of phonological formalism, which abjures easy reference to the notion 'heavy syllable' is supported, as is the linear ordering of rules. The prosodic theory of Liberman (1975) is adapted to give insight into the stress-shifting phenomena of the language. The reduction and deletion phenomena which so markedly distinguish the language from Proto-North West Semitic (and from related languages such as Classical Arabic) are shown to devolve from a single rule of de-stressing that operates in an alternating fashion. The phonology of the construct state is shown to be very simply related to that of the rest of the language when it is understood that the entire aggregation of nouns forms a single phonological word, in the sense of SPE. Certain theses about exceptionality are advanced, and minor rules, operating in contexts created by syntactic rather than morphological combination, are shown to play a role in grammar.

Thesis Supervisor: Morris Halle
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To S.A.

que be'm vols mal

Acknowledgement

It has been well said, that works of light and the scholarly passions do not spring unaided from the brow of their genial creators, Minerva from Jupiter, grey-eyed and gleaming with new intelligence. There is a history here, deep beyond the accumulation of pages, not merely a history of ideas, that calls for a reckoning or for a formal feeling that evokes one.

My history has been much among the nimbus of ideas made by the advisors to this work: Noam Chomsky, Morris Halle, Paul Kiparsky. My first teacher of linguistics, Myrna Gopnik, with her inspired over-view of things, provided me with what proved to be a Pisgah sight of Palestine; with David Lightfoot I came across the border, taking an instructive run around the mountain (Mount Royal I mean) on the way.

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Jean-Roger Vergnaud (one might say: il miglior fabbro), friend

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All the errors, omissions, & compromises are on me.

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Prefatory Remarks

The language we shall be concerned with is the Hebrew of the Bible, especially that major portion of Biblical literature which was composed in the 600 year period preceding the Babylonian Exile of 587 B.C. This material was transmitted through antiquity in the form of a text written with the 22 consonant signs of the Hebrew alphabet. In the 9th and 10th centuries A.D. a group of Jewish scholars working in Tiberias, Palestine -- the Masoretes (transmitters) -- perfected an intricate system of diacritic markings designed to preserve, down to fine phonetic detail, the accepted manner of reading the language; these they interpolated the received consonantal text.

Masoretic Hebrew -- the Hebrew of the Bible as annotated by the Masoretes for vowels, accent, spirantization (and its lack), and gemination -- has the following sound system, according to the standard interpretation, as presented in e.g. Lambdin (1971) and Gesenius (1910):

p	(f)	t	(θ)	<u>t</u>	s	<u>s</u>	s	s	k	(x)	q	h	h
b	(v)	d	(δ)		z				g	(γ)			?
m		n	l	r									
y	w												
		i		u					<u>i</u>		<u>u</u>		
		e (ə)		o					<u>e</u>		<u>o</u>		
		a							<u>a</u>				

Remarks: The non-emphatic stops / p t k b d g / are spirantized in the env. V--. As this is the only source for these spirants, we follow traditional orthographic practice in writing them as the homorganic stop with an under- or over-line: p = f ; t = θ ; k = x ; b = v ; d = δ ; g = γ .

A straightforward analysis of the non-syllabic sonorants, using the features of Kean (1975) provides a grammatically adequate classification of them.

	y	w	l	m	n	r	ḥ	ʕ	h	ʔ
son	+	+	+	+	+	+	+	+	+	+
cns	-	-	+	+	+	-	-	-	-	-
low	-	-	-	-	-	-	+	+	+	+
high	+	+	-	-	-	-	-	-	-	-
back	-	+	-	-	-	-	+	+	-	-
St.V.C.	-	-	-	-	-	-	+	-	+	-
cor	-	-	+	-	+	+	-	-	-	-

The abbreviation 'St.V.C.' refers to the feature [Stiff Vocal Cords].

[+Stiff Vocal Cords] signifies voicelessness.

The segments /ḥ ʕ h ʔ/ are the gutturals; /ʕ/ is the voiced pharyngeal fricative and /ḥ/ is its voiceless counterpart. They form the class [-syl, +son, +low]. They function as a class in a number of rules; their major effect upon neighboring vowels is lowering. A simple and very low level example of their influence is this: before a word-final guttural /ḥ ʕ h/, any non-low vowel picks up an a-off glide:

$$(0) \quad \emptyset \text{ -- a } / \left[\begin{smallmatrix} \text{V} \\ \text{-low} \end{smallmatrix} \right] \text{ -- } \left[\begin{smallmatrix} +\text{son} \\ +\text{low} \\ +\text{cnt} \end{smallmatrix} \right] \#$$

Characteristic instances of the rule are ṣōlēḥ, ḥiṣmīʕ, gāḇōah. The exclusion of /ʔ/ may be an orthographic artifact, since in a form written as yōṣēʔ, the /ʔ/ may well be phonetically absent. At any rate, the rule, which is totally universal in application, shows quite clearly the guttural affinity for lowness.

It may be that the feature [±low] should be replaced, or supplemented, with the feature [±Constricted Pharynx]. However, it is not at all clear that /h ʔ/ involve pharyngeal constriction; but perfectly clear that they pattern with /h ʕ/ and that they tie in with lowness; so I shall use [±low] here.

The class [-syl, -cns, =hi] comprises the gutturals plus /r/, excluding /y w l m n/. This class functions in a centrally important rule of the language, given as rule (11), chapter 2; this grouping-together has occasioned much comment over the years, but in the system of Kean (1975), where /r/ is treated as a glide, it is quite natural. The segments /h ʕ h ʔ r/ are just the non-high glides.

The so-called emphatic consonants /t̤ s̤ q/ provide problems in phonetic analysis which are essentially insoluble because of the nature of the data -- an orthographic record of a language long dead. The segments /t̤ s̤/ obviously have some kind of secondary articulation in common, for an assimilation in this articulation regularly takes place in the *Hitpaʕfēl* conjugation (its morphology is sketched immediately below). The /t/ of the *hit-* prefix metathesizes with a following coronal, and it assimilates in both voicing and 'emphasis' to that coronal.

<u>Prefix</u>	<u>Stem</u>	<u>Combination</u>
hit-	zakkēr	hizdakkér
	dabbēr	hiddabbēr
	saddēq	hištaddēq
	tahēr	hittahēr
	šammōr	hištammēr

I take this as evidence that /t̤ s/ share a feature which non-emphatics like /t s/ lack. The exact character of this secondary articulation is unclear, and in a well-studied modern language which has this series of consonants -- Arabic -- it is the source of a traditionally heated controversy. The emphatics are variously held to be pharyngealized, velarized, or formed with tensing of the tongue-root (Brame 1970).

We have another source of structural information about /t̤ q/. Unlike their non-emphatic counterparts /t k/, they do not undergo spirantization in the env. V--. This property they share with (ordinary) consonants that stand as the first member of a geminate cluster: contrast dābār 'word' with dibbār 'he talked'. Geminates arise through derivation, suffixal inflection, and phonological assimilation; whatever the source, spirantization is blocked. What could be the motive for such recalcitrance? Recall that Korean has a three-way distinction of consonant-types into aspirated, non-aspirated, and 'fortis'. Kim (1975) shows that any geminates arising through morphological combination become 'fortis'. This suggests the possibility that Hebrew geminates are 'fortis', that the emphatics are 'fortis' as well, and that spirantization does not apply to 'fortis' consonants. Now, Kim identifies 'fortis' with glottalization, i.e. the feature specification +Constricted Glottis, -Spread Glottis, and it may be that the Hebrew geminates should be glottalized by a phonological rule. But 'fortis' cannot be simply identified with 'emphatic': the sequence -tt- is never written -t̤- or -t̤t̤-; nor is -kk- written -q- or -qq-. So it seems that the secondary articulation of /t̤ s/ is something other than 'fortis' or [+C.G.]. 'Fortis' may be a 'tertiary'

articulation of these segments, but there is no necessity that forces us to such a conclusion. Assuming glottalization of geminates, the class of segments which spirantize post-vocally can be characterized as [-son, -low, -C.G.] , taking [+low] (perhaps better is [+C.P.]) as the feature shared by /t̤ s q/.

The segment /s/, written with the letter śn, is evidently a palatalized /s/. Unfortunately, it participates in no alternations that would betray the details of its character; but its reflexes in related languages are /s/ (Aramaic) and /s/ (Arabic, Ethiopic, Akkadian), which makes /s^y/ a likely enough candidate.

The following table is offered as a rudimentary characterization of the phonetic composition of the non-sonorant articulations of Hebrew. Those features which are omitted may be assumed to enjoy their unmarked value in the segments at hand.

	p	t	t̤	s	s̤	s	s	k	q	b	d	z	g
syl	-	-	-	-	-	-	-	-	-	-	-	-	-
cns	+	+	+	+	+	+	+	+	+	+	+	+	+
son	-	-	-	-	-	-	-	-	-	-	-	-	-
St.V.C.	+	+	+	+	+	+	+	+	+	-	-	-	-
low	-	-	+	-	+	-	-	-	+	-	-	-	-
high	-	-	-	-	-	+	+	+	-	-	-	-	-
back	-	-	-	-	-	-	-	+	+	-	-	-	+
cor	-	+	+	+	+	+	+	-	-	-	+	+	-
ant	+	+	+	+	+	+	-	-	-	-	+	+	-
cnt	-	-	-	+	+	+	+	-	-	-	-	+	-

Morphological Preliminaries

Hebrew distinguishes two categories of inflection: the verbal and the nominal. There is a distinction in the nominal system (which includes nouns per se, adjectives, participles) between masculine and feminine, and between singular and plural. The old dual has fallen into desuetude, being used only in a narrow range of forms, such as nouns referring to paired body parts or expressions conventionally related to a certain positive integer (2, 200, 'twice', 'two years'). Adjectives are inflected to agree with the noun they modify (the plural being used when the noun is dual). The usual nominal inflections are displayed here attached to the adjective tōb 'good'. (Like all adjectives, it may be used as a noun, signifying 'good one'.)

	<u>Singular</u>	<u>Plural</u>
<u>masc.</u>	<u>tōb</u>	<u>tōbīm</u>
<u>fem.</u>	<u>tōbā</u>	<u>tōbōt</u>

The feminine singular ending -ā will prove (1.11 infra) to be /-at/ underlyingly. The plural endings are /-ōt/ and /-īm/. The dual ending is -ayīm, as in yād 'hand', yādayīm '(2) hands'. Not all feminine nouns bear the mark -- yād, for example, is feminine -- and there is a bit of sexual criss-crossing in the plural, so that the plural of ʔāb 'father' is ʔābōt, the plural of šānā 'year' (fem.) is šānīm. The dual ending comes out as /aym/ once the phonology of chapter 1.3 is recognized, and this indicates a further resolution of the non-singular endings into /ay+m/, /ī+m/. However, as it is my policy in this essay to mark by morpheme boundaries only the major units of structure unless more subtle division is strictly relevant to the

matter at hand, the reader will encounter / ...+im/ and so on.

Verbal inflection is almost equally simple. Two temporal categories are found, a perfective and an imperfective aspect. The perfect is inflected on the pattern of Perfect Stem--Affix, where the affix is chosen on the basis of person (1 2 3), gender (m f), and number (s p). The imperfect displays a somewhat different set of suffixes, and more strikingly, prefixes chosen according to person and number (and in the third person plural, gender): it has the pattern Pref--Impf Stem--Suff. (Some of the suffixes are \emptyset .) The shape of these morphemes will become apparent within the first few pages of the work itself.

Other verbal categories are the hortatory system (imperative, jussive), which is inflectionally related to the imperfect, the participles active and passive (an adjective), the infinitive (traditionally, 'infinitive construct'), and the 'infinitive absolute', which principally serves a kind of adverbial function (it corresponds to the surely in 'and you will surely die'). This latter will not be discussed, as it participates in no alternations. The imperative and the infinitive are treated in section 1.7; the participle surfaces in 1.5 and 2.3.

The finite verb thus has the inflectional structure (Pre) V (Suff). Now, it is not the case that just any amalgamation of vowels and consonants, arranged according to the phonological constraints of the language, will count as the term V in the formula. The V is in fact replete with internal structure. There are five frequent types of V, two of which have regular passives, giving rise to the seven major derived forms of the verb-stem (Hebrew name: binyānīm). In the European

tradition these are called 'conjugations', a very misleading usage, since in the grammar of familiar Indo-European tongues the term 'conjugation' refers strictly to mode of inflection. The Hebrew verb has one mode of inflection and many stem shapes to which these inflections attach. However, the customary term 'conjugation' will be used here in its Semitic-grammatical sense of 'stem-category': caveat lector.

The morphologically simplest conjugation is called qal, the word 'qal' meaning 'light' or 'simple'. The perfect has the stem /Ca C V₁C/, where V₁ may be /e a o/, any one of the three short vowels; the usual case is /a/. The imperfect has the stem /CCV₁C/, which is the shape regularly assumed by three consonant stems when prefixed; V₁ may again be any of the short vowels, and is usually /o/. (A more accurate account of the vocalism is given in 1.7).

The other principal conjugations are formed chiefly by the morphological processes of doubling-the-middle-consonant, and prefixation. They are named after the form that the root p^ḥl would assume in the 3rd person masculine singular of the perfect, if it appeared in the conjugation. This naming, derived from the practice of Arab grammarians, is doubly unfortunate: because in Hebrew the /ḥ/ cannot appear doubled on the surface, being always degeminated by a process discussed in 2.2; and because English has no such letter to write with. My practice will be to write the full of form of the name, using the character ḥ in the midst of the roman characters, disregarding the law of degemination, so that the reader will be reminded of the morphology by the name.

The individual conjugations are associated with such notions as

'causative', 'intensive', 'medio-passive', and the like, but as is generally true of derivational processes, there is considerable lexicalization of meanings and no precise and uniform semantic analysis can be given.

The doubled conjugations are three in number: $Pi\bar{f}\bar{f}\bar{e}l$, its passive $Pu\bar{f}\bar{f}\bar{a}l$, and $Hitpa\bar{f}\bar{f}\bar{e}l$. The $Pi\bar{f}\bar{f}\bar{e}l$ is described as intensive, factitive, transitivity. For example, the word $g\bar{a}d\bar{o}l$ 'big' is related to the Qal verb $g\bar{a}d\bar{a}l$ 'to be big', and to the $Pi\bar{f}\bar{f}\bar{e}l$ verb $gidd\bar{e}l$, which means 'to grow (tr.), to bring up (a person), to extol', all connected with the central vague notion of 'making big'. Every $Pi\bar{f}\bar{f}\bar{e}l$ has a $Pu\bar{f}\bar{f}\bar{a}l$, e.g. $gudd\bar{a}l$, which is just the passive of whatever the $Pi\bar{f}\bar{f}\bar{e}l$ verb signifies. The $Hitpa\bar{f}\bar{f}\bar{e}l$ has the same inner stem as the $Pi\bar{f}\bar{f}\bar{e}l$, the a-i alternation being predictable, accompanied by the prefix hit-, which can be further analysed into h- and t-. According to Lambdin (1971, p. 249), "Hitpa $\bar{f}\bar{f}\bar{e}l$ verbs are intransitive and often have a reciprocal or reflexive meaning...". The verb $hitgadd\bar{e}l$ means 'boast, show oneself great'; $hithall\bar{e}k$ means 'walk about'; $hitpa\bar{f}\bar{f}\bar{e}l$ means 'pray'. In these the semantic indeterminacy of derivation is quite manifest.

The $Ni\bar{p}\bar{f}\bar{a}l$ is intransitive, a kind of medio-passive. It is marked by an n- prefix; the imperfect has the shape $yipp\bar{a}\bar{f}\bar{e}l$, where y- is the 3ms inflectional prefix and the n has assimilated (regularly, vide 1.4) to the first root consonant. The basic stem $-p\bar{a}\bar{f}\bar{e}l$ has a morphologically lengthened \bar{a} (non-deletable) and is distinct in shape from other prefixed stems, which are always $/CCVC/$. This distinction can be attributed either to the double prefixation, on the outside by inflection, on the inside by derivation, or to the lengthening of the vowel. The

Niṭṭāl is in no sense a regular passive (or middle) of Qal, although some Niṭṭāl verbs stand in a passive or middle relation to some Qal verbs. For example, kātāb means 'to write' and niṭṭāb means 'to be written', but niḥār means 'to be acceptable' where bāḥār means 'choose'; and a verb like niṭṭā? 'to be wonderful, marvelous' has no Qal counterpart at all.

The prefix h- marks the Hiṭṭāl and its passive counterpart Hoṭṭāl. These conjugations are usually causative (with the range of semantic drifting which that entails), but there is in Hiṭṭāl, interestingly, a stative subclass, as hiḥbīn 'to be white', related to the adjective lāḥān 'white.' Typical Hiṭṭāl verbs are hiḡḡāl 'to make something great, do a great thing' for, boast' and hiṣṣāf 'proclaim, announce, summon, make or let someone hear', related to the Qal verb sāmaf 'to hear'.

There are other rarer formations, such as Pōlēl (not too uncommon), similar in use to Piṭṭēl, and the reduplicated Piṭṭēl (uncommon), but we shall not be much concerned with them.

This morphological system gives the sense of the triliteral root for which Semitic languages are famous. It is not just that word stems happen to have (in general) three consonants, or even that three-consonant groups have associated with them a kind of meaning; rather that the canonical morphological patterns of the language -- the very definition of what it takes to qualify as a word -- consist of rigidly fixed arrays in which three distinguished consonants are called for to fill the pattern.

Following Lambdin (1971), I will refer to the root consonants by number: I, II, III. A root like ḡḡl can be described as I-ḡ, a root like ḥḥr as II-ḥ; and so on.

CHAPTER 1

STRESS AND SYLLABLE STRUCTURE

1.1 Elements of Stress and Deletion

In words ending with a consonant, main stress falls on final syllable: for example, dābār 'word', dbārīm 'words'. Among vowel-final words there is variation between final and penultimate stress. Consider the following paradigm, the perfect of the typical Qal verb kātáb 'to write'. (Verbs will be cited in the third person masculine singular of the perfect, the simplest form, and glossed with the English infinitive.)

	<u>Singular</u>	<u>Plural</u>
3 m	<u>kātáb</u>	{ <u>kāt</u> <u>b</u> + <u>ū</u>
f	<u>kāt</u> <u>b</u> + <u>ā</u>	
2 m	<u>kātáb</u> + <u>tā</u>	<u>k</u> <u>tab</u> + <u>tém</u>
f	<u>kātáb</u> + <u>t</u>	<u>k</u> <u>tab</u> + <u>tén</u>
1	<u>kātáb</u> + <u>tī</u>	<u>kātáb</u> + <u>nū</u>

Stress is evidently penultimate only in those forms that end a suffix shaped +CV: (+tā 2ms), (+tī (1s), +nū (1p). Otherwise, if the word ends in a consonant, or if the suffix is wholly vocalic, +ā (3fs) and +ū (3p), stress is final. We can

formulate this observation into rule (1),

$$(1) \quad V \rightarrow [+stress] / \text{--}C_O (+ C V) \#\#$$

This rule, however, fails to deal correctly with monosyllabic verbs of the same conjugation (Qal). This is the perfect of qām 'to arise':

	<u>Singular</u>	<u>Plural</u>
3 m	qām	{ qām+ū
f	qām+ā	
2 m	qām+tā	qam+tém
f	qām+t	qam+tén
1	qām+tī	qām+nū

Here we see that stress is penultimate whenever the form ends in a vowel; it goes by a less restricted rule:

$$(2) \quad \text{Main Stress} \quad V \rightarrow [+stress] / \text{--}C_O (V) \#\#$$

These rules differ on the third person feminine: kāt**ā**+ā/ qām+ā: and on the third person plural kāt**ū**+ū/qām+ū. It is in just these forms that kāt**ā** loses the vowel that would be stressed by rule (2). I say loses, for kāt**ā** must possess its second stem vowel underlying. This is evident (1) from the

spirantization of the stem-final /b/ throughout the paradigm, which can only be occasioned by a preceding vowel, and (2) from the contrast with other verbs such as kābḗd 'to be heavy', qāṭón 'to be small', which shows that the vowel is not predictable.

These considerations motivate a rule of vowel deletion. Let us accept (2) as the stress rule of Hebrew. It will prove to be essentially the first rule of phonology, the root of the complex syllabic mutations. We order Vowel Deletion after Main Stress, associating with it a condition that whenever a stressed vowel is deleted, the stress re-appears on the next syllable to the right. (We return to the matter of implementing such a condition.) Derivations like these will result from the ordering:

<u>Main Stress</u>	$\text{kāṭá}\underline{\text{b}}+\bar{\text{u}}$	$\text{qám}+\bar{\text{u}}$
<u>Vowel Deletion</u>	$\text{kāṭ}\phi\underline{\text{b}}+\bar{\text{u}}$	--
Output:	$\text{kāṭ}\underline{\text{b}}\bar{\text{u}}$	$\text{qám}\bar{\text{u}}$

The same pattern of deletion and stress-shift appears in the Qal imperfect:

	<u>Singular</u>		<u>Plural</u>	
3 m	yi+któ b	yā+qúm	yi+ktb+ú	-!- yā+qúm+ū
f	ti+któ b	tā+qúm	ti+któb+nā	t+qúm+é+nā
2 m	ti+któ b	tā+qúm	ti+ktb+ú	-!- tā+qúm+ū
f	ti+ktb+í	-!- tā+qúm+ī	ti+któb+nā	t+qúm+é+nā
1	?e+któ b	?ā+qúm	ni+któb	nā+qúm

The exclamation-pointed forms are those where deletion has made a difference in the surface stress pattern. The -e- augment interposed between the stem and the -na f. pl. suffix is peculiar to imperfects with stem shape CVC̄ (from 'hollow roots' like that of qám) or CVC_iC_i (from geminate roots in which radical II = radical III, e.g. sābáb 'to go around', t+subb+é+nā 'they/you fp will go around'). The augment will prove to have the underlying shape /-ay-/.

Many of the consonant clusters produced by deletion will later in this essay broken up by schwa. The present purpose is to map the gross geography of syllable structure, and to this end we shall abstract away from the role of schwa.

The basic claim embodied in the embryonic two-rule system is this: main stress falls on a final vowel if and only if the penultimate vowel is deleted. There are numerous places in the inflection of the verb where this claim is put to the test. A survey of the relevant forms shows that it is indeed the case. Tabulated here is a representative sampling, to give the flavour of the phenomenon:

Conjugation/Asp.		3 ms.	Deletion/Final Str(3p)	No Del./Penult. Str.
Qal	pf.	<u>ka</u> ta <u>ab</u>	ka <u>tb</u> +u	ka <u>ta</u> ab+ti (1s)
		qam	--	qam+u (3p)
	impf.	yi+kt <u>ob</u>	yi+kt <u>b</u> +u	ti+kt <u>ob</u> +na (2-3 fp)
		ya+qum	--	ya+qum+u (3 mp)
		ya+s <u>ob</u>	--	ya+sobb+u (3 mp)
Nip ^{CC} al	pf.	ni+kt <u>ab</u>	ni+kt <u>b</u> +u	ni+kt <u>ab</u> +ti (1s)
		na+k <u>on</u>	--	na+k <u>on</u> +u (3p)
		na+s <u>ab</u>	--	na+sabb+u (3p)
	impf.	yi+k+kt <u>eb</u>	yi+k+kt <u>b</u> +u	ti+k+kt <u>ab</u> +na (2-3fp)
		yi+k+k <u>on</u>	--	yi+k+k <u>on</u> +u (3mp)
		yi+s+s <u>ab</u>	--	yi+s+sabb+u (3mp)
Pif ^{CC} el	pf.	gid <u>de</u> l	gid <u>dl</u> +u	gid <u>da</u> l+ti (1s)
	impf.	y+gad <u>de</u> l	y+gad <u>dl</u> +u	τ+gad <u>de</u> l+na (2-3fp)
Hip ^{CC} il	pf.	hi+sm <u>id</u>	--	hi+sm <u>id</u> +u (3p)
		he+q <u>im</u>	--	he+q <u>im</u> +u (3p)
		he+s <u>eb</u>	--	he+s <u>eb</u> bb+u (3p)
	impf.	ya+sm <u>id</u>	--	ya+sm <u>id</u> +u (3mp)
		ya+q <u>im</u>	--	ya+q <u>im</u> +u (3mp)
		ya+s <u>eb</u>	--	ya+s <u>eb</u> bb+u (3mp)

It is fair to conclude provisionally that rule (2) really is the main stress rule of the language, and that it interacts with a rule of Vowel Deletion to produce the characteristic patterns illustrated in the table.

What, then, is the nature of this rule of vowel deletion? Perusal of the data presented so far shows that the process occurs only in the env. --CV, never in the env. --CCV: contrast, for example, $k\bar{a}t\emptyset b + \acute{u}$ with $k\bar{a}t\acute{a}b + t\bar{i}$. Notice also that in the form $k\bar{a}b + t\acute{e}m$ it is the first vowel of the stem /katab/ that suffers deletion, and not the second, which finds itself shut up in the env. --CC. For a vowel to delete, then, it is necessary, but not quite sufficient that it be located in an open syllable: $y\bar{a} + k\bar{o}n + \acute{u}$ contrasts with $y\bar{i} + k\bar{t}\emptyset b + \acute{u}$ (cf. $y\bar{i} + k\bar{t}\acute{o}b$).

We observe, however, that the deletable vowels belong to a series in which there is alternation between short and long vowels in positions where the non-deletable vowels retain length.

In the Construct State:

$d\bar{a}b\bar{a}r$ 'word'

$p\bar{a}q\bar{i}d$ 'overseer'

$d\bar{b}ar$ ham-mélek 'the word of the king' $pq\bar{i}d$ hā-fām 'overseer of the people'

$d\bar{i}br\bar{e}$ ham-mélek 'the words of the king'

$pq\bar{i}d\bar{e}$ hāfām 'overseers of the people'

With certain suffixes

$y\bar{i} + \check{s}m\bar{o}r$ 'he will observe'

$y\bar{i} + \check{s}mr + \acute{u}$ 'they will observe masc pl'

$y\bar{i} + \check{s}mor + k\bar{a}$ 'he will observe you' (alternative form: $y\bar{i} + \check{s}mr + \acute{e}kk\bar{a}$)

but: hi+smīd 'he destroyed'
 hi+smīd+ū 'they destroyed'
 hi+smīd+kā 'he destroyed you'

In Proclisis:

yi+ttēn 'he will give'
 yi+ttēn+ū 'they will give'
 yi+ttēn#lī 'he will give to me' $l\bar{i} = l - 'to' + \bar{i} 'me'$
 but: hi+ggīd#lī 'he told me'

Among the theories suggested by this data, and the one we shall pursue, is that in the alternation $\emptyset - \check{V} - \bar{V}$, it is the short vowel that is underlying; and that the non-deleting, non-shortening (in the above environments) vowels are just those that are underlyingly long. This prima facie plausible theory will gain credence if the vowel-lengthening rules which it necessitates prove to be general in character and coherently integrable into the rest of the phonology.

We formulate these observations in a rule of Vowel Deletion:

(3) VD $V \rightarrow \emptyset$ / --C V
 [$\neg \text{lng}$]

How does the rule VD apply? Does it delete every short vowel that lies in an open syllable? Up to this point, we've seen no evidence that would contradict this assumption; but

we shall see below (1.3) that the rule produces an alternating pattern when it applies to a sequence of short vowels in open syllables, as if it iterated from right to left. In the configuration $\check{V} C \bar{V}$ or $\check{V} C V C C$ of course, the short vowel will always go, no matter how the rule applies, simultaneously, leftward, rightward, or whatever.

The reader should perhaps be forewarned that VD is merely the larval form of the organism, that the rule will go through a couple of metamorphoses before we find out exactly what it does to vowels; but the inner sense of it, which we happen on in 1.3, will remain invariant throughout.

1.2 Some Rules of Quantity

Returning to the paradigm of $k\bar{a}t\bar{a}b$, we see that each of the stem vowels is susceptible to deletion: $k\bar{a}t\bar{b}\acute{u}/k\bar{a}b\acute{t}\acute{e}m$. This implies that both are underlyingly short: the verb stem must be /katab/.

The first stem vowel shows up long in all those forms in which the second stem vowel receives stress by rule (2). Here is the paradigm, repeated for convenience, with the surface forms matched to approximately underlying forms after Main Stress has applied:

	<u>Sing.</u>	<u>Plural</u>	
3 m	$k\bar{a}t\bar{a}b$ /katáb/	$k\bar{a}t\bar{b}\acute{u}$ /katáb+ū/	(!)
f	$k\bar{a}t\bar{b}\acute{a}$ /katáb+ā/		(!)

	<u>Sing.</u>	<u>Plural</u>
2 m	kā _ā tā _ā /katāb+ta/	k _ā tā _ā tēm /katab+tēm/
f	kā _ā tā _ā t /katāb+t/	k _ā tā _ā tén /katab+tén/
1	kā _ā tā _ā tī /katāb+tī/	kā _ā tā _ā bnū /katāb+nū/

Evidently, vowels lengthen in pre-stress position: but, as the short a of k_ātā_ātēm indicates, only in the env. --CV. The 3p form k_ātā_ā and the 3fs form k_ātā_ā satisfy this open syllable restriction before VD applies, and fail to satisfy it afterwards. We therefore introduce the rule of Pre-Tonic Lengthening, ordered before VD:

$$(4) \quad \text{PTL} \quad V \rightarrow [+lng] / \text{-- } C \text{ } \overset{\prime}{V}$$

The mutations of the word dā_ābā_ā 'word, matter' make clear the existence of another lengthening rule, whose function is somewhat obscured by a peculiarity of verbal phonology. We can investigate the character of the vowels of dā_ābā_ā by affixing it so as to draw stress away from the stem. In the plural form d_ābā_ā+īm the loss of the first vowel to VD shows that it is short underlyingly; its length in dā_ābā_ā is a result of PTL. Adding the 3mp pronominal suffix to the plural produces d_ābā_ā+ēm 'their m words', a form in which the second stem vowel has succumbed to VD, showing that it too is short. (The appearance of i for a in the first syllable is treated below, 1.3.) Surface dā_ābā_ā must come from

underlying /dabar/. We posit, therefore, a rule lengthening vowels under stress:

$$(5) \quad \text{Tone-Lengthening} \quad \begin{array}{c} V \\ [+ \text{ stress}] \end{array} \rightarrow [+ \text{ long}]$$

The reader who labored dutifully through the Deletion/Stress table (p.22) will have in mind many instances where the operation of TL is apparent: e.g., in the Qal imperfect, we find $yi\text{-}\underline{kt\acute{o}b}\text{-}yi\text{-}\underline{ktb}+\acute{u}$ $ti\text{-}\underline{kt\acute{o}b}+n\bar{a}$, which requires /ktob/; in the Pi^{CC}l imperfect, long under stress: $y\text{-}gadd\acute{e}l$, $t\text{-}gadd\acute{e}l+n\bar{a}$; same vowel deleted $t\text{-}gaddl+\acute{i}$, $y\text{-}gaddl+\acute{u}$; requiring /gaddel/. The peculiarity alluded to is that nowhere in the verbal paradigm does stem-final a undergo TL, although, as we've seen, both e and o do so regularly. Typically, we have $k\bar{a}t\acute{a}b$, $yi\text{-}lm\acute{a}d$, $ni\text{-}\underline{kt\acute{a}b}$, $\acute{s}ill\acute{a}h$, etc.

Now this had led some scholars to argue that in fact TL never does apply to any stem-final vowel in the verb. It happens that there is some external evidence, from the transliteration of Hebrew into Greek letters in Origen's Hexapla (ca. phps 3rd cent A.D.), that in some dialects of Hebrew (id est, the one Origen was listening to) all these vowels were short in the verb in stressed position: namely what the Masoretes write as \bar{e} ($\dot{s}\bar{e}r\bar{e}$) and \bar{o} ($\dot{h}\bar{o}l\bar{e}m$), which are elsewhere uniformly transcribed by eta and omega respectively, are in these positions regularly written with epsilon and omicron. However, the Masoretes had the orthographic resources

to record these distinctions (at least in the case of e (seghol) which can bear stress); that they did not, I take as evidence that in the dialect under consideration, /e o/ did show up long under stress in verbs.

Since the short stem vowels /e o/ in verb forms like kābēd , yiktōb do undergo TL, the rule is ordered after VD, for its effect of lengthening does not block deletion. The correct forms are kābdū (like kātbū), not kabēdū , and yiktū , not yiktōū (but yāqūmū). We arrive, then, at the following order:

- (6) a. Stress
- b. PTL
- c. VD
- d. TL

The ordering of PTL before VD, necessitated by the form kātLū / $*\text{katbū}$, has a consequence which is quite unrelated to this motivating data: that pretonic vowels should be immune to the elidatory effects of VD. This is quite generally the case, as the typical word dbārīm 'words' illustrates.

The following derivations should make clear the functioning of the posited rules.

	/katab+u/	/katab+tem/	/dabar/	/dabar+tīm/
Spir	<u>t</u> <u>b</u>	<u>t</u> <u>b</u>	<u>b</u>	<u>b</u>
Main Str.	ka <u>t</u> ab+ū	ka <u>t</u> ab+ <u>tém</u>	da <u>b</u> ar	da <u>b</u> ar+ <u>tīm</u>
PTL	kā <u>t</u> ab+ū	--	dā <u>b</u> ar	da <u>b</u> ar+ <u>tīm</u>
VD	kāt <u>ø</u> b+ū	k <u>ø</u> tab+ <u>tém</u>	--	d <u>ø</u> bā <u>r</u> + <u>tīm</u>
TL	--	--(!)	dā <u>b</u> ar	--
Output:	kāt <u>b</u> ū	kt <u>a</u> bt <u>ém</u>	dā <u>b</u> ar	db <u>a</u> r <u>tīm</u>

The keen-eyed reader will be wondering why TL fails in ktabtém. Why not ktabttém? The exceptionality is just a property of the suffix, or rather of a class of suffixes to which it belongs. Immediately below (1.4) we shall attempt to characterize this class, after we look a bit more closely at suffixal morphology.

The 'hollow' verbs like qām--so called because of their apparent lack of a middle radical--must have a long stem vowel, for it does not undergo deletion, either in the perfect (qāmū) or the imperfect (yāqūmū). Roots of this type originally had a glide, y or w, as a middle radical; cf. the Arabic qawm^{un}, verbal noun of the cognate word. In Arabic verbs from these roots undergo complex alternations of the stem vowel (explored in Brame (1970)), and the w or y is prominently displayed in verbal derivation. In Hebrew of the pre-Exilic period, on the other hand, the few stem-

vowel alternations are simple reflexes of transparently general processes, and the historical glide is nowhere in evidence in the verbal paradigm. (Forms like *qiyyēm*, *piŕŕel* related to *qām*, only arise later, most likely under Aramaic influence.) That is to say, evidence for an underlying glide is tantalizingly weak. However, even if a glide is posited, the rules that map the stem-internal vowel and glide combinations onto \bar{V} can be as early as possible, and indeed must precede VD so that stress is retained on the stem (*qāmū*). Therefore, even if such rules exist, only their output--the long vowel--is relevant to the present inquiry.

The stem vowel loses its length in the env. --CC: *qāmt*, *qamtēm* contrast with *qām*, *qāmū*. We need, therefore, a rule of shortening:

(7) Shortening $V \rightarrow [-\text{long}] / \text{-- } C C$

This rule is not invoked in the imperfect, because the only consonant-initial suffix, *-nā* (fp), attaches with a vocalic augment (*tiktōbnā*, but *tqūmenā*). In the imperative, which has the same endings, we find the following:

	<u>Sing.</u>	<u>Pl.</u>
m	<i>qūm</i>	<i>qūmū</i>
f	<i>qūmī</i>	<i>qōmnā</i>

The reader may have noticed that the rule TL, when it applies to short vowels, has a non-high output: *yiktōb*,

gaddēl are characteristic. Observe that in the imperative paradigm, the vowel appears non-high just where rule (7) would shorten it and TL would lengthen it:

	/qūm/	/qūm+na/
Shortening	--	qum+na
Main Str.	qūm	qūm+na
TL.	qūm	qōm+na
Other		qōm+nā
Output:	qūm	qōmnā

How is the lowering to be accomplished? In Chapter 2 it will be shown that there is a rule that makes short vowels non-high:

$$(8) \text{ Lowering} \quad V \rightarrow [-\text{high}]$$

$$[-\text{lng}]$$

The order is Shortening-Lowering-TL.

All final vowels are long, the only exceptions on the surface being those that arise from combination with \underline{y} : yibné 'he will build' is at an earlier stage of derivation /yibnay/. The mysterious 'other' in the above derivation is the rule that insures this fact:

$$(9) \text{ V-final} \quad V \rightarrow [+long] / \text{---}\#$$

Motivation for, and use of the rule will be found in 1.11.

These three rules (Shortening, Lowering, V-final) do not play a significant role in the deliberations of this chapter, and will therefore be essentially ignored. The characteristic alternations in the short and shortened vowels, i-e-ē and u-o-ō, will be studied in detail in Chapter 2. Here we shall focus on the laws of quantity and deletion.

1.2.1 Some Exceptions.

A kind of exceptionality that the system can tolerate fairly easily occurs when a vowel known to be short does not delete. If stressed, stress remains and does not shift. Examples of this sort are found in the paradigm of pronominal suffixation. The preposition la 'to' when suffixed with the 1p pronoun is: lānū 'to us'. But the vowel is deletable: ldābār 'to a word'. But the appropriate underlying form /la+nū/ generates *lnū, just as /katab+ū/ generates kātbū. It turns out that vowels before -nū are quite generally [-VD]. In section 1.11.2, after the treatment of deletion phenomena has been deepened, or at least ramified, we return to the question of representing such cases.

A converse kind of exceptionality, in which stress shifts to the end of a vowel that doesn't delete, is more costly to express. This requires that a minor rule be added to the grammar, a rule that forms must be marked to undergo. In section 1.13 we find two words of this type (and only two): the pronouns ?ānōkī 'I', ?attā 'you ms'.

1.2.2 A Restriction on TL

As the following table of typical forms shows, TL applies to any stressed /e o/ whatever, but fails to apply to /a/ in the env. --CC:

ʔátt 'you fs'	yēbk 'let them weep'	yākól+ṭ 'you fs can'
támm+ū 'they are finished'	ʔēlle 'these'	yā-sōbb+ū 'they will go around'
qám+tī 'I arose'	hēmmā 'they m'	qōm + nā 'arise! fp'
lāylā 'night'	hēsēbb+ū 'they lead around'	ktōb+nā 'write! fp'
lāmmā 'why'	t+gaddēl+nā 'they/you fp grew s.t.'	

Observe that this configuration of data has nothing whatever to do with Shortening, rule (7), which affects all vowels and applies early, before TL is reached in the ordering.

The environments where TL does apply to /a/ are two: --C##, as in dābār /dabar/, and --CV, in open syllables, when VD (exceptionally) fails, as in lānū 'to us', ktābānū /katab+b+a+nū/ 'he wrote us'. These environments collapse into the following rule:

$$(10) \quad \begin{array}{c} a \\ [+stɹ] \end{array} \rightarrow \bar{a} / \text{-- C (V X) \#\#}$$

Use of the familiar subscripted-parentheses notation allows (10) to be combined with branch of TL that applies to non-low vowels:

(11) Tone-Lengthening

$$\left[\begin{array}{c} \text{V} \\ + \text{ stress} \\ (+\text{low})_a \end{array} \right] \rightarrow [+long] / \text{-- C ((V)_b X) } \# \#$$

Condition: a b

When (a) is met--when the affected vowel is [+low],
i.e. /a/ -- rule (10) is generated by the implicational con-
dition. When (a) is not met--when the affected vowel is from
the set /e o/ -- the material in (b) is optional, and the rule
is:

$$(12) \acute{V} \rightarrow \bar{V} / \text{-- C ((V) X) } \# \#$$

The optional vowel imposes no restriction whatsoever; rule (12)
is equivalent to

$$(13) \acute{V} \rightarrow \bar{V} / \text{--C (X) } \# \#$$

which, given the structure of the language, says that any
stressed vowel lengthens; just what should be said, once the
[+low] case is factored out.

The rule TL, thus constrained, allows an understanding
of an otherwise puzzling phenomenon. Among the monosyllables in
/a/ we find those with the expected long vowel, like $\acute{d}\bar{a}m$ 'blood'
 $\acute{y}\bar{a}d$ 'hand', and those with a superficially unexpected short
vowel, like $\acute{f}am$ 'people' $\acute{r}\bar{a}b$ 'many' $\acute{d}\bar{a}l$ 'poor'. The short
vowel'd monosyllables uniformly show a doubled final consonant
in suffixation, the long ones only the single consonant surfacely

visible: ʔammīm 'peoples' rabbīm 'many pl.' dallīm 'poor pl.', as against dāmīm 'bloods' yādāyim '(two) hands'. This consonantal alternation evidences an underlying distinction between single and double consonants that is neutralized finally by degemination:

$$(14) \begin{array}{l} \text{Word Final} \\ \text{Degemination} \end{array} \quad C_i C_i \rightarrow C_i / \text{ -- } \#$$

The underlying distinction serves to block TL, giving the noted distribution of data. Rule (14), WFD, therefore follows TL in the ordering.

As predicted, in the e-class of monosyllables, there is no surface distinction in vowel quantity between geminate tri-literal stems like ḥēs 'arrow' (pl. ḥissīm), ʔēm 'mother' (pl. ʔimmōt), lēb 'heart' (pl. libbōt), and truly biliteral stems like bēn 'son' (pl. bānīm, the ā is irreg.) and sēm (pl. sēmōt). Of monosyllables in /o/ there are no biliteral examples. The impossibility of finding any is guaranteed by a peculiarity of stem-final /o/ in nouns and adjectives; instead of pretonic lengthening, doubling of the final stem consonant is found, as ʔērōm 'naked', ʔērummīm 'pl.'. As this phenomenon is quite general, let us record it:

$$(15) \begin{array}{lll} \text{O-Closure} & \text{S.D.} & \circ C]_{\text{stem of N,A}} \\ & & 1 \ 2 \ 3 \\ & \text{S.C.} & 1 \ 2 \ 2 \ 3 \end{array}$$

Note that the presence of an affix need not be required.

Because TL is unrestricted for /o/, a form /ḡēromm/ will lead to ḡēróm (via WFD) as surely as /ḡērom/ will. Rule (15) functions, like Shortening, as a very early adjustment.

Some derivations to illustrate these principles:

	/dam/	/ḡamm/	/hess/	/ḡērom/
O-Closure				ḡēromm
Main Stress	dám	ḡám	hess	ḡēróm
TL	dám	--	hess	ḡēróm
WFD	--	ḡám	hes	ḡēróm
Output:	dám	ḡám	hes	ḡēróm

Rule (14), WFD, was written intentionally with a single word boundary (#) at the right extremity. Consider the alternations of the preposition ?et- 'with': ?et#Dāwīd 'with David', but ?itt+á+nū 'with us'. Clearly the word ends in a geminate underlyingly. The reader will recall that SPE provides for only one word boundary between preposition and NP object (cf. also Selkirk 1972, 1974).

Forms like gmall+ím 'camels', gmall+ē+hém 'their m camels' indicate that there is a minor rule of pre-suffixal gemination; minor, because it applies to small number of forms, unpredictably; a rule, because a putative base-form */gamall/ neither meets the constraint of triliterality nor falls into a derivational pattern (like the tetra-consonantal

Pi^{CC}l^ē stem, for example). Therefore, the unaffixed form $\bar{g}ā\bar{m}ā\bar{l}$ with its long stressed vowel, is not a counterexample to the proposed restriction on TL. Also to be treated this way is the alternation $\bar{y}ām$ -- $yammīm$ 'sea--seas'. (This is near to history for $\bar{g}ā\bar{m}ā\bar{l}$, cf Arabic $gamal^{un}$, not so for $\bar{y}ām$, Arabic $yamm^{un}$).

(16)	Minor Doubling	S.D.	C +
			1 2
		S.C.	1 1 2

The doubling in $gmāllīm$ is often described as kind of consonantal version of Pre-Tonic Lengthening (see, for example, Blake 1952), the intuition being that the pre-tonic syllable must be heavy, and that this restriction is implemented either by PTL or by doubling (which of course excludes PTL). However, forms like $gmāllēhēm$, in which doubling regularly occurs at some remove from the stress, show that the desideratum is, as rule (16) requires, suffixation, not proximity to stress. The phenomenon has nothing to do with PTL.

1.3 Segholates and the Mode of Vowel Deletion

There is a class of nouns which show penultimate stress: e.g. $mēlek̄$ 'king' $sēp̄er$ 'book' $qōdēs̄$ 'holiness'. The traditional account mirrors history in regarding these forms as underlyingly monosyllabic -- $/malk/$ $/sep̄r/$ $/qod̄s̄/$ -- so that

stress falls upon the stem vowel, and then is made to appear penultimate by a later rule of epenthesis. This analysis is well-supported. To take such forms as underlyingly bisyllabic would not only require a complication of the otherwise limpid stress rule, it would also require enriching the segmental inventory to include a special /e/ that (1) could be distinguished as the vowel to be skipped over in the stress rule, and (2) could provide a lengthening-immune source for the stressed-short [e] of *melek* that alternates with [a], as *malki*, 'my king'. Further, the quality of the final unstressed vowel is with 2 or 3 exceptions, predictable: it is usually [e] (Hebrew name: *seghol*), but appears as [a] when abutted on either side by any one of the gutturals /ʔ h ʁ ʕ/, as *naʕar* 'boy', *pesaḥ* 'passover', *poʕal* 'work'.

A crushing argument for the insertion analysis can be garnered from the behaviour of verbs with a 'weak' third root consonant (historically /y w /). Verbs of this root type in the imperfect of all conjugations end in -é, e.g., *tipné* (from *tipnáy*) 'she will turn'. To form the jussive of the unsuffixed forms, these verbs strip off the final vowel, yielding, in this case, *tēpen* 'let her turn', from /tipn/ via TL (and Lowering). It is revealing that in certain verbs the vowel insertion fails to take place, for example, *yēbk* 'let him weep' from *yibké*, an irregularity which clearly displays the jussive formation process as a truncation. There

is no intelligible way to read the /e/ into the underlying form of the imperfect: not only would such a move require a special rule to get rid of the /e/ in forms like $y\acute{e}b\bar{k}$, but, more seriously, it would rupture the canonical pattern CCVC which is assumed by tri-consonantal stems after all prefixes of derivation and inflexion.

Noting that these nouns appear in their monosyllabic guise before pronominal suffixes, as in $malk\acute{i}$ 'my king', $sipr\acute{i}$ 'my book', $qod\check{s}\acute{i}$ 'my holiness', we postulate the following rule of insertion:

(17) Segholation $\emptyset \rightarrow e / C \text{ -- } C \#$

Another rule is needed to describe the a-e alternation found in words like $m\acute{e}lek$ -- $malk\acute{i}$. We propose rule (18), consequent to Segholation:

(18)
$$\begin{array}{c} a \\ [-lng] \\ [+str] \end{array} \rightarrow e / \text{ -- } C \begin{array}{c} V \\ [-gutt] \end{array}$$

Observe that in the underlying /e/ and /o/ stems, the stem vowel surfaces long due to the effect of TL: $s\acute{e}p\bar{e}r$, $q\acute{o}d\check{s}\acute{e}$: but in the /a/ stems, the basic vowel, whether mutated to [e] or not, appears short: $m\acute{e}lek$, $n\acute{a}l\bar{a}r$. This is obviously a consequence of the single-consonant restriction on the tone lengthening of /a/. Segholation therefore follows TL in the ordering. In pause, the single consonant restriction is usually lifted, and we find for $\text{f}\acute{e}b\bar{e}d$, $\text{f}\acute{a}b\bar{e}d$, confirming

both the choice of /a/ as the underlying vowel in such forms, and the [-long] restriction in rule (18).

There are no segholated forms in which the last two consonants are identical: from /ʕamm/ comes ʕám, never ʕémem. When in the course of derivation such a configuration arises, degemination occurs, not segholation. So from yitté 'he will extend', we get yet 'let him extend'. Segholation therefore follows Word Final Degemination, which destroys its two-consonant environment.

This gives an ordering WFD--Segholation. Recall that one of the results of 1.2.2 was the ordering TL-WFD. By transitivity of ordering, these two orderings go together to force the linear arrangement TL--WFD--Segholation. Thus the ordering TL--Segholation, necessary to insure the shortness of the stressed vowel in mélek, náʕar, is predicted by independent considerations.

The plural of melek is not, as one might guess, *malkím, with the plural affix attached directly to the underlying stem, but mlākím, in which a new vowel has dramatically appeared inside the stem-final consonant cluster. This vowel does not appear in all surface forms of the plural stem: e.g., malke 'kings of ...', malkéhém 'their m kings': but its one-time residence in the spot is revealed by spirantization of the /k/, as observed by Aronoff (1971).

I assume, then, a morphological rule epenthesizing /a/ --short because deletable--into the stem-final cluster in all

plural forms:

(19) Plural Breaking $\emptyset \rightarrow a$ / C -- C + Plural

The inserted vowel should be expected to come and go in accordance with the rule of Vowel Deletion. The following range of forms is found:

mlākīm /malak+īm/ 'kings' spārīm /separ+īm/ 'books' qmaṣīm /qomaṣ+īm/ 'hand-fuls'
 malkēhēm /malak+ē+hem/ siprēhēm /separ+ē+hem/ qoms-ēhēm/qomaṣ+ē+hem/

What is remarkable is the preservation of the underlying stem vowel in the forms on the second line. This implies that the rule VD applies in an alternating fashion, chopping out every other vowel in a string of weak syllables; deletion of the plural infix then precludes deletion of the stem vowel.

A complication appears when we examine the same forms of an ordinary bisyllabic noun like dābār.

dbārīm /daba. īm/
 dibrēhēm /dabar+ē+hem/

Here the stem vowel is not preserved. Looking at this form alone, and it is representative, one might wish to conclude that both vowels are in fact effaced and the initial 3 consonant cluster is broken up by a rule of epenthesis. Indeed, such a rule will come to light in 1.6. However, this view is

incompatible with the data of stem mutations in the plural segholates, which demands an alternating mode of deletion. Further, there is a scattering of exceptions to the pattern-- for example, kānāp 'wing' has $\text{kanpēhém}/\text{*kinpēhém}$, and zānāb 'tail' has $\text{zanbēhém} / \text{*zinbēhém}$ -- in which the underlying vowel is preserved. These data suggest we admit the following rule:

(20) A to I $a \rightarrow i / \#C \text{ -- } CC$

(When we consider the segmental system in detail, we shall see that a rule like this is involved in a number of characteristic alternations in the verb: e.g. giddēl -- ygaddēl , yi-ktōb -- yā-qūm , ni-ktāb -- nākōn , etc.)

With rule (12) in the grammar, we should expect that the plural forms of mélek , since they are based on the stem malak- , should conform in every respect to those of dābār . The point of difference -- preservation of the stem vowel in its underlying form in $\text{malkēhém} / \text{*milkēhém}$ -- we must attribute to a lexical marking of mélek as being [-AI].

In addition to the three major classes of segholates -- the mélek type with the characteristic stem-vowel alternation e/a, the sēper type \bar{e}/i , and the qōdeš type \bar{o}/o -- there is a fourth, hybrid type e/i, seen for example in the word qēber 'grave', qibrī 'my grave'. That the stem-vowel surfaces as short e under stress suggests that it comes from /a/ (cf. /malk/),

as does the pausal (sentence-final) form qā^ˈber. It might appear from these data that qe^ˈber is distinguished from mé^ˈlek only in that qe^ˈber undergoes the rule A-to-I when it is suffixed, whereas mé^ˈlek does not; hence qib^ˈrām from the putative source /qabr+a+m/, contrasting with malk^ˈām /malk+a+m/. However, many of the qe^ˈber-type e/i have doublets in ē/i; e.g. sé^ˈter/sē^ˈter/ 'hiding place', né^ˈbel/nē^ˈbel 'harp', né^ˈder/nē^ˈder 'vow'. Even those with such doublets show ā in pause: sā^ˈter, nā^ˈder, nā^ˈbel. This suggests an underlying shape /qebr/ etc., with an early rule turning e to a under stress; the rule is evidently ordered before TL. We shall adduce such a rule in Chapter 2, on independent grounds.

(It is the synchronic reflex of Philippi's Law.)

Removing qe^ˈber and its look-alikes from the A-to-I nexus clears the way for the following generalization: no member of the segholate class - no morpheme shaped /CVC/ -- undergoes the rule A-to-I. While exceptionality is not to be applauded, in this case it can be seen to follow its own strict law.

1.3.1 Two Further Remarks on Segholation

(I) There is a class of forms which never undergoes Segholation: those created by suffixation of the 2fs morpheme /-t/. Always found is kāt^ˈabt 'you fs wrote', never **kātē^ˈbet, apparently from /katab+t/. The 2fs of

the perfect has another peculiarity, in that WFD, rule (10), never simplifies a final geminate cluster produced by inflection: so in the verb $\text{kāra}^{\prime}\text{t}$ 'to cut (off), to make (a covenant, $\text{br}^{\prime}\text{t}$)', we find $\text{kāra}^{\prime}\text{tt}$ 'you fs cut off', evidently from $/\text{karat}+\text{t}/$.

The root of this pair of idiosyncrasies becomes apparent when the 2fs perfect is pronominally suffixed: $\text{kta}^{\prime}\text{bim}$ 'you fs wrote them m', $\text{kra}^{\prime}\text{ttim}$ 'you fs cut them m off'. Contrast the 2ms forms $\text{kta}^{\prime}\text{btam}$, $\text{kra}^{\prime}\text{ttam}$, which show that the suffix is just -m: $/\text{katab}+\text{ta}+\text{m}/$, $/\text{karat}+\text{ta}+\text{m}/$.

From the suffixed forms it appears that the 2fs morpheme is really $/-\text{t}\bar{\text{i}}/$. If such were the case on the surface, neither Segholation nor WFD would get a shot at 2fs perfect forms like $*\text{kata}^{\prime}\text{bt}\bar{\text{i}}$, $*\text{kara}^{\prime}\text{tt}\bar{\text{i}}$. We therefore posit a late rule of truncation, following Segholation and WFD, which removes the suffix vowel word-finally.

Further analysis can be performed on the suffix $/-\text{t}\bar{\text{i}}/$. Recall that the 2fs imperfect ending is $/\bar{\text{i}}/$, as in $\text{tik}^{\prime}\text{tbi}$, $\text{ta}^{\prime}\text{qum}\bar{\text{i}}$. It appears, then, that the 2fs morpheme for the verb as a whole is $/\bar{\text{i}}/$, and that the perfect is specially marked by a stem-augment $/-\text{t}-/$ in the second person and first person singular. The ultimate underlying form of $\text{kata}^{\prime}\text{bt}$ is $/\text{katab}+\text{t}+\bar{\text{i}}/$.

We posit the following rule:

(21) 2fs Truncation $\bar{\text{i}} \rightarrow \emptyset / +\text{t}+ \text{ -- } \# / \text{ 2fs}$

(Note that the rule does not apply to the phonologically identical 1s form $kā\bar{t}ab\bar{t}ī$.) Rule (21) is also responsible for the preservation of the final geminate in the 2fs subject pronoun $ʔātt /ʔan+t+ī/$. We return to the matter of suffixes immediately below (1.4).

Observe that rule (21) truncates a specific morpheme, which it must name. Aronoff (1976) postulates that rules of truncation that depend on morphological information can only remove whole morphemes, not parts thereof; the present case is consistent with his constraint. Note too that although the rule depends on morphological information--that it is in some sense a rule of morphology--it is ordered into the phonology, and rather late at that.

(II) The vowel epenthesized by Segholation appears as i when it follows y. The base /bayt/ leads to phonetic $bāyit$. A low-level adjustment suffices to correct the output of Segholation:

(22) Y-Adjust e → i/y ---

Rule (22) is also operative, as would be expected, in words like $ʔōyib\bar{k}ā /ʔōyeb+e+ka/$ 'your ms enemy', related to $ʔōyē\bar{b}$ 'enemy', where the affected e is a survivor from the lexicon, not an inserted element. (See 1.4 on the morphological analysis.)

1.3.2 Remark on Plural Breaking

Plural Breaking must be constrained not to disrupt a sequence of two identical consonants: rabbīm / *rbābīm 'many pl.' From this it might be argued that the ordering argument placing WFD before Segholation is artifactual, since there may be a general constraint against separating identical consonants. However, where the constraint against forms like *rébeb is absolute, the constraint on plural breaking has a few exceptions, as šēl 'shadow', šlālīm 'shadows'. It is fitting, then, that the two similar constraints be differently implemented in the grammar.

1.4 Pronouns and Suffixes

Pronominal suffixes attach to the noun to indicate possession, to verb and preposition as object, to the infinitive as subject or object. In this excursion we shall explore the basic morphology of these suffixes, tracing the network of relationships between the free (subject) forms of the pronouns, the pronominal suffixes, and the inflectional suffixes of the perfect verb.

The 2nd person possessive suffixes provide interesting problems to start with. Here are two typical nouns, a masculine and a feminine, suffixed with the 2nd person possessors of both singular and plural.

	dābār 'word'		tōrā 'law'	
	<u>s.</u>	<u>pl.</u>	<u>s.</u>	<u>pl.</u>
m.	dbār <u>kā</u>	dbark <u>ém</u>	tōrāt <u>kā</u>	tōrat <u>kém</u>
f.	dbār <u>ék</u>	dbark <u>én</u>	tōrāt <u>ék</u>	tōrat <u>kén</u>

The properties of the feminine affix /-at/ are taken up in 1.11: the feminine noun is cited here merely to illustrate its conformity to the pattern seen in the masculine -- non-derived -- noun-class.

The suffixes are evidently -kā (ms), -ék (fs), -kem (mp) -ken (fp). Several features of this paradigm are remarkable: (1) stress in final on -kā even though it ends in a vowel, (2) the vowel in the syllable preceding -kā is long

even though it is separated from the stress by two consonants, (3) the /k/ shared by these formatives is always spirantized, but no vowel stands before it, (4) the vowel of the plural suffixes is short even though it is stressed. Let us defer an account of (4) until we look at the third person, which shows the same behaviour.

The triple cluster of apparently aberrant properties (1), (2), (3) will make coherent sense, given the rule-system we have motivated, if it's assumed that there is underlyingly a linking vowel that joins these endings to the stems they attach to. Since ē shows up in the feminine singular, let us take /e/ as the Bindevokal. Derivations like these will produce the surface forms:

	/dabar+e+ka/	/dabar+e+k/	/dabar+e+kem/
Spir, V-Final	dab <u>a</u> r+e+k <u>ā</u>	dab <u>a</u> r+e+k	dabar+e+k <u>e</u> m
Main Stress	dab <u>a</u> r+ <u>é</u> +k <u>ā</u>	dab <u>a</u> r+ <u>é</u> +k	dab <u>a</u> r+e+k <u>é</u> m
PTL	<u>ā</u>	<u>ā</u>	--
VD	d <u>ø</u> b <u>a</u> r+ <u>ø</u> +k <u>ā</u>	d <u>ø</u> b <u>a</u> r+ <u>é</u> +k	d <u>ø</u> b <u>a</u> r+ <u>ø</u> +k <u>é</u> m
TL	---	d <u>a</u> r+ <u>é</u> +k	---
Output	db <u>a</u> rk <u>ā</u>	db <u>a</u> r <u>é</u> k	dbark <u>é</u> m

Observe the crucial role played by the alternating character of VD in generating the word dbarkem.

This solution has a cost attached to it, evident in the third column: the linking vowel /-e-/ must be marked

[-PTL] so that VD will be able to remove it. Nevertheless, this exceptionality -- which can perhaps be resolved upon deeper understanding of the relevant morphology -- should not obscure the fact that the three rather disparate idiosyncrasies follow from the linking-vowel hypothesis.

In the case of -kem/-ken the proposed solution is abstract in that the linking vowel never appears phonetically in propria persona; in the case of -ēk it is of course there for all to see; in the case of -kā it makes an appearance at the end of sentences, in the pausal form, where deletion of stressed vowels is inhibited (vide 1.13): here we find dbārēkā. Here the linking vowel appears under stress, and does not lengthen; it must be exceptional to TL in the 2ms: note, however, that this peculiarity is overt in the data, and must occasion discomfort in any account.

When the plural noun is suffixed with these pronouns, it looks like this:

dbārīm 'words'

	<u>s.</u>	<u>p.</u>
m.	dbārēkā	dibrēkēm
f.	dbārāyik	dibrēkén

Here the plural morpheme -īm is evidently supplanted by some sort of augment. (The exact mechanism of replacement is investigated in 1.12: for the present, we can accept it as a fait accompli.) The fs form is obviously /dabar+ay+k/, with

Segholation (17) and Y-Adjustment (22) applying to give the surface form of the suffix. Only slightly less obviously, the plural pronouns are connected by the same augment: /dabar+ay+kem/, /dabar+ay+ken/. Diphthongs ay, aw, when unstressed, regularly turn to ē, ō (respectively) in the env. --C. This uniformly regular alternation is seen, for example, in báyit 'house' -- bētkā 'your ms house', záyit 'olive tree' -- zētīm 'olive trees'. Under stress, the diphthong is preserved: báytā /bayt+a/ 'to a house', where /a/ is the directional suffix. The general rule is then:

(23) De-Diphthongization-I $\overset{\text{U}}{a}y, \overset{\text{U}}{a}w \rightarrow \bar{e}, \bar{o} / \text{--[+cns]}$

(The rule is more carefully formulated as (5) of Chapter 2.)

What, then, of the short stressed e that links /-ka/ to the stem? All other things being equal, we'd expect -áykā in the 2ms slot, phonetically parallel to báytā. The reader who is familiar with the language will recall that the /y/ is actually present in the orthography, the consonantal spelling of dbārékā being DBRYK. However, the /y/ is not pointed with a schwa-sign, the necessary marker of pronounced syllable-final consonants inside words, and therefore could not have been regarded by the Masoretes as phonetically manifest. Recall too that /y/ is orthographically present throughout the entire paradigm of plural noun + suffixes, a clear case of morphophonomic spelling.

A special rule is required to handle the case of stressed /ay/, perhaps rather a special clause of rule (32). It is dependent on boundary information, for although base forms like /bayt+a/ and /dabar+ay+ka/ share the relevant feature of purely segmental make-up, a diphthong destined to bear stress, they are readily distinguishable in terms of morphological structure. The rule must look like this:

(23a) De-Diphth. II áy → e / -- + C V

The rule DD-II clarifies the underlying shape of the augment -e- that we noticed above (1.1) in certain imperfects: tqūmé'nā 'they/you fp will arise', tsubbénā 'they/you fp will go around. It is /-ay-/, and behaves exactly like the morpheme we are looking at.

DD-II must be ordered after VD, so that the underlying glide protects the vowel from deletion.

Turning now to the first person, we find the following:

dābār + suff.		dbārīm + suff. /dabar+ay/	
<u>s.</u>	<u>p.</u>	<u>s.</u>	<u>p.</u>
dbārī́	dbārēnū́	dbāráy	dbārēnū́

The augments we found in the 2nd person paradigm are discernible, through a little phonology. The form dbārī́ appears strange, because a vocalic final bears stress; the form dbāráy appears to lack a pronoun altogether. If we assume that the 1s ending is /-y/, then the augments we saw in the

2nd person will get us close to the surface forms: /dabar+e+y/, /dabar+ay+y/. The /y/ functions as a final consonant, insuring final stress; the plural form comes out of the rules we've seen, since Word-Final Degemination will simplify the final geminate. The singular demands a rule taking /e+y/ to \bar{i} ; this hints that the vowel we are representing as /e/, which is the short front vowel of the language, should perhaps be represented most deeply as /i/, from which it descended historically. I shall persist with /e/, since it is this vowel that participates in the quantity alternations which are germane to the subject of the overall investigation. In Chapter 2, this detail of representation will be sorted out. For the present, we postulate the following:

(23b) High Glide e y → \bar{i} / -- #

From the plural form (on the plural noun) /dabar+ay+nū/, we expect *dbāráy[́]nū, or rather, through the effects of DD-II, *dbārénū[́], with the stressed vowel short. Evidently, the rule DD-I, (32), disregards in this case the [-stress] condition that preserves the diphthong in e.g. báytā.

On the singular noun, from /dabar+e+nū/, we should get by VD *dbār[́]nū. What actually happens is preservation of the augment and consequent lengthening of it by the normal action of TL: dbārénū[́]. This (as opposed to the appearance of the long vowel \bar{e} in the plural) is the reflex of a significant sub-regularity among the suffixes: of those shaped +CV

only /-ka/ serves as a context for VD. In 1.11 an integrative account of the fact is given. Recognizing this, and factoring it out, the form dbārenū 'our word' supports choosing /e/ as the linking vowel attached to the singular noun.

At this point, we have reached the following analysis of suffixation:

	<u>s.</u>	<u>p.</u>
1	-AUG + y	-AUG + nū
2m	-AUG + ka	-AUG + kem
2f	-AUG + k	-AUG + ken

The character of AUG is determined by the number of the noun; singular, it is /e/, in the plural /ay/.

Clearly the /k/ that is constant throughout the 2nd person stands as a morpheme on its own. With this in mind, recall the look of the 2nd person inflection of the perfect:

2m	kāṭābtā	kṭābtém
2f	$\text{kāṭābt} /t+i/$	kṭābén

The inflectional affixes parallel the pronouns point-for-point: -ta/-ka (ms); -t/-k (fs), -tem/-kem (mp), -ten/-ken (fp). Recall that the underlying /-ī/ termination of the f.s. is a feature of the inflected verb per se, appearing in the imperfect (and imperative) as well. Based on this parallelism, we can further analyze the 2nd person affix as a structure C+M, where C = /k/ or /t/ depending on syntactic category, and M varies with the number and gender of the pronoun.

M-forms

	<u>s.</u>	<u>p.</u>
m.	a	em
f.	∅	en

The subject pronouns of the first and second persons have this form:

	<u>s.</u>	<u>p.</u>
1	?anī́	?anā́hnū
2m	?attā́	?attém
2f	?átt	?attén

These are based on a stem /?an/. Full progressive assimilation of /n/ is the norm in the language, and it explains the doubling of the /t/ in the second person.

(24) N-Assimilation $n \rightarrow C_i / \text{-- } C_i$

The rule operates across a morpheme boundary in the Nip̄^Cal imperfect, producing e.g. yikkā[/]tēb from /ya+n+kateb/; across a single word boundary optionally with the preposition min- 'from', as mibbāyit[/] or min-bāyit[/] 'from a house' (though perhaps the optionality is to be located in a rule weakening the word boundary in a string like min#bayit[/]); and stem internally in e.g. yittén[/] /ya+nten/ 'he will give', higgīd[/] /he+ngīd/ (Hip̄^Cīl). The rule has wrinkles: across a boundary /n/ will assimilate to anything; inside a stem, it does not assimilate to gutturals (2 exceptions), as a form

like yinhál 'he will obtain (property)' illustrates; furthermore, in the verb, a stem-final /n/ will not assimilate: nākōntā /na+kōn+ta/ 'you ms stood firm' (Nip̄fal) is the regular case. The verb nātān 'to give' is the only exception to the last provision, always assimilating at both ends whenever possible: nātāttā /natan+ta/ 'you ms. gave'.

The fs pronoun ?átt does not indicate, as might be thought, that N-assimilation precedes WFD, but rather that the pronoun, like the verb-suffix, ends in /-ī/, being therefore /?an+t+ī/. In other cases where N-assimilation interacts with WFD, degemination always occurs. Consider the jussive yēt 'let him extend', truncated from yitté /ya+n+tay/; compare yēbk 'let him weep' truncated from yibké /ya+bkay/.

Now, if we took the suffixes we found above and attached them to the stem /?an/, we'd get the following underlying forms:

	<u>S.</u>	<u>P.</u>
1	?an+y	?an+nū
2m	?an+t+a	?an+t+em
2f	?an+t+ī	?an+t+en

The 1s form demands a rule of glide vocalization, and an early one, so that stress can be shifted onto the vocalized glide by VD (the ǔ of ?ǎní is due to the initial

guttural, cf. rule (44), section 1.6 'Schwa-to-A'). Such a rule of vocalization will in fact be motivated quite independently in 1.9.

The 1p form given needs the infix -ah- to underly ?anáhñū. This morpheme makes no other appearance in the language. Note the failure of PTL; *?ānáhñū is certainly the expected form.

The 2ms form ?attā should of course be penultimately stressed, but is so only in sentence-final position. A minor rule is at hand; cf. 1.13 where sentence-final forms are discussed.

The characteristic 2nd person consonant t/k can now be seen for what it is. The /t/ appears as the inflection expressing the notion 'subject of the finite verb'; the /k/ elsewhere, as possessor on nouns, object on verbs, subject or object of the infinitive.

Turning now to the third person, a slightly different situation presents itself:

	dābār		dbārīm	
	<u>s.</u>	<u>pl.</u>	<u>s.</u>	<u>pl.</u>
m.	dbārō	dbārām	dbārāw	dibrēhēm
f.	dbārāh	dbārān	dbārēhā	dibrēhén

Looking at the plural pronouns, we see repeated the use of /m/ in the masculine, /n/ in feminine, establishing

these as separate morphemes. The augment on the singular noun, where it is obvious, is /a/, not the /e/ of the other person.

The feminine plural pronoun is clearly /ha/. Being of the form CV, like /ka/, it is susceptible to DD II, and the short vowel is indeed what's there. In the singular only the /h/ remains. This is no feature of the singular noun, but a reflex of a-augmentation. On the verb, for example, in the imperfect, the augment is /e/, and the full form of the pronoun remains: $y\check{i}\check{s}m\check{r}\acute{e}h\bar{a}$ / $ya+\check{s}mor+e+ha$ / 'he will guard her'. In the perfect, when an /a/ precedes, the form is just /h/: $\check{s}m\bar{a}r\acute{a}h$ / $\check{s}amar+a+ha$ / 'he guarded her', where the /a/ is an augment; $\check{s}mart\acute{a}h$ / $\check{s}amar+ta+ha$ / 'you ms guarded her; where the /a/ is part of the 2ms inflection. Note too $\check{s}mart\acute{i}ha$ / $samar+t+\bar{i}+ha$ /, where a non-a vowel precedes.

These forms indicate that there is a rule chopping off /a/:

(25) A-After-A $a \rightarrow \emptyset / a + C \text{ --\#}$

It is instructive to look at the subject forms for the 3rd person.

	$\frac{s.}{\bar{h}\acute{u}}$	$\frac{p.}{\bar{h}\acute{e}m, \bar{h}\acute{e}mm\bar{a}}$
m.		
	$\bar{h}\acute{i}$	$\bar{h}\acute{e}nn\bar{a}$
f.		

Clearly, the 3rd person pronouns are based on the stem /h-/. Subtracting this in the plural leaves a remainder that is very similar to what's left when the /t/ or /k/ is stripped from the 2 plural forms.

Observe that the plural forms, when extended with /-a/, show a geminate consonant: $\acute{h}emm\bar{a}$, $\acute{h}enn\bar{a}$ (?attēnnā is an alternate form for the 2fp ?attēn). This implies that in $\bar{h}em$, and by extension, -hem, -hen, -kem, -ken, -ten, -tem, the final nasal is geminated. Is it then the case that the masculine morpheme is really -mm-, the feminine -nn-? This cannot be correct, because in $\acute{d}b\bar{a}r\bar{a}m$ the stressed vowel is lengthened. I suggest rather that we see the augment /-en-/ interposed between the pronominal consonant and the gender marker: the 3 mp is /h+en+m/, the 3 fp is /h+en+n/. The rule of nasal assimilation, (33), will produce the geminates, the rule WFD, (14), will simplify them when abut a word boundary.

The augment /-en-/ functions elsewhere in the system. To the imperfect there are two species of pronominal attachment, one mediated by /-e-/, the other by /-en-/. As well as $\acute{y}i\check{s}mork\bar{a}$ /ya+smor+e+ka/, there is $\acute{y}i\check{s}mr\acute{e}kk\bar{a}$; beside $\acute{y}i\check{s}mr\acute{e}n\bar{u}$, there is $\acute{y}i\check{s}mr\acute{e}nn\bar{u}$ /ya+šmor+en+nū/.

Observe that, in the imperfect examples, the vowel of the augment fails to lengthen under stress. This, then, is the root of the exceptionality to TL that bedevils all affixes related to the 2 and 3 pl. pronouns. The morpheme /-en-/ is exceptional to TL: but only when it is not the first

syllable of a word, as $\acute{h}\acute{e}m$, $\acute{h}\acute{e}nn\bar{a}$ illustrate.

The organization of the (non-1st person) plural pronouns emerges as PERS-en- GEN, where PERS is a single consonant -- h for 3rd person, k/t for the 2nd -- and GEN is m for masculine, n for feminine.

Now, the masculine singular suffixes $-\bar{o}$ and $-\bar{a}w$ do not stand in a totally perspicuous relationship to the free subject pronoun $h\bar{u}$ 'he', but the relationship is not impenetrable either. The form $h\bar{u}$ does make regular appearances in the paradigm of suffixation. One may say either $\acute{s}m\bar{a}r\acute{o}$ or $\acute{s}m\bar{a}r\acute{a}h\bar{u}$, meaning 'he guarded him'; one may say either $\acute{s}m\bar{a}rt\acute{i}h\bar{u}$ or $\acute{s}m\bar{a}rt\acute{i}w$, if one means 'I guarded him'. The last example suggests a derivational path: $/ay+h\bar{u}/ \rightarrow /ay+w/ \rightarrow /aw+w/$. The last is an appropriate source for $-\bar{a}w$. Degemination will simplify the final cluster, TL will lengthen the vowel. But! says the keen-eyed reader: the vowel is followed by a cluster, and should not lengthen; just as it does not lengthen in the 1st person $/-ay+y/$. True enough, but $/w/$ does not count in the blocking of TL: contrast $\acute{m}\acute{a}w\acute{e}t$ $/mawt/$ 'death' with $\acute{b}ayit$ 'house'. A truly final version of TL would record this.

Since the rules relating the alternants of the 3ms suffix are of very narrow scope, and since the type of machinery they use is of a familiar sort, I am not going to elaborate them.

Observe finally in the fs pronoun $h\bar{i}$ $/h+i/$ the morpheme $/i/$ that we have seen in the verb and on the pronoun 2fs. The fs object suffix cannot be $/k+i/$ because Seghulation

occurs on the plural noun: dbāráyik. Contrast the failure of Segholation in kātábt /katab+t+ī/. The distribution of this /ī/ is thus parallel to the distribution of the /t/ in the 2nd person: it shows up only in inflection that refers to the subject of finite verbs.

The results of the excursus can be tabulated as follows:

Suffixes

	<u>Sing.</u>	<u>Plural</u>
1	-y	-nū
2m	k/t + a	k/t+ en +m
2f	k/t	k/t +en +n
3m	h +ū	h +en +m
3f	h +a	h +en +n

On the noun, the augment before the suffixes is /ay/ in the plural; in the singular it is /e/ for the 1st and 2nd persons, /a/ for the 3rd.

I have led this rather brisk sight-seeing tour through the gates and alleys of pronominal morphology to clarify the geography of suffixation in the language; and to show how certain phonological correlates of suffixation, particularly of the 2nd person suffixes (-ka, -kem) find a reasonable explanation in terms of the rule-set developed so far, within an

analysis of the morphology that provides a general account of the structural regularities of the system.

This done, I shall not represent the ultimate results of the analysis in every cited underlying form, e.g.

/dabar+ay+h+en+m/; for purposes of clarity, I will use boundaries to mark the major divisions, as between stem and suffix, augment and pronoun.

1.5 On the correct formulation of PTL

1.5.1 Let us turn now to a variety of deletion which is not dealt with correctly in the system developed so far.

The non-low vowels /e o/, when they appear in the env. $\bar{V}C--CV$ or $VCC-CV$ -- when they lie after a heavy syllable-- regularly suffer deletion. According to the present rules, however, when they appear in the env. $--C\acute{V}$, they should lengthen by PTL, and therefore be immune to VD. Only /a/ behaves in the predicted way. These examples present the facts:

$\bar{V}C--CV$		$VCC--CV$	
/šōpēt/	/īōlām/	/ma+qaddeš/	/ma+špat/
šōpēt	īōlām	mqāddēš	mišpāt
šōptīm	īōlāmīm	mqaddšīm	mišpātīm

(šōpēt: a judge; īōlām: eternity; mqāddēš: sanctifying (part. $\text{Pi}^{\text{f}}\text{fēl}$); mišpāt: judgment)

The same contrast between /e o/ and /a/ is found in the forms of the imperfect verb when it is suffixed with object pronouns. Consider what happens when the suffix $-\bar{e}n\bar{i}$ 'me' is attached to the m.s.:

/ya+šmor/	yīšmōr	yīšmrēnī	'he will guard/me'
/ya+ntēn/	yittēn	yittnēnī	'he will give/me'
/ya+šma'f/	yīšma'f	yīšmāfēnī	'he will hear/me'

(The total progressive assimilation of the stem-initial n of yittēn¹ is absolutely regular; the process was touched on in 1.4.)

Traditionally, this phenomenon has been thought to imply the existence of another rule of vowel deletion, operating in the env. $\begin{Bmatrix} VC \\ \bar{V} \end{Bmatrix}$ C--CV. Aronoff (1971) orders the rule early, before PTL has a chance to lengthen the vowels.

If this approach is correct, then a key feature of the SPE theory stands in need of revision. Eschewing direct representation of the notion 'syllable', SPE only allows reference to concatenations of segments. This restricted mode of analysis characterizes $\check{V}C$ --the weak syllable--as a natural element in phonological description, because it is expressible as a simple concatenation. But the two disjuncts of the notion 'heavy syllable' -- to be 'heavy' is either to contain a long vowel or to be closed with a consonant -- do not coalesce into one entity in SPE theory. To express 'heaviness' requires a clumsy list, braced together, as we've just seen in stating the environment for the alleged Hebrew process. Great success has been attained in eliminating the 'heavy syllable' from the analysis of stress-phonology, where it has been a touchstone in traditional description. The theory of disjunction allows it to be treated as the (unstated) complement of the natural unit 'weak syllable'. For example, consider a not unusual stress-assignment situation: main stress falls on

the last syllable if it contains a long vowel or if it has the shape VCC; otherwise, stress falls on the penult. We write:

$$(26) \quad V \rightarrow [+stress] / \text{-- } C_O (\check{V} (C)) \#$$

This notation says: stress the penult if the final syllable consists of a short vowel followed by at most one consonant; otherwise, stress the final syllable. But the difference is not merely verbal. The SPE theory entails that natural languages will manifest only such patterns as are expressible in this fashion. The present example of deletion seems to demand positive reference to a heavy syllable, and thus constitutes an interesting challenge to the SPE claim.

In terms of the Hebrew rule-system, too, there is good ground for suspicion. A new, early rule of Post-Heavy Syllable-Deletion (PHD) repeats essential respects of the richly motivated VD, since it applies like VD only to short vowels in open syllables. Because of this, if the vowels under consideration do not undergo PTL, the rule of VD as given will remove them, all by itself.

Let us turn the question around, then, and ask not where /e o/ delete, but where they lengthen pre-tonically. There are really only two environments, as the following table illustrates:

#C--CV			VC--CV		
lēbab̄	/lebab/	'heart'	zqēnīm̄	/zaqen/	'old man'
mēʔā̄	/meʔ+at/	'100'	nbēlā̄	/nabel+at/	'corpse'
īesāh̄	/īes+a+ha/	'her tree'	yrekāh̄	/yarek+a+ha/	'her thigh'
šēmōt̄	/šēm+ōt/	'names'	zqēnkā̄	/zaqen+e+ka/	'yr ms. old man'

(The fs. affix -at is discussed in 1.11.)

These two environments can be collapsed readily in an SPE-type notation (See Vergnaud 1974; Halle, Prince, & Vergnaud 1975 for details):

$$(27) \quad \begin{array}{c} V \\ [-low] \end{array} \rightarrow [+long] / \# \# (X \check{V}) C -- C \check{V}$$

The words bēn 'son' and šēm 'name' are peculiar in that they lose their stem vowel before pronominal suffixes: bnāh̄ 'her son', šmāh̄ 'her name'. That this is a peculiarity, not a phonological condition on the rule, is shown by the tabulated form īesāh̄ 'her tree', in which lengthening does take place. Apparently the two words are subject to a condition that can be expressed in a minor rule of exception-feature assignment:

$$(28) \quad /šēm/, /ben/ \rightarrow [-PTL] / --+Pron$$

The specialized rule of PTL for non-low vowels fits into the less restricted rule that applies to /a/:

$$(29) \text{PTL} \quad \left[\begin{array}{c} V \\ (-lo) \\ a \end{array} \right] \rightarrow [+long] / \# \# (X (\check{V})_b) C -- C \check{V}$$

Condition: $a \succ b$

When (a) is satisfied, the condition generates rule (27).

When (a) is not satisfied--when PTL applies to a [+low] vowel--, the following rule emerges:

$$(30) \quad V \rightarrow [+long] / \#\# (X(V)) C \text{ -- } C \acute{V}$$

As with TL, the parenthesized vowel places no restriction, since it abuts a variable. The rule is equivalent to

$$(31) \quad V \rightarrow [+long] / \#\# (X) C \text{ -- } C \acute{V}$$

which says that lengthening occurs wherever the right-hand environment is met; exactly what we want to say, once /e o/ are removed from consideration.

The unwieldy notion of a heavy syllable thus proves to be replaceable by its readily expressible complement, the light syllable, with a minimum of conditional decoration.

The two theories, however, are not mere notational variants. Recall that the Heavy Syllable Theory require an order PHD--PTL(--VD), so that the deleted vowel of e.g. $\bar{s}\bar{o}\bar{p}\bar{t}\bar{i}m$ / $\bar{s}\bar{o}\bar{p}\bar{e}t\bar{i}m$ / is gone before PTL has a chance to preserve it. This ordering raises the possibility that two vowels in a row could be deleted, one by PHD, one by VD, which follows it. In the Weak Syllable Theory here expounded, this is an out-and-out impossibility; there being just one rule of vowel deletion (VD), a rule which applies in an alternating fashion, never doing two-in-a-row. The crucial examples exist. Suppose

we affix a Qal imperfect like $yi\check{s}m\bar{o}r$ / $ya+\check{s}mor$ / or a Pi^{CC} $\bar{f}\bar{e}l$ perfect like $gidd\bar{e}l$ / $gaddel$ / with the 2ms object pronoun +e+ka. Forms like / $ya+\check{s}mor+e+ka$ /, / $gaddel+e+ka$ / have the requisite two-vowel line-up, the non-low stem vowels occurring after a heavy syllable, and the vocalic augment +e+ being subject to VD. What happens is preservation, not deletion, of the stem vowels, as predicted by the Weak Syllable or VD-only theory.

	/ $ya+\check{s}mor+e+ka$ /	/ $gaddel+e+ka$ / 'he brought you up'
Spir,V-Final	$\underline{k\bar{a}}$	$\underline{k\bar{a}}$
Main Stress	$ya+\check{s}mor+\acute{e}+\underline{k\bar{a}}$	$gaddel+\acute{e}+\underline{k\bar{a}}$
PTL	--	--
VD	$ya+\check{s}mor+\emptyset+\underline{k\bar{a}}$	$giddel+\emptyset+\underline{k\bar{a}}$
A-to-I	$yi+\check{s}mor+\underline{k\bar{a}}$	$giddel+\underline{k\bar{a}}$
Output:	$yi\check{s}mork\bar{a}$	$giddelk\bar{a}$

The most general version of Heavy Syllable Theory predicts the unheard-of forms $**yismrk\bar{a}$, $**giddlk\bar{a}$. The VD-only theory not only accords with SPE; it has the virtue of being right.

It may be instructive to derive the same verb forms affixed with the other incarnation of the 2ms pronoun, -ekka / $en+ka$ /.

	/ya+šmor+en+ka/	/gaddel+en+ka/
N-Assimil, V-Final	ek+kā	ek+kā
Main Stress	ya+šmor+ék+kā	gaddel+ék+kā
PTL	----	---
VD	ya+šmør+ék+kā	gaddøl+ék+kā
A-to-I	yi+šmr+ék+kā	giddl+ék+kā
Output:	yišmrékkā	gaddlékkā

1.5.2 Countertermoves

Against the proposal to restrict PTL rather than introduce a new rule of deletion along the lines of PHD, there are at least two clear lines of argument.

(I) It might be alleged that in an overzealous pursuit of regularity, all occurrences of -kā as a noun and verb suffix have been reduced to -e + ka, thereby artifactually creating a complex situation which arises in no other way. The proper tonic for this excess would be a realism that posits -kā where it sees -kā: yišmorkā is just /yišmor + ka/, and the ɔ is short simply because it never occurs -- C Ṽ. In this view the allomorphs of the 2ms pronominal suffix when attached to the imperfect are -ekkā /en+ka/ and -ka /ka/. This proposal is tested by the behaviour of verbs with imperfects in /a/, such as šālāḥ 'to send', impf. yišlāḥ. The realistic theory that posits /ka/ (and attendant mechanisms to get the stress final) predicts that the a-stem vowel will remain short, as the environment for PTL is not met in a string

like /ya+š[✓]lah+kā/. The theory that uses /+e+ka/ will, on the other hand, predict lengthening by PTL of the low stem-vowel in /ya+š[✓]lah+e+ka/, there being no restriction on the pre-tonic lengthening of /a/.

Lengthening occurs: yislāh^akā is the attested form. (The raised a is a predictable concomitant of the guttural: see 1.6 infra: a short, unstressed echo). This is strong evidence for /-e+ka/, strong evidence against the mere /-kā/.

Now, in Pi^{CC}l̄l̄ it happens that this lengthening does not take place: from šillah 'to send' (same root), impf. yšallah[✓], comes šillah^akā, yšallah^akā 'he sent/ will send you'. (Cf. Qal šmārkā[✓] /šamar+e+ka/ 'he guarded you', šlāh^akā /šalah+e+ka/ 'he sent you', with the expected lengthening). This failure of PTL in Pi^{CC}l̄l̄ occurs uniformly before all pronominal suffixes, not just before -e+ka, and in both perfect and imperfect. With the 1s suffix (impf.) -ēnī, for example, we find yšallhēnī[✓] 'he will send me'. Here, failure of PTL has meant loss of the stem-vowel via VD. Contrast the Qal version yišlāhēnī[✓], where the expected pre-tonic lengthening is evident.

Why does /a/ behave peculiarly in Pi^{CC}l̄l̄? More fundamentally, one might ask: what is /a/ doing in the Pi^{CC}l̄l̄ anyway? The characteristic vowel of the Pi^{CC}l̄l̄, as the name suggests, is /e/, as in giddēl[✓] 'to grow, raise (tr)', biqqēs[✓]

'to seek', qillēl 'to curse' (same root, qll, as Qal), hillēl 'to praise', qiddēs 'to sanctify'. Evidently the characteristic vowel turns to /a/ before gutturals, as in šillah, but behaves like /e/ with respect to PTL, failing to lengthen after VCC-- . This indicates that the requisite rule follows PTL. It is simplest to order it before TL, so that the general prohibition against lengthening /a/ under stress in verbs can be invoked to explain the quantity properties; after TL, the simplest rule, a mere lowering (and backing) would map ē onto ā.

The story does not end here, however. Many PiCCēl verbs allow an alternate perfect in /a/, regardless of the character of the final consonant: so qiddēs may also be vocalized qiddās, šillēm 'make whole' as šillām, bērék /berrek/ 'bless' as bērák, and so on. (Vide Ch. 2 for the first syllable vocalism of bērék). This alternation, or equivocation, seems to be by-and-large optional, although some verbs, e.g. limmád 'to teach', apparently only allow /a/. This phenomenon only occurs in the perfect; all other forms -- imperfect, participle, infinitive, imperative -- take /e/ with total uniformity: e.g. ylammed 'he will teach'. The guttural-final stems show /a/ everywhere (yšalláh) except in the participle, which is mšallēah /mašsalleh/.

Two rules are at hand, then, one which uniformly affects /e/ before gutturals in verbs (not adjectives, like

the participle), another which affects /e/ in the Pi^{CC}l̄ perfect. Both are ordered between PTL and TL, because the vowel they affect acts like /e/ with respect to PTL and /a/ with respect to TL.

(32) Verb-Guttural e → a / --G# / in verbs

(33) Pi^{CC}l̄-A e → a / --C# / in Pi^{CC}l̄ perfect

Rule (33) is either optional or minor, perhaps both, depending on the actual distribution of /a/ and /e/ in the verbs of the language, a kind of fact that may be lost in the folds of time.

Both rules are ordered so as to effect a kind of paradigmatic regularity. The /a/ of Pi^{CC}l̄, whether it arise through guttural influence or through the option of rule (33), mimics the basic e-vowel of the conjugation in deletability and pre-tonic lengthen-ability. A form like qiddaš[́]kā parallels qiddeš[́]kā more perfectly than the *qiddāš[́]kā one might expect on general grounds, looking at ktāh[́]kā, dbār[́]kā, or yilbaš[́]kā.

The Pi^{CC}l̄ data, then, give no comfort to the proposal that the 2ms suffix -kā is attached directly in the imperfect, without its linking vowel. Quite the contrary: the deletion before other suffixes, such as in šillhām[́]/ *šillāhām[́] is explicable by the same principles that secure retention of the vowel as short in e.g. qiddaš[́]kā, šillah[́]a[́]kā.

The surfacist who denies -ka its linking vowel forfeits an understanding of the behaviour of Piġġēl verbs before suffixes, and at the same time misses an explanation of the difference in PTL-properties between e.g. yilbāš[✓]kā (long vowel, Qal) and qiddaš[✓]kā (short vowel, Piġġēl).

(II) The proposal I am making is that PTL be restricted in its application to non-low vowels, with VD responsible for all deletions; call this the Restriction Hypothesis (RH). The most obvious counterproposal, based on traditional accounts, would hold that PTL is unlimited and adduce a separate, earlier (before VD) rule of deletion, PHD, that elides non-low vowels (short ones) after a heavy syllable; call this the Heavy Syllable Theory (HST). It is possible to construct an argument for the Heavy Syllable Theory, based on a kind of data that is dealt with very clumsily in the Restriction Hypothesis. The argument has a rather subtle coloration: it urges the existence of the rule PHD because there are forms that are exceptional to it; in HST they can be treated as simple exceptions, but in the RH which I propose, a special minor rule must be concocted. This mode of argument may seem a bit rarified, but I think it's important to pursue it, since it is based on a clear empirical difference between the two theories and not many such differences can be found. The counterargument will show (1) that when HST is elaborated to the point where

it works (gets facts like non-deletion in $y\check{i}šmork\bar{a}$, discussed above), significant generalizations about the language are inexpressible in it, and (2)* that very similar data require a minor rule treatment in HST, anyway. The counterargument will vindicate the RH offered above, and with it the SPE theory of natural phonological elements.

The difficult data arises in the derivation of certain feminine nouns from Qal participles. Participles Qal of ordinary triliteral verbs are, in the masculine singular, shaped /CōCeC/, as in $k\bar{o}t\bar{e}b$ 'writing ms', $k\bar{o}t\bar{p}\bar{i}m$ 'mp'. Observe, in the plural form, the regular deletion (rather than lengthening) of the pre-tonic /e/. The participial feminine is formed in the singular by affixation of /-t/ instead of the usual fs morpheme /-at/ (cf. 1.11): $k\bar{o}t\bar{e}bet$ / $k\bar{o}teb+t$ /. (The shortness of the stressed vowel is due to Philippi's Law, Ch. 2). In the plural, affixation of the fp morpheme /-ōt/ produces, as expected, $k\bar{o}tb\bar{o}t$.

So far, no wrinkles. But a small number of nouns are formed by affixation of the full fs ending /-at/ to the participial stem. Examples are $y\bar{o}l\bar{e}d\bar{a}$ / $y\bar{o}led+at$ / 'woman in travail', related to the verb $y\bar{a}l\bar{a}d$ 'to give birth', and $t\bar{o}f\bar{e}b\bar{a}$ / $t\bar{o}feb+at$ / 'abominable thing', from the root $t\bar{i}b$. In these words, strikingly, the /e/ is not only retained, but lengthened. If PTL is restricted to apply to non-low vowels only in the environment ## (X \check{V}) C--CV, it cannot possibly

lengthen the underlying short stem vowel of $y\bar{o}l\bar{e}d\bar{a}$. However, in HST, the word class Participle Stem+/at/ can be regarded as simply exceptional to PHD, as a consequence of which the unrestricted rule of PTL will lengthen the surviving vowel. In the RH some special rule must be created to lengthen the pre-tonic vowel in just these cases.

Before the argument can be evaluated, the HST has got to be explicitly formulated, and in such a way that it handles the central body of regular data. Observe that if the rule PHD is constructed to be inapplicable to the preserved non-low stem vowels in $yi\check{s}mork\bar{a}$ /ya+šmor+e+ka/, $giddel\bar{k}\bar{a}$ /gaddel+e+ka/, then PTL must still be constrained from applying to them; the Restriction Hypothesis re-surfaces. This problem breaks into two parts, there being two relevant vowels: the treatment of /o/ and the treatment of /e/.

As for /o/, it can be excluded from PTL altogether, since there are no forms in the ordinary language that require it to be lengthened pre-tonically. This is because, as we noted above, stems ending -oC# always geminate the consonant, due to rule (15), as in $?\bar{a}y\bar{o}m$ 'afraid' -- $?ayumm\bar{i}m$ 'pl.'. In his exhaustive survey of the treatment of pre-tonic vowels, F. R. Blake is able to come up with only two cases (JNES, 1950): (1) the word $gb\bar{o}h\bar{i}m$ 'high', singular: $g\bar{a}b\bar{o}ah$, (2) before the archaic imperfect affixes - $\bar{u}n$ 2 & 3 m pl, for - \bar{u} , and - $\bar{i}n$ 2 f sing, for - \bar{i} . Example (1) is,

alas, irrelevant: from the expected geminated plural form /gabohh+īm/ would come, by a general process discussed in Ch. 2, the observed gbōhīm, with its long vowel. Example (2) can be brushed off as archaism operating outside the normal patterns of the language. Supporting this view is the fact that these cases should be susceptible to the syncopatory action of Post-Heavy Syllable Deletion: yiktōbūn, tiktōbūn, tiktōbīn. Gesenius (par. 47m) notes that these occur mainly in pause, where the usual forms are yiktōbū, tiktōbū, tiktōbī; this suggests a conscious archaizing, perhaps distorted by hypercorrection. Finally, there simply are no stems /CoCVC/ in the language, an arbitrary restriction on canonical form. Therefore, in HST, we exclude /o/ from PTL, allowing the rule to apply only to the non-round vowels /e a/.

This done, it becomes clear that PHD need not (and must not) apply to /o/ either. Since the round vowel never lengthens by PTL, the deletion evident in a word like yišmrēm /ya+šmor+e+m/ 'he will guard them m' is accomplished by VD; it's not necessary to invoke PHD. And in yišmorkā /ya+šmor+e+ka/ the vowel that lies after the heavy syllable is preserved: VD may not delete it, because it deletes the augment -e-; PHD cannot be allowed to delete it either. The rule PHD therefore applies only to /e/.

The vowel /e/ cannot be denied pre-tonic lengthening: recall examples like $zq\bar{e}n\acute{k}\bar{a}$ /zaqen+e+ka/, $\check{s}\bar{e}m\acute{o}t$ /šem+ōt/. However, once the rule PHD is constrained from deleting /o/, once it is allowed to delete, in fact, only one vowel, it is a small matter to see the e of $giddel\bar{k}\bar{a}$ or $\check{s}\ddot{o}mer\bar{k}\bar{a}$ /šōmer+e+ka/ 'your ms guardian' as being epenthesized to break up the four-consonant cluster that results from deletion in adjacent syllables. An observationally satisfactory version of HST thus requires the following system of rules:

- (34) a. PHD $e \rightarrow \emptyset / \left\{ \begin{smallmatrix} VC \\ \bar{V} \end{smallmatrix} \right\} C \text{ -- } CV$
- b. PTL' $V \rightarrow [+long] / \text{--- } C \check{V}$
 $[-round]$
- c. VD, as above, rule (3)
- d. e-Insertion
- e. TL, as above, rule (11)

(The rule of e-Insertion may seem damagingly ad-hoc, but within the revised system we present below (1.6) something very like it is motivated.)

These rules would function in derivation like this:

	/gaddel+e+ka/	/ya+smor+e+ka/	/ya+smor+e+em/
(Spir, V-Final)	<u>kā</u>	<u>kā</u>	
Main Stress	gaddel+é+ <u>kā</u>	ya+smor+é+ <u>kā</u>	ya+smor+é+m
PHD	gaddl +é+ <u>kā</u>	---	---
PTL'	---	---	---
VD	gaddl + <u>kā</u>	ya+smor+ + <u>kā</u>	ya+smr +é+m
e-Ins	gaddel + <u>kā</u>	---	---
A-to-I	gidde ^l l + <u>kā</u>	yi+smor+ <u>kā</u>	yi+smr +é+m
TL	---	---	yi+smr +é+m
Output:	gidde ^l l <u>kā</u>	yismor <u>kā</u>	yismrēm

Although this solution is observationally adequate, and not totally implausible, it is not very acceptable. Leaving aside the fact that rules (34a, b) are more discursive than the restricted version of PTL, rule (29), observe that the exclusion of /o/ from PHD and PTL' is an ad-hoc measure aimed at forms of the yismorkā class. Under the Restriction Hypothesis, there is no need to accord /o/ special status in the rules: the properties of /o/ are consequent upon the peculiarities of its distribution, which must be stated in any grammar. In the Heavy Syllable Theory, /o/ has the same set of distributional restrictions in morphemes, but their effects must be redundantly re-specified in the phonological rules; and specified twice, independently in each relevant rule (PHD, PTL').

Returning to the data of the argument, note that the plural of $y\bar{o}l\bar{e}d\bar{a}$ is $y\bar{o}l\bar{d}\bar{o}t$ / $y\bar{o}led+\bar{o}t$ /, which is regular; the plural of $t\bar{o}f\bar{e}b\bar{a}$ is $t\bar{o}f\bar{e}b\bar{o}t$, which is exceptional in the same way as the singular. These data are not particularly illuminating. But if we look at the derivational class / $ma+CCeC$ /, we find a similarly widespread and erratic exceptionality. Consider the word $ma\ddot{s}\bar{s}\bar{e}b\bar{a}$ / $ma+n\bar{s}eb+at$ / 'standing-stone', in which the pre-tonic vowel is lengthened exceptionally, not deleted. The plural $ma\ddot{s}\bar{s}\bar{e}b\bar{o}t$, like $t\bar{o}f\bar{e}b\bar{o}t$, but when pronominal suffixes are added to draw the accent away, eliminating the possibility of PTL, the long \bar{e} remains: $ma\ddot{s}\bar{s}\bar{e}b\bar{o}t\bar{e}h\bar{e}m$ / $ma+n\bar{s}eb+\bar{o}t+ay+h\bar{e}mm$ /, $ma\ddot{s}\bar{s}\bar{e}b\bar{o}t\bar{e}k\bar{a}$ / $ma+n\bar{s}eb+\bar{o}t+ay+ka$ /. The same situation prevails in e.g. $mag\bar{g}\bar{e}p\bar{a}$ / $ma+ngep+at$ / 'plague', plural suffixed, $mag\bar{g}\bar{e}p\bar{o}t\bar{a}y$ / $ma+ngep+\bar{o}t+ay+y$ / 'my plagues'. We know the surface \bar{e} is short underlying (1) on general grounds, since these forms are clearly derived by / $-at$ /-affixation from the stem / $ma+CCeC$ /, which is quite regular in the masculine, e.g. $mizb\bar{e}ah$ 'altar', pl. $mizb\bar{h}\bar{o}t$, and (2) at least some of the members of this class show deletion in the construct state, e.g. $ma\ddot{s}\bar{s}b\bar{a}t$, $ma\ddot{s}\bar{s}b\bar{o}t$ 'standing-stone(s) of'. (See 1.12 for an account of construct phonology).

Consequently, any theory is doomed to a minor rule lengthening these vowels in variety of morphological circumstances, which vary for each individual word. Some undergo the rule uniformly in all inflections ($mag\bar{g}\bar{e}p\bar{a}$), some everywhere but in the construct state ($ma\ddot{s}\bar{s}\bar{e}b\bar{a}$). And there

is no reason not to invoke this rule in the $y\bar{o}l\bar{e}d\check{a}$ -type of case, which displays an exactly similar kind of irregularity.

To conclude: we have seen that only the solution embodied in rule (29), the annotated version of PTL, can explain both the quantity and the deletion properties of /e o/ in terms of a single restriction, the limitation of the rule to the env. $\#\ (X \check{V}) C \text{ -- } CV$ when it applies to non-low vowels. The Heavy Syllable Theory can be elaborated to the point of observational adequacy, but it must impose two independent restrictions on the processing of /o/, one in PTL', one in PHD, both aimed ad hoc at the $y\check{i}smork\check{a}$ -type of case. The single restriction in the RH is, on the other hand, motivated independently of the behaviour of /o/ by facts like the $\check{s}\bar{o}p\bar{e}t/\check{s}opt\bar{i}m$ alternation; and, because of this, in the RH the distributional restrictions on /o/ in morphemes (and the rule of O-Closure (15)) provide a real explanation for the character of its surface alternants.

On a more crassly empirical level, we found that the data upon which the argument for the HST was based could easily be subsumed under a minor rule that must be an appurtenance of any grammar of the language.

1.6 Schwas, Spirantization, Silence

The discussion so far has been eased by a simplification: where standard grammars transcribe schwa, I have omitted indication of a vowel. In Lambdin (1971) for example, there is found $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\bar{\text{im}}$ for my $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\bar{\text{im}}$, $\text{k}\bar{\text{a}}\text{t}\bar{\text{a}}\text{b}\bar{\text{u}}$ for $\text{k}\bar{\text{a}}\text{t}\bar{\text{b}}\bar{\text{u}}$, $\text{yik}\bar{\text{t}}\bar{\text{a}}\text{b}\bar{\text{u}}$ for $\text{yik}\bar{\text{t}}\bar{\text{b}}\bar{\text{u}}$. Two issues present themselves, one phonetic, the other phonological: (1) to what extent is the standard transcription justified, and (2) to that extent, what is the role of schwa in the system of Hebrew grammar.

The phonetic issue arises because the Masoretes used one diacritic to mark both vowellessness and schwa. This sign, a vertically oriented pair of dots, is placed under consonants in basically two environments, like this: $\text{C}\underset{\cdot\cdot}{\text{C}}\text{V}$, $\text{C}\underset{\cdot\cdot}{\text{C}}\#$. Our examples thus appear: $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\bar{\text{im}} \text{ k}\bar{\text{a}}\text{t}\bar{\text{b}}\bar{\text{u}} \text{ yik}\bar{\text{t}}\bar{\text{b}}\bar{\text{u}}$. Word-final two consonant clusters arise regularly through truncation in the 2fs (vide supra 1.4), e.g. $\text{?a}\bar{\text{t}}\bar{\text{t}}$ 'you fs', $\text{n}\bar{\text{a}}\bar{\text{p}}\bar{\text{a}}\bar{\text{t}}\bar{\text{t}}$ 'you fs fell'; and appear irregularly in such forms as $\text{y}\bar{\text{e}}\bar{\text{b}}\bar{\text{k}}$ 'let him weep' (truncated from $\text{yib}\bar{\text{k}}\bar{\text{e}}$).

The transcription we have used comes out of the orthography via the simple principle of ignoring the schwa-sign. Traditional grammar distinguishes the quiescent schwa, \emptyset , marking the end of the syllable, from the vocal schwa, ə , the reduced vowel. According to the view of Lambdin (1971) and Gesenius (1910), which is ultimately based upon that

expressed in R. David Qimhi's Mikhlol, an important mid-1200's compilation of the results of 3 centuries of grammatical research, the schwa is vocal in three contexts: #C---, V C C---, \bar{V} C---; that is, everywhere except after a weak syllable \bar{V} C --

This view deserves skepsis because it is the child of two theories, neither of which is acceptable. First, that spirantization of the unemphatic stops /b g d k p t/ occurs after surface - manifest vowels. If vocal schwas are not hypothesized, then in each of our examples -- $\text{dbārī}^{\prime}\text{m}$, $\text{kāt}^{\prime}\text{bū}$, $\text{yikt}^{\prime}\text{bū}$ -- known spirants will occur post-consonantly. In a theory with rule ordering, this evidence does not carry weight; and besides, the raw data of the language refutes the statement of distribution: in $\text{mal}^{\prime}\text{kē}$ 'kings of ...', $\text{mal}^{\prime}\text{kēhem}$ 'their m. kings', as we discovered in our discussion of the segholate nouns, the root final consonant is spirantized because of the underlying presence of a vowel-- the infixed plural marker /-a-/ -- which even under the standard theory of schwa is completely absent phonetically. (Apparently there were some die-hard surfacists among the earlier medieval grammarians who urged the pronunciation $\text{mal}^{\prime}\text{ə}^{\prime}\text{kē}$, etc., just to obtain the transparency of spirantization. ref: W. Chomsky). Second is Qimhi's theory that unstressed long vowels could only occur in open syllables (again, on the surface), so that $\text{dbār}^{\prime}\text{kā}$ 'your m.s. word' must be in the relevant respect vocalized as $\text{dbār}^{\prime}\text{ə}^{\prime}\text{kā}$. But there

is no good reason to accept this as an accurate generalization about Hebrew structure, and indeed certain other grammarians, among them Ben Asher, Ibn Ballām, and Ibn Ezra, did not work with it. (W. Chomsky p. 44, n. 19). All the grammarians agree that schwa is vocal in the env. V C C--C.

There is, however, evidence from outside the grammatical tradition which bears on the point. Transliterations of Hebrew words into Greek letters in the Hexapla (2-3 c. A.D.) and the Septuagint (2nd c. B.C.), a translation of the Bible into greek prepared for the Jews of Alexandria, clearly show vocalization of certain schwa-signs. In the LXX, we find the following:

<u>English</u>	<u>Hebrew</u>	<u>Greek</u>
Samuel	šmūʔēl	Σαμουήλ
Sodom	šdōm	Σόδομα
cherubim	krūbīm	Χερουβίμ
Solomon	šlōmō	Σαλωμών

These transliterations clearly support the view that word-initial schwa was actually pronounced. (They also evidence assimilations of schwa to the following vowel, even more extensive than is provided for in Qimḥi (par. 4 b-d), a level of detail that is not recoverable from Masoretic orthography.) The antepenultimate stress in the Greek of Sodom (sódoma) is presumably the result of applying to it the Greek principle

of recessive accent (cf. Kiparsky 1973). (The word does look like a neuter.) The initial of 'cherub' does not indicate spirantization, but rather that Hebrew k was perceived as being closer to the aspirated chi = k^h than the unaspirated kappa = k.). This is not the place to take up the philological issues in serious detail: the interested reader is directed to M. L. Margolis, *AJSL*. XXVI, p. 62 ff. and to Einar Brønno, *Studien über hebräische Morphologie und Vokalismus auf Grundlage der mercatischen Fragmente der zweiten Kolumne der Hexapla des Origenes*.

Another argument that schwa was in some cases vocalized, pointed out by T. O. Lambdin (pers. comm.), comes from the character of the consonantal text. Between two identical consonants, according to the standard view, a reduced vowel is retained always: so, from sābáb 'go around' we get sābābū 'they went around', from sēl 'shadow' we get šlālīm 'shadows', silālē 'shadows of ...'. In the consonantal text, sābābū appears as SBBW, šilālē as ŠLLY. It is crucial that in examples like this the consonant is written twice: phonetic geminates are always written with a single letter, so sabbōtēm /sabb+ō+temm/ 'you mp went around' is SBWTM, and šillī /šell+e+y/ 'my shadow' is ŠLY. The consonants themselves, which are certifiably ancient, testify that a vowel was pronounced in these syllables where we hypothesize VD to operate.

Let us assume, then, that schwa is pronounced in the env. #C--C and V CC--C. I am going to assume, with Ibn Ezra, silence after $\bar{V}C--$, but this decision is arbitrary and could be reversed in the system to be proposed by the addition of one feature to one rule. At any rate, nothing much should ride upon details of this type, which can certainly be expected to vary widely from place to place and time to time.

Can the rule of VD be maintained, supplemented with a late rule of schwa-insertion? The appearance of schwa, not \emptyset , between identical consonants in the output of VD shows this to be untenable, for after VD has applied, it is impossible to distinguish between $\dot{s}ille$ / $\dot{s}elal+ay$ / 'shadows of' and $\dot{s}illi$ / $\dot{s}ell+e+y$ / 'my shadow', yet $\dot{s}ille$ must be schwa-inserted to produce the surface output $\dot{s}il\emptyset le$. The rule VD is therefore reconceived as accomplishing a reduction to schwa:

$$(35) \text{ Vowel Reduction} \quad V \rightarrow \emptyset / \text{--C } V [-\text{lng}]$$

To tailor the output of VR to accord with the pattern of schwa - \emptyset distribution we have accepted, we need a rule to make appropriate eliminations:

$$(36) \text{ Schwa-Deletion} \quad \emptyset \rightarrow \emptyset / VC_a \text{--} C_b \text{ Condition } C_a \neq C_b$$

Initial consonant clusters are broken up by schwa. Does this phonetic generalization entail a rule of schwa-

insertion? The nouns do not provide a clear answer: words like $\text{barā}^{\text{á}}\text{kā}$, previously cited as $\text{brā}^{\text{á}}\text{kā}$, 'blessing' need not be lexicalized as $\text{brak} + \text{at}/$; an underlying vowel can be hypothesized, say $/\text{barak} + \text{at}/$, and VR would supply the schwa. Indeed, as we shall see at 2.1, $\text{CC}\bar{\text{V}}\text{C}$ is not a possible stem shape for an unaffixed noun. That it appears on the surface before the feminine affix $-\text{at}$ can be ascribed to the effects of phonology on the combination of canonically-shaped morphemes, $/\text{CVCVC}/$ plus $/\text{VC}/$. On the other hand, nouns like $\text{gā}^{\text{b}}\text{ūl}$ 'boundary', $\text{bār}^{\text{ī}}\text{t}$ 'covenant', show no vowel but schwa in the first syllable, and there is no general process in the language to reduce a vowel that might be underlyingly present in the first syllable. The frame $\text{CC}\bar{\text{V}}\text{C}$ can, without loss, be stipulated as a canonical stem-form. However, the historical provenance of $\text{gā}^{\text{b}}\text{ūl}$ and words like it from either $*\text{gibūl}$ or $*\text{gubūl}$ via a rule of reduction that wiped out $/i\ u/$ (= our $/e\ o/$) in the env. $\#C--C\ \bar{\text{V}}$ left a gaping hole in the lexicon, and the canonical pattern $\text{CC}\bar{\text{V}}\text{C}$ could be 'derived' by re-instating the historical forms and the historical rule, into the grammar of Hebrew.

The behavior of the Qal infinitive, however, shows that $\#CC$ clusters must be dealt with in the phonology. The following forms are relevant:

- i. $k_{\bar{a}}t_{\bar{o}}b$ 'to write' / ktob /
- ii. $likt_{\bar{o}}b$ 'to write' / la+ ktob/ la = to (inf. marker)
- iii. $bikt_{\bar{o}}b$ 'when writing' /ba# ktob / ba = in

All Qal infinitives of ordinary tri-literal stems follow the same pattern.

Looking at form (i), $k_{\bar{a}}t_{\bar{o}}b$, one might suspect an underlying initial vowel that does not behave properly with regard to PTL. The nonspirant /t/ of form (ii), $likt_{\bar{o}}b$, is inconsistent with such a hypothesis, if the disappearance of the vowel comes about through the offices of the reduction and deletion rules already in the grammar, for they do not interfere with spirantization. Nailing down the non-existence of an early rule of (complete) syncope will take us deep into details, and we shall put it off briefly until the outlines of the basic system become somewhat clearer. Under present assumptions, then, forms (i, ii) evidence a rule inserting schwa into initial consonant clusters:

$$(37) \quad \emptyset \rightarrow \bar{a} / \#C--C$$

Rule (37) closely resembles Segholation, rule (17). It is not improbable, in fact, that the vowel written \bar{e} that appears unstressed in segholates had the phonetic value of schwa; if it did, the Masoretic orthography would have had no direct way to indicate it, the schwa-sign itself being used to mark final clusters, and writing \bar{e} would be a satisfactory compromise, phonetically not far distant

and easy to interpret. If it did not, we need a trivial low-level adjustment. So let us dispense with Segholation, and using the mirror image convention generalize rule (37) to break up both initial and final clusters:

(38) Cluster Break-Up $\emptyset \rightarrow \text{ə} // \#C--C$

Form (iii), $\text{bikt}^{\text{ə}}\text{ob}$, with its spirantized t , shows that Cluster Break-Up applies to the inner word $\#ktob$ of $/ba\#ktob/$, sparking Spirantization, after which Schwa-Deletion removes the inserted schwa. The infinitive as object of a true preposition, occurring in a structure $[_{PP} \# P[_{NP} \# N] \#]$, retains its integrity as a word (as the syntax predicts), and only differs from the free form $k\text{ə}\text{t}^{\text{ə}}\text{ob}$ because the preposition provides the context for Schwa-Deletion.

This array of data thus compells the ordering:

Cluster Break Up (schwa insertion)

Spirantization

Schwa Deletion

There's a slight wrinkle here: this rule-system will delete all schwas inserted by the segholation clause of Cluster Break-Up; the schwa of $\text{mel}\text{ə}\text{k}$ is certainly in the env. VC--. This falsification can be amended by ordering a rule of adjustment before Schwa-Deletion, bleeding it:

(39) Segholate Adjustment $\text{ə} \rightarrow \text{e} / \text{C} \text{ -- } \text{C} \#$

However, if it is true, as I suggested, that the unstressed e of mélek is an orthographic dodge for representing a schwa-quality vowel, then Segholate Adjustment is artificial. Surely too, a vowel like that epenthesized into the final clusters of segholates, being unstressed, is liable to great dialectal variation. (Think of the multitudinous phonations of reduced vowels in English.) I am hesitant, therefore, to make a detail of its value (+back) a principal desideratum of surface word-shape. Schwa-Deletion is easily amended to cover the case:

(40) Schwa-Deletion $\text{ə} \rightarrow \emptyset / \text{VC}_a \text{ -- } \text{C}_b \text{ V}$

Condition $\text{C}_a \neq \text{C}_b$

(The environment of rule (40) recalls the notion 'doubly open syllable' of Kuroda 1967.)

A question arises as to the correct form of the preposition b- 'in', whether it is /ba/ or just /b/. Of the infinitive marker l- we can be sure, because its vocalism alternates regularly, li- before --CC, lā- before --C $\acute{\text{V}}$, as lāšébet /la + šeb + t/ 'to sit or dwell', root yšb. The real prepositions l- 'to', b- 'in', k- 'like' never display the ā-vocalism before nouns in the env.--C $\acute{\text{V}}$, except for l- in a few fixed phrases (see Gesenius, p. 299f-1

for a list of them). Before certain pronominal suffixes, the /ā/ shows up, as lākém bākém kākém 'to, in, like you mp'. This does stand as evidence for la,ba,ka. To get this to work, VR must be allowed to operate across a single word-boundary. PTL as it is stated in rule (13) does not apply across #, so that in strings like /la#ʕamm/ 'to a people', VR outputs ləʕam. If these prepositions are to be analyzed as merely consonantal, a rule will be needed to turn schwa to /i/ in the env. --CC; and indeed such a rule is motivated by alternations in the paradigm of the Qal imperative:

	sing.	<u>Write!</u>	pl.
m.	kəṭob /ktob/		kitbū /ktob + ū/
f.	kitbī /ktob + ī/		kəṭobnā /ktob + na/

This paradigm also gives evidence for Cluster Break-Up, because the i-vowel in the fs and mp has no plausible source in either /ɔ/ or /e/, as both undergo PTL in the env. #C-CV' with regularity. Consequently, the i-vowel can have no other source than the inserted schwa which gets trapped behind two consonants. We require, therefore, rule (41):

(41) Schwa-to-I ə → i / --CC

The relationship of rule (41) to the rule of A-to-I operating in essentially the same environment will be explored

in detail when we turn to examine the segmental alternations. Rule (41) follows Schwa Deletion, being fed by it. A derivation may clarify the operation of the rule system thus far developed.

	/ ktob + ū/	
Stress		
VR	kt ə b + ^ˈ ū	
Cluster Break-Up	k ə t ə b + ^ˈ ū	
Spirantization	k ə <u>t</u> <u>ə</u> b + ^ˈ ū	
Schwa Deletion	k ə <u>t</u> <u>b</u> + ^ˈ ū	
Schwa-to-I	ki <u>t</u> <u>b</u> + ^ˈ ū	
Output	ki <u>t</u> <u>b</u> ū	'you all boys write!'

The cited infinitive forms derive as follows:

	/ktob/	/la+ktob/	ba#ktob/
Main Stress	kt ó b	la+kt ó b	ba#kt ó b
PTL	--	--	--
VR	--	--	ba#kt ó b
TL	kt ó b	la+kt ó b	ba#kt ó b
Cluster Break-Up	k t ó b	--	ba#k ə t ó b
Spir	k t ó <u>b</u>	la+kt ó <u>b</u>	ba#k ə t ó <u>b</u>
Schwa-Del	--	--	ba#k ə t ó b
A-to-I, Schwa-to-I	--	li+kt ó b	bi#kt ó b
Output:	k ə <u>t</u> <u>b</u> ū	li <u>k</u> <u>t</u> <u>b</u> ū	bi <u>k</u> <u>t</u> <u>b</u> ū

This analysis has several features worthy of comment.

First, in relation to problems of lexical structure and canonical form of underlying representations, it obviates the necessity for positing a vocalic source for first syllable schwas that alternate only with \emptyset , as $gəb\bar{u}l$ 'boundary', $liḡb\bar{u}l$ 'to a boundary'; or only with \emptyset and /i/, as $bəṛākā$ 'blessing', $birkōṭāy$ 'my blessings', $kibrākā$ 'like a blessing'. Underlying forms like /gebūl/ or /gobūl/, can be abandoned in favor of /gbūl/, in which the \emptyset alternate is chosen as base, without altering the output: the rules dealing with schwa that are in the grammar to describe alternations in other morphological categories would treat these base forms properly. This fact of course does not decide the question of underlying form in these cases, but it shows that the decision is without phonological content.

Similarly, the schwa-/i/ alternation in the vocalism of the monosyllabic prepositions b- l- k- could be treated as reflex of vowel-lessness without modifying any rules.

Second, in relation to the structure of the rule-system, observe that the ordering of Schwa-Deletion and Spirantization was discovered by examining only forms like $bikt\bar{o}b$ where the crucial schwa -- the one that spirantizes the \bar{t} -- is inserted by rule. This ordering predicts that all underlying vowels will induce spirantization of immediately following stops, because the syncope of reduced vowels is accomplished by the same rule that deletes inserted

schwas. Not only is this prediction borne out, as forms like *malkēhem* /mal-a-k + ay + hemm/ 'their m. kings' and *kanpēhem* /kanap + ay + hemm/ attest, but for the situation to be otherwise would necessitate a complication of the grammar. Recall that the treatment of VR-VD as reduction-to-schwa rather than outright deletion is motivated by the identical consonant facts -- *sābəbū*/**sābbū* -- and thus a Hebrew in which the correct forms were **kanpēhém* and **malkēhém* would have another rule of schwa deletion, identical to the first, but ordered before spirantization.

It is significant that the system of early reduction and late deletion receives this kind of empirical support, for the rule of Spirantization runs into serious ordering problems in the first grammar we proposed, with VD, rule (3), accomplishing complete syncope.

For purposes of discussion, let's assume the distribution of schwa could be handled by late rules of insertion, and return to the VD-Grammar we started out with, attempting to place Spirantization with respect to the other rules, whose order has been successfully determined.

Observe first that Spirantization must be early, must in fact precede VD. Forms like *kanpēhem* /kanap+ay+hemm/ and *kātbū* /katab+ū/ have a vowel deleted which is never replaced by schwa; yet the consonant that follows the deleted vowel is spirantized. Spirantization must occur before the

conditioning vowel is removed by VD. The order is:

Spirantization

VD

Segholation, rule (17), feeds Spirantization: from /malk/ we get mélek_u, never ***mélek. Therefore, Segholation precedes Spirantization. But Segholation is rather late among the rules presented. It must follow Word-Final Degemination, rule (14), so that from a base form /rabb/ we obtain ráb_u, not **rébeb_u. Word-Final Degemination applies after TL, rule (11), so that /rabb/ leads to ráb_u, with a short vowel because of the terminal cluster, not *ráb_u, which has the shape assumed by biconsonantal words like dām /dam/. Transitivity of ordering gives

TL

WFD

Segholation

Spirantization.

We know on other grounds that Segholation must follow TL, since the final cluster in, e.g., /malk/, /naʕr/ inhibits lengthening of a, giving mélek_u, naʕar with short stressed vowels.

But, as we argued above (1.2), VD comes before TL. If it did not, TL would apply to a form like /kabēd+ū/, producing /kabēd+ū/, and the lengthened stem-vowel should

remain; but it's gone: $kā\bar{b}d\bar{u}$, not $*kā\bar{b}ēd\bar{u}$, is found on the surface. This gives

VD

TL.

This ordered pair is the link that allows us to chain all the rules mentioned into one linear order:

Spirantization

VD

TL

WFD

Segholation

Spirantization

A nasty result.

A simpler and therefore more devastating paradox arises in the phonology of gutturals. When a guttural $/ʔ\ h\ ʕ\ h/$ closes an unstressed syllable, i.e. occurs as G in the context V G C, a (short) copy of the vowel appears after the guttural on the surface. Typically, we find $naʕarām$ $/naʕr+a+m/$ 'their m boy', $noʕōrām$ $/noʕr+a+m/$ 'their m early life', $yaʕābōd$ $/ya+ʕbod/$ 'he will work'. In the orthography, these copied vowels are written with special signs, called $hāṭēp$'s (henceforth: hateph), which consist of the ordinary sign for /a e o/ flanked on the right by the schwa-sign. Traditional grammars set these apart from the non-reduced vowels, describing them as ultra-short, murmured, a species

of schwa. Since the hateph signs are used only in the env.--C V, the peculiar quality of these vowels should be ascribed to their being short vowels in unstressed open syllables. No third degree of length (or shortness) need be taken as primitive, and we identify them completely with the ordinary short vowels they are semiotically cognate to.

It's clear that the hateph vowel in e.g. $\text{no}^{\text{C}}\text{f}^{\text{U}}\text{or}^{\text{A}}\text{am}$ has no place in the underlying string; is inserted by rule. The bare bones of the process look like this:

(42) Hateph Formation	S.D.	V	G	C
		[-str]		
		1	2	3
	S.C.	1	2	1 3

Now, in the first grammar proposed, the rule VD will create the sequence V G C when it deletes a vowel lying between the G and the C. These sequences are broken up by Hateph Formation. Consider the word $\text{po}^{\text{C}}\text{al}$, meaning 'work', a segholate noun like $\text{me}^{\text{C}}\text{lek}$, but with an a in the second syllable because of the C . The stem $/\text{po}^{\text{C}}\text{il}/$ is augmented in the plural by rule (19) to $/\text{po}^{\text{C}}\text{al}/$, just as $/\text{malk}/$ becomes $/\text{malak}/$. Adding the 3 mp suffix to the plural form looses VD on the inserted vowel, yielding $\text{malk}^{\text{C}}\text{ehem}$ and -- $\text{po}^{\text{C}}\text{ol}^{\text{C}}\text{ehem}$, from the intermediate form $/\text{po}^{\text{C}}\text{il}^{\text{C}}\text{ehem}/$. Similarly, a disyllabic like $\text{nah}^{\text{C}}\text{ar}$ 'river' gives $\text{nah}^{\text{C}}\text{ar}^{\text{C}}\text{ot}^{\text{C}}\text{ehem}$ from the intermediate vowel-deleted form $/\text{nahr}^{\text{C}}\text{ot}^{\text{C}}\text{ehem}/$.

	/poʕ-a-l+ay+hém/	/nahar+ōt+ay+hém/
Stress	poʕal+ay+hém	nahar+ōt+ay+hém
Spir	--	nahar+ot+ay+hém
VD	poʕl + ay+hém	nahr + ōt+ay+hém
HF	poʕol+ay+hém	nahar+ōt+ay+hém
Other:	poʕol+ē+hém	nahar+ōt+ē+hém
Output:	poʕolēhém	naharōtēhém

Hateph Formation must follow VD.

But Hateph Formation, like all rules inserting vowels, feeds and thus precedes Spirantization: consider yaʕābōd /ya + ʕbod/ 'he will labor' heʕēbīr /he + ʕbīr/ 'he led across'. Spirantization does not pass across gutturals, as is shown by šāmāʕtī /šamalʕtī/ 'I heard', which does not meet the SDof Hateph Formation because of stress, and by tehdar /te+hdar/ 'you m.s. will favor', which is simply exceptional with regard to HF.

So Spirantization, which precedes VD, must apply to the output of HF, which follows VD.

Spirantization

VD

Hateph Formation

Spirantization

The paradox is simple, and inescapable.

These data might set one to thinking of global rules, of local ordering, or -- of dividing VD into an early reduction and a late deletion. We have seen that the last alternative is abundantly supported by considerations entirely unrelated to the paradoxes at hand.

At this point it might be instructive to see how the new grammar with Vowel Reduction replacing Vowel Deletion handles the phenomenon of the hateph vowels.

Actually, there's no possibility of a serious problem developing. Although Schwa-Deletion in a string V G \emptyset C V would create an environment for Hateph Formation, it's not necessary to wait for Schwa-Deletion to come along: the rule Hateph Formation can be expanded to affect schwa as well as \emptyset , assimilating schwa to the preceding vowel, replacing \emptyset with a copy of the vowel.

(43) Hateph Formation	S.D.	V	G	(\emptyset)	C
		[-str]			
		1	2	3	4
	S.C.	1	2	1	4

There is another rule in the grammar that deals with schwa following a guttural: whereas dābār^{\prime} gives rise to pl. dābārīm^{\prime} , ʔādām^{\prime} 'man has pl. ʔādāmīm^{\prime} ; where mélek^{\prime} has malākīm^{\prime} , ʕébed^{\prime} 'servant' has ʕābādīm^{\prime} . The vowels written

ă are spelt with the hateph-sign. Evidently, where schwa is generally predicted, a preceding guttural induces an a-quality vowel; an assimilation, since the gutturals are low sonorants.

The phenomenon is not restricted to initial position. Qal participles like $k\bar{o}t\acute{e}b/k\bar{o}teb/$ 'writing' lose the short vowel in the plural due to the limitation on PTL: $k\bar{o}t\acute{b}\acute{im}/k\bar{o}teb+\acute{im}/$. In a verb II-guttural, like $\acute{s}\bar{a}\acute{f}\acute{a}q$ 'cry out', participle $\acute{s}\bar{o}\acute{f}\acute{e}q$, the vowel reduces as expected but instead of going all the way to \emptyset , it survives as a: $\acute{s}\bar{o}\acute{f}\acute{a}q\acute{im}$.

These facts evidence a rule lowering post-guttural schwas:

(44) Schwa-to-A $\emptyset \rightarrow a / G \text{ --}$

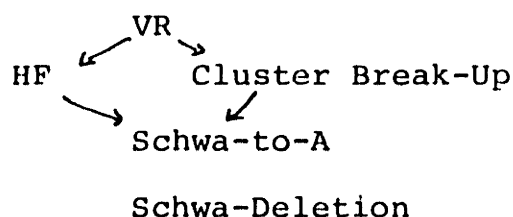
Rule (44) precedes Schwa-Deletion, robbing it of schwas to delete. It must follow Hateph Formation, rule (43), since whenever the two conflict, Hateph Formation wins. In the form $po\acute{f}ol\acute{e}h\acute{e}m /po\acute{f}-a-l+ay+hem/$, for example, the o-hateph is a descendent of a VR created schwa; if Schwa-to-A had first crack, the form would be $*po\acute{f}al\acute{e}h\acute{e}m$. In fact, if Schwa-to-A preceded HF, there would be no motivation for the new schwa-clause in HF, since all schwas would be sent to a in the environment V G -- C.

The rule Schwa-to-A also plays a role in determining the vocalism of segholats. A base form like /CVGC/ undergoes Cluster Break-Up, becoming CVG C; Schwa-to-A applies,

outputting CVGaC. This is, of course, correct: a base like /noʕr/ yields noʕar.

The ordering presupposed, Cluster Break-Up -- Schwa-to-A, is confirmed by the behaviour of forms with initial clusters. Infinitives and imperatives from roots I-guttural (except /ʔ/ show the a-hateph: ʕabōd /ʕbod/, ʕazāq /ʕzaq/ 'be strong'. The roots I-ʔ have e in the parallel forms, e.g. ʔekōl /ʔkol/ 'to eat'; this is due to a rather specialized rule affecting schwa between ʔ and o (vide Ch. 2). Words from underlying /CCVC/, like bərīt 'covenant', when they begin with a guttural, also conform to the expected pattern: ʕazīr /ʕzīr/.

The order of the various rules relating to schwas is as follows:



As a final flourish, let us formulate the rule in its detail:

$$(45) \text{ Spirantization } \begin{bmatrix} -\text{son} \\ -\text{low} \\ -\text{C.G.} \end{bmatrix} \rightarrow [+ \text{cnt}] / \begin{bmatrix} -\text{cns} \\ +\text{voi} \\ -\text{cor} \end{bmatrix} \text{ ---}$$

The [-low] restriction excludes the emphatics /ṭ q/. The environment is intended to include all vowels and the glides /y w/ but not /ʔ hr/. Observe habbaytā 'homeward' /ha#bayt+ ā/ and yehdar 'he will favor' /ya + hdar/. I know of only five exceptions to the rule, which is not a bad record for a rule that is in Kiparsky's sense opaque--one whose conditioning environment is not always visible on the surface. Not applying where expected: kaspēhém /kas-a-p+ay+hemm/ ;their m. money (pl.)', birkāt /barak+at/ 'blessing of ...'. Here there is nothing to say but that certain plural forms of késep /kasp/ 'money, silver' are built on the singular stem; and the construct state of is based irregularly on a truncated form of the stem. Applying to consonant not post-vocalic: kaspēnū (kasp + ēnū) 'our money (sing)', bigdī (bigd+ī) 'my garment', yiqbéka (yiqb + e + ka) 'your m.s. wine-vat'. These anomalies can be rendered tractable by attaching the pronominal suffix with a word boundary, #, rather than the usual morpheme-weight boundary, + : kasp#ēnū, bigd#ī, yiqb#e+ka. They are now liable to Cluster Break-Up, which inserts a schwa into the cluster, causing spirantization. Unlike the ordinary case of segholation, the inserted schwa now appears in the env. VC-CV, and is therefore removed by Schwa-Deletion. Only spirantization is left as a trace of its brief existence inside the cluster.

1.7 The Remaining Deletion and Reduction Cases

The infinitive and imperative Qal have in their unaffixed forms the underlying shape C C V C: $k\bar{a}t\bar{o}b$ 'you m.s. write!', $k\bar{a}t\bar{o}b$ 'to write'; $b\bar{a}h\bar{a}r$ 'you m.s. choose!', $b\bar{a}h\bar{o}r$ 'to choose'. Now it happens that this word-shape is not found elsewhere in the verbal system; indeed it is not found in the lexicon at all, with a couple of exceptions ($d\bar{a}b\bar{a}š$ 'honey', $\check{s}\bar{a}k\bar{e}m$ 'shoulder' are the ones I am aware of). Words like $z\bar{a}?\bar{e}b$ 'wolf', $b\bar{a}?\bar{e}r$ 'well' are not real exceptions, for as D. Guttman (1970) observes, there are no segholates $C\bar{e}?\bar{a}C$, the expected surface reflex of $/Ce?C/$; apparently an early metathesis turns e.g. $/ze?b/$ into $/z?eb/$. This metathesis enables us to clear the dictionary of nouns $/CCVC/$, and provides another set of forms for which Cluster Break-Up is necessary.

The shape C C V C is universally assumed by three-consonant stems when they are singly prefixed in the course of derivation or inflection. The prefixes of the imperfect, $y-$, $t-$, $?\bar{-}$, $n-$; the verbal derivational prefixes, $n-$ ($Ni\bar{p}\bar{f}\bar{a}l$), $h-$ ($Hi\bar{p}\bar{f}\bar{a}l$, $Ho\bar{p}\bar{f}\bar{a}l$), $m-$ (participial); the nominal prefixes $m-$, $t-$; all of these attach to the same stem shape. When the stem has four consonants, due to a derivational process such as doubling the middle radical or reduplication, or because the root is one of the very rare quadrilaterals, the stem shape remains invariant under prefixation: in $Pi\bar{f}\bar{f}\bar{e}l$, for example, we find characteristically $gidd\bar{e}l$ (pf.), $y\bar{o}gadd\bar{e}l$

(impf.), m gaddeī (part.). The four consonants are always arrayed CVCCVC.

Now it also happens to be the case that the imperative mirrors the imperfect due to minutiae: it has the same pattern of reduction, modulo initial cluster phenomena, and, even more strikingly, it has the same stem-vowel. And the stem-vowel of the imperfect is not always predictable. Usually it is /o/: yiktób. When a guttural is the second or third root-consonant, it is /a/: yiṣḥaq 'he will laugh'; yišmaʿ 'he will hear'. When the perfect has /e/ or /o/, it is /a/: qāṭon 'he is small', impf. yiqṭán; kābēd 'he is heavy', impf. yikbād. When the verb is stative, it is /a/: ḥāzaq 'he is strong', impf. yeḥzeq. But the vowel is unpredictably /a/ in a handful of cases, e.g. lāmād 'to learn', impf. yilmād; and unpredictably /e/ in yittēn 'he will give', impf. of nātān.

In all these cases, whether the stem-vowel is predictable or idiosyncratic, the imperative follows the imperfect: kaṭób ṣəḥaq, šəmaʿ; ləmad, tēn.

Contrast the imperative and the imperfect in inflection:

	<u>2nd Pers Imperf.</u>	<u>Imper.</u>
m.s.	tiktób	kaṭób
m.p.	tiktəbū	kitbū
f.s.	tiktəbī	kitbtī
f.p.	tiktōbnā	kaṭōbnā

These considerations suggest that the Imperative is literally derived from the Imperfect by truncation of the inflectional prefix, explaining in one blow the vocalism, inflection, and peculiar stem-shape. (This idea about the imperative has, not surprisingly, been around for a while. Its most recent appearance in the modern tradition is in Gutman (1970)).

Using a rule of prefix-removal to get the imperative opens the way to explain certain features of the derived conjugations. In Pi^{CC}l̄, the imperfect has the shape illustrated in yagaddēl: if we assume here the same stem /gaddel/, the rule A-to-I will operate on the first syllable to produce the observed form. The imperative is gaddēl. If it's assumed to come simply from /gaddel/, it is unclear why it should not follow the perfect in vocalism, being equally liable to A-to-I. But if it's derived from an imperfect-like form /ta+gaddel/, the rule that takes away the prefix can be ordered after A-to-I, which only applies to first syllables. The vocalic parallelism between imperfect and imperative will thus be attributed to the same source, prefixation.

In Hi^{p̄}l̄, the characteristic h-prefix is quite visible in the perfect: e.g. hišmīdū 'they destroyed'. Not so in the imperfect: yašmīdū. But it reappears in the imperfect (and in the infinitive); hašmīdū 'destroy!' If we assume that it is underlyingly present in the imperfect, and

obscured by loss of the h-, then the prefix a-vocalism (where i is found elsewhere in the verb) follows from the restriction of A-to-I to the env. #C-CC; and the form of the infinitive, with its a-vocalism and h-prefix, follows from the existence of the rule removing prefixes.

What of the infinitive? Surely it is senseless to encumber it at any stage with person-number prefixes, and if we must stipulate its form, the argument for truncation in the imperative is correspondingly weakened. But there is a prefix waiting in the wings: to wit, la-, which is similar to and historically derived from the ordinary preposition l-'to'.

The infinitive marker can be readily distinguished from the related preposition on both syntactic and phonological grounds. The unmarked infinitive, which may appear with subject, object, and other clausal accoutrements, has essentially the distribution of a noun: it may function as subject of a sentence, as in "man's being by himself is not good" (Gen.2.18); as adjunct to a noun, as in "a time to mourn and a time to dance"; as object of a preposition, resulting in structures best given periphrastic clausal translations, "because, until, when, as, after, than . . . " (The bare infinitive may also appear as complement to verbs like know(how), begin, be able, etc.). For present purposes the

most relevant of these uses is the prepositional construction, specifically the idiom in which the monosyllabic prepositions, b- 'in', k- 'like', l- 'to', take the infinitive, producing a temporal clause translatable with when, as, while and the like. (This is easily the most common way of forming such clauses.) The prepositions b-, k- are used more frequently than l- for this purpose, but there are a number of clear instances of l- in this temporal usage. Gesenius (p. 348, n.1) cites Dt 23.12, Ex. 14.27, Ju 19.26; and 2 S 18.29. The reader who is diligent enough to pursue the references will find that the first three involve the phrase $l\bar{p}n\bar{o}t$ + noun referring to time of day, meaning 'as it became e.g. morning'; the last is an authentic temporal clause, 'when (=l-) Joab sent (infinitive) the king's servant and your servant (= me).'

Contrasting with this is the infinitive marked with l-: it appears as complement to equi-type verbs like be able, begin, cease, finish, be willing to, desire, refuse, expect, hasten, continue, learn (how), understand how, know how; it appears in adsentential and ad-verb-phrasal complements of purpose and result; and it is used in certain locutions with the verb 'to be' and its equivalents to express the modal notions of incipience, possibility, and obligation. It seems to be the case that the l-marked infinitive does not allow the expression of an overt subject, a fact which has evidently gone unnoticed. By the time of Mishnaic Hebrew, first attested 400 - 300 B.C.,

at least five hundred years after the mid-point of the period we are focusing on, the infinitive was always marked with l-. Concomitantly, all of the constructions of the bare, nominal infinitive had disappeared. It is interesting, then, that Segal (1927) remarks: "the pronominal suffixes attached to this [Mishnaic infinitive prefixed with l-] are however . . . always of an objective force." It seems that in fact the syntactic situation in Mishnaic Hebrew is simply a direct continuation of that in Biblical Hebrew, and the differences are attributable to loss of the bare infinitive, with its noun-like distribution and sentence-like structure.

The phonological distinction is equally clearly marked, as we saw above. There is a contrast in spirantization between the l- prefixed infinitive and the infinitive that follows a real preposition: liktōb with [t], vs. biktōb with [t̪]. The infinitive as prepositional object has the spirantization properties of the bare infinitive; the prefixed case is like the imperfect yiktōb: we conclude therefore that the prefix is attached with a morpheme boundary, +, and the preposition with a word boundary, #. Of course, these boundary assignments follow from the general principles of the theory, once we note that l- is a true prefix, distinct from its cognate preposition. A further distinction in vocalism has been noted above: the prefix l- shows the alternation lā-/li-, as lāšēbet/liktōb, where šēbet is the infinitive of yāšab 'dwell' formed by

processes we discuss below; but the preposition b-, l-, k- show an alternation between [ə] and [i] in parallel circumstances: bādābār/bidbārīm. In the rule-system we have developed, this also falls out from the morpho-syntactic distinction of boundary-type.

The result of these lucubrations is that the infinitive has a prefix that behaves in every phonological respect like the inflectional prefixes on the imperfect. We therefore attribute the infinitive stem shape CCVC to the existence and character of this prefix, just as we attribute the other regular occurrences of this stem-shape to prefixation. The direct way to model this observation is to take the prefix to be part of the underlying form of every infinitive and remove it by rule when appropriate, parallel to the removal of the person-number prefix to form the imperative from the imperfect. When is appropriate? A crude formulation, suggested by our brief review of infinitive syntax is: (1) whenever it serves a noun-like function, and (2) optionally after verbs of which it is the complement. It is quite striking that the environment for the proposed deletion is basically syntactic rather than morphological; the same is true of the imperative, perhaps less obviously. If the prefix-truncation proposal is correct, then the imperative is just a kind of 2nd person variant of the imperfect in a certain syntactic environment: observe that the imperfect is also used with commandatory

force: yiktōb can mean 'let him write'. Further, the imperative per se appears only in positive commands; after negatives, the full, prefixed imperfect is used. The rule of imperfect prefix truncation, if there be such, must be constrained from applying in negative sentences. The rule looks like this:

(46)	Prefix Stripping	S.D.	# CV +
			1 2
		S.C.	1 ∅

Condition: Constrained syntactically and
morphologically as described

We might pursue the question of stem-shape a bit further and ask how it comes about that post-prefixal stems assume the form CCVC. Two general approaches to modeling phenomena of this type suggest themselves: one we may designate 'interpretive', like that of Halle (1973), in which a positive condition is placed upon the lexicon requiring the structure CV+CCVC] stem for all prefixed items; the other, which we may term 'generative', more closely analogous to familiar phonological modes of thinking, in which one stem form is taken as basic and a battery of rules apply to mold it to its various environments. Let us look at the phonological consequences of one way of developing the generative approach.

Observing an alternation in stem form such as that between the perfect kātab /katab/ 'he wrote' and the imperfect

yikt[/]ōb /ya+ktob/, it is plausible to take the form as base and posit a simple rule to take out the stem-initial vowel, a rule which we know to be quite general:

$$\begin{array}{rcl}
 (47) \quad 3\text{-Syllable Rule} & \text{S.D.} & \underbrace{\text{CV} + \text{C}}_1 \text{ V } \underbrace{\text{C V C}}_{\text{stem}}_3 \\
 & & \qquad \qquad \qquad 1 \quad 2 \quad 3 \\
 & \text{S.C.} & 1 \quad \emptyset \quad 3
 \end{array}$$

Such an account will, of course, be supplemented with the various rules of ablaut whose effects we briefly discussed above.

The possibility of the 3-Syllable Rule is important at this point because it fulfills the portentous description found in the discussion of Schwa-Insertion (37): an early rule of complete syncope. This opens the way to a new analysis of the initial cluster data. If we order Prefix Stripping before the 3-Syllable Rule, then both bare infinitives and imperatives are going to have two stem vowels, the first of which could underly schwa, /i/, or any other initial vowel, thus eliminating the need for the posited rule of schwa-insertion (37). Some complex and unexpected data from the behavior of the infinitive when suffixed pronominally might seem to give a measure of support to such a move. The entire paradigm runs as follows:

<u>Suff.</u>	<u>Sing.</u>	<u>Pl.</u>
1	kotb-ī	kotb-ēnū
2m. a.	kəto ḅ kā	a. kəto ḅ kém
b.	kotb-ə kā	b. kotb-ə kém
2f	kotb-ē k	a. kəto ḅ -ə kén
		b. kotb-ə kén
3m	kotb-ō	kotbām
3f	kotb-ā h	kotb-ā n

As is often the case with individual lexical items, not every form given here actually appears in the text: those which do not are projected from citations of phonologically parallel words. The 2nd person feminine plural forms are projected directly from the 2nd person masculine plural forms; although there are no citations of these forms at all, there is no reason to expect that they would diverge from the elsewhere (on nouns) always parallel masculine form. More important to our analysis are the (b) forms of the 2nd person masculine. The crucial point is the non-spirantization of the third root consonant, which contrasts markedly to its spirantization elsewhere in the paradigm. These forms of kāṭāḅ do not appear in the Bible. But this projection is supported by the forms like bəʔospə**kā** 'when thou m. hast gathered', Ex.23.16, and bəʔospə**kém** 'when ye have gathered', Lev.23.39, from the verb ʔāsāḅ 'gather'. Gesenius (p. 162 par.61a) says " ... before -ka and -kem also the syllable is completely

closed ... ", where by 'complete closure' he means merely to indicate the failure of spirantization. Other supporting evidence known to me is the occurrence of šokbəkā 'when thou m. liest down' from sākab, at Dt 6.7 and twice elsewhere. The form 2m(a) pl. is supported by Gesenius' authority and by ?akolkēm 'your eating' from ?ākal, Gen. 3.5.

I have tarried over these details because they are significant in the argument. The non-spirantization in the 2m(b) forms show that they do not arise from the operation of VR as we know it; they evidence a rule of metathesis which applies optionally, and early, to 2nd person forms.

(48)	2nd Pers. Metath.	SC.	C	C	V	C	+	2nd Pers Pron
			1	2	3		4	
		SC.	1	3	2		4	

The occasional maverick form from other persons, like hopk-ī 'my overturning' from hāpāk, or noḡp-ō 'his striking' from nāḡāp (Ex.12.27), suggests that this rule may apply sporadically outside its proper domain. This rule is an early adjustment, applying before VR.

Let us now examine the paradigm without the (b) forms, which are handled correctly and completely by the rule 2nd Person Metathesis. The remaining stem mutations are just those that would arise from application of the rules to a base /kotob/, given that PTL does not apply.

	/kotob/	/kotob+a+m/	kotob+e+ka/	/kotob+e+kemm/
V-final			\bar{a}	
Stress	ko <u>tó</u> b	ko <u>tob</u> + <u>a</u> +m	ko <u>tob</u> + <u>e</u> + <u>kā</u>	ko <u>tob</u> + <u>e</u> + <u>kém</u> m
PTL	---	---	---	---
VR	ko <u>tó</u> b	ko <u>tob</u> + <u>a</u> +m	k <u>ə</u> to <u>b</u> + <u>ə</u> + <u>kā</u>	k <u>ə</u> to <u>b</u> + <u>ə</u> + <u>kém</u> m
TL	k <u>ə</u> to <u>b</u>	ko <u>tob</u> + <u>a</u> +m	vac.	---
WFD	---	---	---	---
Spir	k <u>ə</u> to <u>b</u>	ko <u>tob</u> + <u>a</u> +m	k <u>ə</u> to <u>b</u> + <u>ə</u> + <u>kā</u>	k <u>ə</u> to <u>b</u> + <u>ə</u> + <u>kém</u>
Schwa-Del	---	ko <u>tob</u> + <u>a</u> +m	k <u>ə</u> to <u>b</u> + <u>kā</u>	k <u>ə</u> to <u>b</u> + <u>kém</u>
Output:	k <u>ə</u> to <u>b</u>	ko <u>tob</u> a <u>m</u>	k <u>ə</u> to <u>b</u> k <u>a</u>	k <u>ə</u> to <u>b</u> k <u>ém</u>

What this observation suggests is that the infinitive stem be set up as /kotob/; when prefixed, /la+kotob/ goes to /la+ktob/ by the 3-syllable Rule; unprefixed, the vowel remains to partake of the alternations observed, granting the non-applicability of PTL.

The proposal to employ the 3-Syllable Rule in this fashion loses plausibility when it is realized that the suffixed infinitive has the same form whether or not it is marked with 1-: kotob-ī/ ləkotob-ī 'to write me'. This proposal predicts, on the contrary, *liktob-ī, parallel to the authentic tiktob-ī 'you f.s. will write' from /ta+ktob+ī/. Of course, the 3-Syllable Rule could be altered ad hoc to not apply to suffixed infinitives, a strange restriction for a rule of such generality to exhibit.

Rather than seeing the infinitive stem alternations as the result of lacunae in otherwise general processes -- PTL, the 3-Syllable Rule -- I propose a special rule that copies the stem vowel into the initial cluster of suffixed forms:

(49)	Echo	S.D.	C	C	V	<u>C + Pron</u>
	(First Version)		1	2	3	4
		S.C.	1	2	3	4

To what categories does this rule apply? Clearly, not to the imperfect: we have seen *yismor-kā* 'he will guard you', not **y somr kā*. In the imperative, however, interesting data is found. Displayed here are the relevant forms:

<u>Imper. m.s.</u>	<u>+l.s.suff</u>	<u>Imper.m.p.</u>	<u>+l.s.suff</u>
šəmor ^{/'}	šomr-ēnī ^{/'}	šimrū ^{/'}	šimrū-nī ^{/'} 'guard (me)'
šəma ^{/'}	šəma ^{/'} -ēnī	šim ^{/'} ū	šəma ^{/'} ū-nī 'hear (me)'

Contrast these data with the parallel forms of the imperfect:

<u>Impf.m.s.</u>		<u>Imperf.m.p.</u>	
tišmōr ^{/'}	tismər-ēnī ^{/'}	tišmōrū ^{/'}	tišmōrū-nī ^{/'}
tišma ^{/'}	tisma ^{/'} -ēnī	tišma ^{/'} ū	tišma ^{/'} ū-nī

Remarkably, the fate of the stem vowel is imperfect and imperative is point-for-point identical, modulo deletion of schwa.

Under the analysis developed above, the fate of the stem vowel in the pronominally suffixed forms is determined by

the applicability of PTL, since stress happens to fall always on the immediately post-stem syllable. In the imperfect, the fact that non-initial Pre-Tonic lengthening of /e o/ is limited to the env. V C --C V means that /e o/ will remain short and be subsequently reduced, where stem -vowel /a/ will be lengthened and preserved. In the imperative, what guarantees the same patterning? If Prefix-Stripping follows PTL, then the imperative will inherit the quantity, and hence reduction, properties of the parent imperfect, since they are formally identical until beyond the point where quantity differences relevant to reduction are introduced. Observe that the same ordering explains the shortness of the preserved vowel in *kə́tobkǎ́*, if it comes from /la + ktob + e + ka/.

Other approaches might be imagined, though. It will not do to allege that PTL simply doesn't apply to /o/, because imperatives in /e/ have identical reduction properties. For example, *tén*, 'give' from *nā́tán* (we discuss its aberrant stem shape below) shows *tənū́-nī* 'you all m. give me' and *tən-énī* 'you m.s. give me!' It might be suggested that PTL is restricted in the env. # C C --, that is, that it only applies to word initial non-low vowels in the env. # C --. Now there can be evidence against this only if there are underlying #CC sequences in the lexicon other than those of the imperative/ infinitive. Words like *nə́belǎ́* 'corpse' can be pointed to, where an underlying /nbəl + at/ produces

correct surface forms. (The /e/ is deletable, as in *niblāt*, 'corpses of'). Of course, an underlying form like /nabel + at/ works equally well in terms of the present system, is preferable in terms of the restrictions on canonical form of 2.1, and so it does not provide much of a case.

Returning to the main theme, observe that the rule of Echo has applied to the pronominally suffixed form of the m.s. imperative: *šomr-énī* 'guard me', not as we might expect, **šimr-énī* parallel to *simrū-nī* (pl.). The rule does not apply to the plural form, but then there is no reason to expect that it should, because its shape, CCVC+V+Pron, does not satisfy the S.D. of the Echo rule, which is CCVC+Pron. This rather subtle detail provides confirmation for the view that analogical relations between categories must be developed through rules defined over elements of structure, not through the exploitation of gross correspondences.

The appearance of the echo phenomenon in imperative inflection gives clear evidence that a rule is operating, that we are not merely witnessing the emergence into daylight of an underlying stem vowel usually suppressed. If the imperative had such a stem vowel, V_i in a proposed base like / kV_i tob/, it would have to be able to modulate to /i/ upon deletion of the second stem vowel, as in the mp. *kitbū* and the f.s. *kitbī*. Plausible candidates are /a/ and /e/, certainly not /o/. If basic imperative/imperfect stems

like /katob/ or /ketob/ are set up, with the 3 Syllable Rule used to trim them in the presence of prefixes, the rule Echo could easily be re-stated as an assimilation of the first vowel to the second, rather than a copying. But we should expect phonetic $\text{kā} \text{tō} \text{b}$ or $\text{kē} \text{tō} \text{b}$ for the bare m.s. imperative, not the observed $\text{kə} \text{tō} \text{b}$. Thus, attempting to use the 3-Syllable Rule to account for alternations in stem-shape in the imperative and infinitive leads to postulating a variety of irregularities: in the 3-Syllable Rule itself, with regard to the suffixed infinitive which is marked with 1-, discussed above; and in the operation of PTL upon the hypothesized stem vowel, I conclude therefore that, for purposes of phonology, there never is a vowel between C_1 and C_2 in the imperative/imperfect/infinitive stem $C_1 C_2 VC_3$. The implicit promise in the discussion of schwa-insertion, to nail down the non-existence of an early phonological rule of complete syncope, has been met. The 3-Syllable Rule, if it exists, plays no role in phonology; the internal workings of morphology remain as inscrutable as activity inside the En-Soph.

Where does the rule Echo fit into the phonology? If the stem-initial CC cluster is to play a crucial role in inhibiting PTL in the infinitive and imperative, Echo, which breaks up this cluster, must apply after PTL. This necessitates a slight complication of the rule, for it cannot copy the pretonically lengthened /ā/ of $\text{šā} \text{mā} \text{lē} \text{nī}$; it would wrongly output

The (A) form of the rule must be ordered after prefix-stripping so that the imperative will meet its S.D. The (B) form need not; since the rule of prefix stripping is obligatory in the imperative, no forms like *təkotbēm 'write them!' will be generated. Since prefix-stripping is not universal in its application to infinitives, both kotbām and ləkotbām will emerge. Since the (A) version redundantly repeats the condition on the infinitive, I opt for (B).

Let us derive a few forms to illustrate the operation of the rules:

	/la+ktob+a+m/	/ta+ktob+e_m/	/ta+šlah+e+m/
Stress	la+ktob+á+m	ta+ktob+é+m	ta+šlah+é+m
PTL	n.a.	n.a.	ta+šlāh+é+m
Pref. Strip	(declined)	ktob+é+m	šlāh+é+m
Echo	la+kotob+á+m	ktob+é+m	--
VR	lə+kotəb+á+m	kot ə b+é+m	--
TL	lə+kotəb+ā+m	kotə b+é+m	šlāh+é+m
Cluster B-U	--	--	šəlah+é+m
Spir	lə+kotə b+ā+m	kot ə b+é+m	--
Schwa-Del	lə+kot b+ā+m	kot b+é+m	--
Output:	ləkotbām	kotbēm	šəlahēm

(Gloss: to write them m, write ms then m!, send ms them m!)

To complete our discussion of imperative/infinitive phonology, we deal first with two relatively minor matters of detail and then turn to a problem of some interest in 1.8.

(I) Infinitives in /a/. A small group of regular triliteral stems takes /a/, not /o/, in the imperfect/imperative: predictably, verbs with non-a perfects like kābēd 'be heavy', qātōn 'be small'; unpredictably, a handful comprising lāmād 'learn', rākāb 'ride', šākāb 'lie down'. The infinitives for this class are very poorly attested: the question is, whether there is an infinitive form in /a/ and how it behaves with regard to the Echo-ing process we have explored. Of the verbs with non-a perfects, neither kābēd nor qātōn has an infinitive cited, but the phonologically similar verbs yāsēn 'sleep', yārē? 'fear', šānē? 'hate' all exhibit regular infinitives: yəšōn, yərō?, šənō? I conclude that the non-a perfects (and its allied class of stative verbs like qārāb 'be near') take /o/ in the infinitive.

Of those unpredictably a in the imperfect, rākāb has only the form lirkōb attested, which is perfectly ordinary: lāmād has only lomd-ī, again ordinary; but sākāb has šəkāb, the type we have been seeking. With suffixes, we find šikb-āh 'her lying down' and šokb-əkā 'your m.s. lying down'. Observe that, because of the non-spirantized /b/, both forms have been subjected to the early rule we have termed '2nd Person Metathesis'; the first apparently coming from a stem /škab/, the

second from /škob/. Further evidence that a regular /o/ infinitive exists is the attested proclitic form liškob-, which is, as it happens, the end of our information about this verb. Of the behaviour of /a/ before suffixes we have no evidence. I conclude tentatively that, although an /a/ form did exist, every verb could have a regular /o/ form.

(II) Extended Imperatives. The affix -ā can be added to m.s. imperatives and 1st person imperfects with imperative force: ?ektōb, ?ektābā 'let me write'; niktōb, niktābā 'let us write'; kətōb, kotbā 'write, you m.s.!' . In the imperative the Echo phenomenon is quite visible suggesting that we extend the Echo rule to apply before this suffix as well. What of a-imperatives? According to Lambdin (1971), these show not o but i: šəlāh, šilhā 'send'; šəkāb, šikbā 'lie down'. This is just what we'd expect if Echo copied the /a/, for it would go to /i/ regularly in the env #C--CC by A-to-I; on the other hand, it is also just what we'd expect if Echo didn't copy /a/, but Schwa-to-I (rule 41). There is no illumination of the proper constraint on Echo to be found here.

1.8 'Short' Imperatives and Infinitives in /t/

Two classes of verbs have 'short', that is, biconsonantal, imperatives: (1) verbs I-y with /e/-stem vowel in the imperfect, such as $y\bar{a}\check{s}ab$ 'dwell', imperfect $y\bar{e}\check{s}\bar{e}b$ /ye+šeb/, imperative: $\check{s}eb$, $\check{s}ab\bar{u}$ etc., from the stem /šeb/; (2) verbs I-n with /a e/ in the imperfect, such as $n\bar{a}s\acute{a}f$ 'set out on a journey', imperfect $yiss\acute{a}f$ /ya+nasf/, imperative $s\acute{a}f$, $s\bar{a}f\bar{u}$ etc.; or $n\bar{a}t\acute{a}n$ 'give', imperfect $yitt\bar{e}n$ /ya+ntēn/, imperative $t\bar{e}n$, $t\bar{a}n\bar{u}$.

Y-loss in class (1) is due to a rule of tremendous antiquity. It appears in Brame's thesis as 'W-Occultation', relating e.g. $wa\theta aba$ 'he dwelt' to $ya\theta ibu$ 'he will dwell' /ya+θib+u/. T. O. Lambdin reports (pers. comm.) that there are alternations of this type in Egyptian. At any rate, the rule is quite limited in scope, and we shall simply assume that its output is available to the phonology we are studying.

Shortening in Class (2) is clearly mediated by the assimilation of root-initial \bar{n} to the following consonant. If we allow the rule of Prefix-Stripping to apply to the assimilated forms, we'd get $*tt\bar{e}n$, $*ssa\bar{f}$, and so on. But there are no initial geminates in the language, as there are no final geminates: the rule of Word-Final DeGeminatation can be easily generalized by the mirror-image convention to accommodate these cases:

(51) Degem. at Word Boundary $C_iC_i \rightarrow C_i // \#--$

Not all verbs I-n follow this pattern. Those with o-imperfects, such as *naḥal* 'fall', impf. *yippōl*, have regular triconsonantal imperatives derived from the non-assimilated underlying stem: *naḥōl*, *niḥlū*. A simple and direct way to handle this is to mark these verbs [-assimilation] in the imperative.

Surveying just this range of data, it appears that a satisfactory solution to the I-n short imperative phenomenon has been found; with no new rules and with one exception feature assigned by clear principle, the shape of the imperative has been related to the assimilation observed in the imperfect. The I-n verbs with ordinary imperatives, such as *naḥōl* 'fall!' and *naḥōr* 'vow!' from *naḥar*, have ordinary infinitives and the n remains unassimilated even when they are prefixed: *linḥōl*, *linḥōr*. (Note the regular lack of spirantization.). This is perfectly consistent with the prefix-stripping hypothesis, and shows that the marking of these verbs as [-assimilation] is general over both imperative and infinitive, thus supporting the proposal that they are to be treated as exceptions.

In the Mishnaic period, the system of short infinitives was lost as prefix-stripping no longer applied to the infinitive marker, and the infinitive was brought into perfect parallelism with the imperfect. Concomitant with the disappearance of forms like *naḥōl*, *naḥōr* in the imperative was the regularization of the infinitive to *lippōl*, *liddōr*. This is exactly

what you'd expect if the change was, as suggested, loss of exceptionality in the application of N-assimilation. The short infinitives from I-y stems were replaced by forms like lēšēb /le+seb/, which mirror exactly the structure of the imperfect yēšēb /ye+šeb/. Presumably the rules applying in the env. of the imperfect prefixes were simply generalized to apply equally to the infinitive prefix.

Confirmation of the general drift of the analysis, that the o-imperfects are irregular rather than the a, e ones, comes from the historical development of the system into the Mishnaic period, in which all assimilated imperfects have a short imperative: pōl /*nəpōl. In our terms this state of uniformity was attained by eliminating a peculiarity in the treatment of the o-class.

However, a complication enters the theoretical picture when the infinitives associated with the I-n and I-y verbs are taken into account. The infinitive of yāšab is not the expected yāšob , but šēbet , suffixed šibt-ī . This form behaves exactly like the segholate noun of the qéber-type; evidently the /t/ is a derivational suffix added to the stem common to the imperfect and imperative, giving a phonologically relevant base form /šeb+t/. In parallel fashion the shortening I-n verbs allow an infinitive in -t formed from the biconsonantal stem: tēt /ten+t/, suffixed titt-ī /ten+t+e+y/, of nātan ; sāfat /saḏ+t/, saft-ī , from nāsaḏ .

(The I-n verbs also allow a regular infinitive: $n\acute{a}t\bar{o}n$ (not common), $n\acute{a}so\acute{a}f$).

The generalization governing the -t infinitives is evidently this: if a verb has a short imperative, then it has a short infinitive formed on the short imperative stem. This is not limited to the regular I-n and I-y cases; the occasional maverick which imitates them also falls under this law: $h\bar{a}l\acute{a}k$ 'go' has impf. $y\bar{e}l\acute{e}k$ /ye+lek/, imper. $l\acute{e}k$, inf. $l\acute{e}ket$ /lek+t/; $l\bar{a}q\acute{a}h$ 'take' has impf. $yiqq\acute{a}h$, with irregular assimilation, giving rise to imper. $q\acute{a}h$, inf. $q\acute{a}hat$. But the notion short imperative -- one with stem-structure CVC -- is not clearly represented at the underlying level, but only at the surface level after N-assimilation, Prefix-Stripping, and, crucially, Degemination have rather extensively modified the imperative base.

Idiosyncrasies of N-assimilation are mirrored clearly in infinitive formation. Thus the stem-initial n generally fails to assimilate to a following guttural: $n\bar{a}h\acute{a}l$ 'obtain property' has impf. $yinh\acute{a}l$, and due to this failure, imper. $n\bar{a}h\acute{a}l$, inf. $n\bar{a}h\acute{o}l$. Thus the short imperative is not simply a feature of verbs I-n with a,e-imperfects, but is conditional upon assimilation, as the analysis working via Degemination predicts.

One way to approach the problem, preserving the phonological account of shortness, is to impose a 'global transderivational constraint' in the sense of Siegel (1971) upon the operation of t-affixation, stating the rule may apply to a

verb only if, on the surface, the shape of the imperative stem is CVC. This drastic and clumsy measure fails, however. For nā́tān , it allows the underlying infinitive form $/\text{la}+\text{nten}+\text{t}/$, because of imper. tēn . Given free operation of the rules, this comes out $*\text{littḗt}$, an impossible form: correct is lā́tḗt , evidently from $/\text{la}+\text{ten}+\text{t}/$. The short infinitive, shockingly, behaves under prefixation as if it had but one initial consonant; as if it was formed from a stem that had undergone already the phonological rules of N-assimilation and Degemination.

It is clearly undesirable to abandon the natural phonological account of the form of an imperative like tēn , deriving it from $/\text{ta}+\text{nten}/$ via the sequence $\text{ta}+\text{ntēn} \rightarrow \text{ta}+\text{ttēn} \rightarrow \text{ttēn} \rightarrow \text{tēn}$, in which each step has a measure of independent motivation. The alternative is to posit a set of morphological rules that would mirror the effects of the phonology that is already in the grammar. Yet the infinitive form requires a rule to do exactly that, removing the initial $/n/$ to form a stem shaped CVC that is liable to $/-t/$ affixation, opening the prefix syllable of lā́tḗt $/\text{la}+\text{ten}+\text{t}/$, so that PTL can affect it. And PTL is an early rule, much earlier than the rule Degemination, which might be revised ad hoc to simplify the geminate cluster after the infinitive prefix $/\text{la}-/$.

So: the present rule-system (and the theory of phonology and morphology behind it) provides insight into the apparently aberrant imperatives like tēn by deriving them from base forms like /ta+nten/, which are the same as those of any 'regular' imperative, e.g. kəṭōb /ta+ktob/. But the approach fails with infinitives like tēt , because a base /la+nten+t/ leads to $*\text{littēt}$. It would seem that we require for the infinitive the morphological rules we avoided in the imperative; and the effect of the rules is to make the infinitive look like the imperative on the surface, even though their derivations are not parallel. Up to this point we have succeeded in explaining the striking similarities between infinitive and imperative on the basis of underlying structural parallelism; here we seem to find underlying disparity-- /la+ten+t/ vs. /ta+nten/ -- mapped by special rules into surface parallelism. This result does not disconfirm the analysis of the imperative, but indicates a shortcoming in our understanding, either of the rules of Hebrew or of the character of morphological processes.

* * *

This is the end of our excursion into the complexities of infinitive/imperative phonology. The major systematic goal has been to demonstrate the existence of a #CC structure

relevant to phonology, supporting the rule Cluster Break-Up (38) and therefore the conclusions that follow from it about the treatment of schwa in the grammar. Other results have been (1) the irrelevance of the 3-Syllable Rule to phonological alternation, (2) the relevance of the rule Prefix-Stripping, which is constrained by morphological and syntactic information, and (3) the problematic quasi-phonological quasi-morphological character of imperative/infinitive formation in verbs I-n.

1.9 The Nature of Vowel Reduction

There is a small class of nouns -- perhaps 20 to 30 members--which have, unsuffixed, the shape C \check{V} C \acute{I} where \check{V} is schwa, a reflex thereof, or /o/. Characteristic examples from the schwa family are tabulated here.

<u>Item</u>	<u>Gloss</u>	<u>Pausal Form</u>	<u>Sing+Pron Suff</u>	<u>PL</u>	<u>Pl + Suff</u>
p \acute{e} r \acute{I}	fruit	p \acute{e} r \bar{I}	piry \acute{I} , piry- \acute{o} piry- $\bar{a}m$ (3m.p.) pery \acute{o} k \bar{a} , pery \acute{o} k $\acute{e}m$ p \acute{e} r \bar{I} -h $\acute{e}m$ (3m.p.)	-	-
k \acute{e} l \acute{I}	utensil	k \acute{e} l \bar{I}	kely- \acute{o} k \bar{a}	k \acute{e} l $\acute{I}m$	k \acute{e} l- $\acute{a}y$ (1s) kel- $\bar{e}n\bar{u}$ (ip) k \acute{e} l- $\bar{e}k\acute{e}m$ (2 mp)
š \acute{e} b \acute{I}	captivity	š \acute{e} b \bar{I}	šiby- \acute{o} (3ms) šeby- \acute{o} k \bar{a} š \acute{e} b \bar{I} - $\acute{k}e\bar{m}$	-	-
h \acute{e} s \acute{I}	half	h \acute{e} s \bar{I}	hesy- \acute{o} , hesy- $\acute{a}h$ (3fs) - hesy- $\bar{e}n\bar{u}$, hesy- $\bar{a}m$	-	-

Looking at the entries in column 1, it might be surmised that these arise from underlying CC \bar{I} ; however, the pausal forms show a vowel intruding in the initial cluster, and not a predictable one: note h \acute{e} s \bar{I} vs. k \acute{e} l \bar{I} . Furthermore, there is the plural k \acute{e} l $\acute{I}m$, evidently from /kel+ $\bar{I}m$ /, a form in which truncation of the stem-final segment (\bar{y} or \bar{I}) should not blind us to the preservation of the vowel.

The alternations in the suffixed forms, though virtually limited to this class of words, show obvious regularities. The ī shows up as y before vowels, including those that reduce to schwa: contrast *piry-ī*, *pery-okā́* with *porī-hém* and *šobī-kém* (here the Bindevokal has truncated, as it regularly does after vowels). This suggests either glide-formation, if the ī is underlying, or vocalization, if the y is. General considerations of lexical structure suggest that the y must be the third root consonant missing in phonetic C V C ī; the base /CVCy/ is thus a subtype of the familiar segholate stem shape /CVCC/.

(53) Glide Vocalization: $y \rightarrow \bar{i} /C--(C\ X)\ \#$

Leaving aside *ḥaṣī́*, where the guttural damps alternation, we see that the stem vowel is i in the env. --CyV́, e in the env. --CyṼ; and schwa where it should be by the laws of reduction we have expounded. What stem vowel should be set up? The alternations discussed could happen to either e or a; the lack of lengthening in the pausal forms when the vowel is stressed suggests a, as in *mélek*; but the plural *kēlīm* needs e. To minimize irregularity, let us set up /pary/, /śaby/, /kely/ -- which is [-TL]. The word *ḥaṣī́* is clearly /ḥesý/ because of the long vowel in the pausal form.

Now if Glide Vocalization is early, the current rule system produces exactly the correct forms:

	/pary/	/pary+a+m/	/pary+hemm/
Glide Voc.	parī	-	parī+hem
Stress	pārī	pary+ám	pari+hém
PTL	-	-	-
VR	p̄orī	-	p̄orī+hém
TL	-	pary+ám	-
Other		piry+ám	
Output:	parī	piryám	p̄orīhém

The smoothness with which these somewhat odd looking forms can be integrated into the grammar is a measure of confirmation for the proposed rule system. However, the round vowel forms pose something of a problem. They look like this:

Item	Gloss	Pause	S.+Suff.	Pl.	Pl+Suff	Other
holī	sickness	holī	holy-ō	holāyīm	holāyēnū	
ʿonī	affliction	ʿonī	ʿony-i ʿony-ék			
?onī	fleet					?oniyā 'ship'
*ʿopī	branch			ʿopāyīm		
ro?ī	appearance					
*yopī	beauty	yopī	yopy-ō			estr. yāpī
sorī	a resin					also ūsrī
domī	rest					estr. domī (lx)
dolī	bucket				doly-āw (3m.s.)	(this form is dual)

Philology: * means the form isn't attested. The form ʿopāyīm is noted by Masoretes as the correct reading (Q̄arē?) for what is

written (Kot̄ib): ʃopāʔīm

Of these, only the last is well-behaved: the underlying o reduces to schwa in the unaffixed form, just as it should. In the others o persists through the entire paradigm, regardless of the syllable structure. Now, in a form like ʃolāyīm, the o could be regarded as just exceptional to Vowel Reduction. (Note the regular segholate type of plural formation, clearly evidencing an underlying /ʃoly/ with /y/.) Such a move is inadequate for ʃolī́, because the stress has shifted onto the final vowel, an effect which is supposedly concomitant upon application of Vowel Reduction. This threatens the integrity of VR-Stress Shift in a rather serious way, showing a kind of independence in the two processes.

Resistance of o to deletion is fairly widespread. In segholates of the type /CoCC/, the plural is quite frequently CoCāCīm, rather than the expected CəCāCīm. For example, qōdeš 'holiness', hōdeš 'month', gōren 'threshing floor', have qodāšīm, ^{ʃodāšīm}ʃogorānīm, respectively. T. O. Lambdin has suggested speculatively (pers. comm.) that the apparent retention might possibly be due not to simple preservation of o, but rather to an indirect process whereby the o causes labialization of the preceding segment, so that qōdeš is actually q^wōdeš; then, when reduction takes place, the result, q^wodāšīm, either becomes, or is written approximately as, qodāšīm. This suggestion would gain plausibility if a specific phonetic class of segments were affected by the

hypothesized mediating rule of labialization. It is unfortunate, and remarkable, that the greatest potential source of evidence, the reduction in the Qal imperfect (yiktō[́]_b --yiktō[́]_{bū}), never shows retention of o. This morphologically general source lacking, we are left to the vagaries of the lexicon, where uniformity is scarce. It is striking that of the 8 problematic nouns listed above, 5 commence with gutturals or /r/--back consonants. But the others cannot be erased (coronals, /y/). A similar preference for backness is evident among the o-class ordinary segholates which don't reduce to schwa, and it is striking that bōqer 'morning' and pō'al 'work' do exhibit reduction, labials plausibly being resistant to labialization. However, šōreš 'root' has for plural šorāšīm; and beside qōdeš, there is qōmeš 'handful' pl. qomāšīm. I conclude that although o-retention may have a phonetic basis, at the state of the language we are examining, it is essentially an option of lexical items. Observe that if it were mediated phonetically in the way Lambdin suggests, there would be no problem with the rule VR. However, the failure of o-retention in the imperfect essentially proves that it cannot be mediated by a simple phonetic process.

The solution to the dilemma lies in a more careful consideration of the nature of vowel reduction. The rule has been written as if its principal effect were to

adjust the quality of certain eligible vowels, making them nonround, back, nonlow, nonhigh. But reduction also signifies a de-stressing of the affected vowel, and the stress-differential between reduced and non-reduced vowels has not been explicitly represented. Similarly, in discussing the hateph-vowels we observed that their 'reduced' character was due to their being short, unstressed vowels in open syllables, but again no account was offered of how the hateph's neighbors came to bear a secondary, or relatively-greater-zero, stress-level.

The essential feature of the rule VR, then, is that it indicates where the totally stressless vowels lie. The rule of Hateph-Formation inserts un-stressed vowels. All other vowels in the word bear, in comparison, a modicum of stress. The stress facts can be modelled quite directly, preserving the rule structure we have articulated, if it is assumed that all underlying vowels are [+stress]. The rule VR is re-conceived as a rule of simple de-stressing. Non-stressed short vowels either delete by the principles discussed above, or they turn to schwa and its reflexes, except for certain lexically marked cases of /o/. It is thus to the process of shift-to-schwa that certain rounded vowels are exceptional, and not to the early, and phonologically central processing of de-stressing.

Now, an alternating pattern of stresses such as the one implemented by VR is usually approached from the opposite conceptual direction: it is assumed that all vowels are underlyingly [-stress], and therefore that the observed stresses must be placed in the string by rule. Should VR be turned inside out and re-fashioned as a rule of secondary stressing?

There is, of course, no problem with stating the class of vowels Secondary Stress would apply to: (1) every long vowel (underlying or lengthened by PTL), (2) every vowel in the env. --CC (closed syllables), and (3) in a string of weak syllables ... $\check{V}C \check{V}C \check{V}C \check{V}C \acute{V}....$, the even ones, counting back from the stress: ... $\check{V}C VC \check{V}C VC \acute{V}$. Readers of contemporary phonological literature will recognize this as the archetypical rule of alternating stress: stress all heavy syllables, and alternate across stretches of weak syllables. The superficially disparate provisions of the rule can be brought under one generalization if we assume moraic representation of long vowels ($\bar{V}_i = V_i V_i$). The rule of alternating stress then becomes

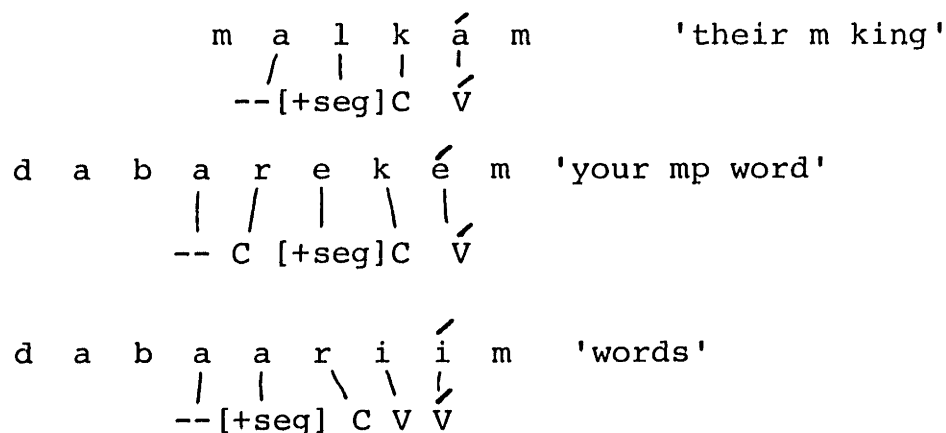
(54) Alternating Stress $V \rightarrow [+stress] / -- C_0 [+seg] C(V) \acute{V}$

The rule is presumed to apply iteratively left-ward.

The term (V) in the rule AS means that stress appears 2 moras back from a stressed syllable, not a stressed mora.

The input *dabaariím* must yield output *dabáariím*, not *dábaáriím*, in which every other mora is stressed without regard to its place in the syllable.

The term [+seg] is the mora that is skipped over. It may be a vowel, or it may be a consonant in the env. --C, i.e. a syllable-closing consonant.



Rather than explore the issues of representation and formalism that are associated with a rule like AS, let us inquire into the (for us) more fundamental issue of its appropriateness to the present nexus of problems. In favor of such a 'positive' reformulation of VR, it might be pointed out that there is some evidence in the text for a rule of alternating stress. If it is the same as (29), then surely that counts as evidence for it over VR.

The evidence comes from the placement of diacritic 'metheg', which Gesenius treats as marking, in part, the 'counter-tone' or secondary stress. He gives the following

description of its use in this capacity (p.64, par.16d)

[it appears] as a rule in the second (open) syllable before the tone, e.g. hāʔādam ['the man'] (cf. also such cases as mēlek-šor ['king of Tyre']); but also in the third when the second is closed, e.g. hāʔarbalim ['the forty'] (also such cases as lēbed-hammēlek ['the king's servant']), and when the third is not suitable for it, even in the fourth (open) syllable before the tone. This Metheg may be repeated in the fourth syllable before the tone, when it already stands in the second, e.g. šabūlotekēm ['your mp.weeks'] .

This metheg is used to mark vowels which occur in open syllables before main stress. A simple rule can be given, covering his cases, iterating leftward:

(54a) Metheg Placement: $V \rightarrow [+metheg] / \text{-- } C \begin{bmatrix} V \\ \text{--metheg} \\ \text{--main stress} \end{bmatrix}$

This is an orthographic rule, describing the basic practice of the Masoretic editors.

Is it really a stress rule? The issue is unfortunately clouded by the other principal use of the metheg, which is to specially mark long vowels that occur where they might not be expected. Basically, this means in the env. --CC: so in ʔākl-ā 'she ate' (from ʔākāl 'eat'), the first vowel carries a metheg, which contrasts it visibly with ʔoklā 'food', which is otherwise graphically identical. Hence the name accorded it by medieval grammarians: maʔarīk 'lengthener'. It might be argued that the cases mentioned by Gesenius fall into this category as well; in hāʔādam, say, the first ā deserves a mark because it's so far from main stress, and in an open syllable, where schwa or a reflex of schwa is phonetically expected. However, this does not explain the phrasal cases adduced by Gesenius (mēlek-šor, lēbed-hammēlek), in which length is not of the issue.

Here, metheg is used to mark secondary stress. And the alternating pattern marked in šābūlōtēkēm cannot be explained in a simple 'length-marker' hypothesis.

Even if it is granted that metheg marks stress in some uses -- and granted that those uses can be identified -- the pattern of its occurrence simply does not accord with the output of Alternating Stress. AS places stress on all strong syllables, open with a long vowel, closed with a short; Metheg Placement puts methegs only on open syllables, and not on every one, but alternately. Further, and perhaps more damaging to any attempt at conflation, the two rules disagree on what weak syllables get stress: given an input dabārīm, AS outputs dabārīm, but Metheg Placement outputs dābārīm, a form which is unsuitable as input to the rule taking unstressed short vowels to schwa.

I conclude, therefore, that Metheg Placement cannot be identified with the early rule that determines the stress pattern of words. If it really is a rule pertaining to stress, then it is a low-level rhythm rule adjusting the relative levels of stresses whose positions are determined much earlier in derivation.

The rule of Secondary Stress thus functions solely as the dual counterpart of VR, and cannot subsume the rhythmic phenomena signaled by the metheg.

This gives us clear and substantial grounds for preferring VR to Secondary Stressing: the generalization with which this essay began, that the simple, motivated rule of reduction, applying freely, affected the main-stressed vowel just in the cases where a stress-shift occurred. A theory of secondary stressing can in principle have nothing to say about this 'coincidence'; but in a theory of stress-removal, loss of the main stress from certain positions is a predicted result.

How is the re-appearance of main stress one syllable to the right to be accounted for, preserving its organic connection with loss of stress? Current theorizing offers two main avenues of approach, which we may designate the tonological and the metrical. The tonological line is essentially that of Halle's (1973) description of Russian and Kiparsky's (1973) of Greek, Skt., and Lithuanian: it is assumed that the word is assigned a two-level tonal contour, say M M M H H, one tone per syllable, where the point of level-shift (Tonbruch) -- the first H bordering an M -- marks the place where the accent will be perceived. The accent rules determine the syllable where the Tonbruch lies. Suppose that the accented syllable is deleted, or that its H-tone is otherwise removed: our model word M M M H H becomes M M M \emptyset H, or M M M M H. In such a case the Tonbruch automatically moves one syllable to the right,

causing the accent to appear there. Observe that a high-nonhigh contour, say H H H M M, would be associated with a shift in the opposite direction. Clearly, this kind of technology can be adapted to the case at hand. It fits easiest into a scheme where there is complete deletion, the type of system we started out with; a deleted vowel, in this view, takes its tone with it, and accent-shift is the consequence. It has been shown, however, that the rule originally treated as deletion must rather accomplish a de-stressing of the affected vowels. The problem thus has two dimensions, non-orthogonal, one being the disposition of the feature [+stress] (this is the dimension of vowel reduction), the other being the disposition of the tonal feature [+H] (stress-shift). Now, the stress-category is already partly subsumed in the tone category by the concept of Tonbruch, which locates main stress. It is technically a small step to go all the way: let us assume that the rule VR assigns L, low tone. The rule we have called Stress locates the Tonbruch; the basic Hebrew melody we assume to be M H. Consider the fate of a word like /dabar+e+ka/:

	dabar+e+ka
Stress	*
(Interprets as:)	dabar+e+ka M M H H
PTL	\bar{a}
VD-VR	dab \bar{a} r+e+ka
	L M L H

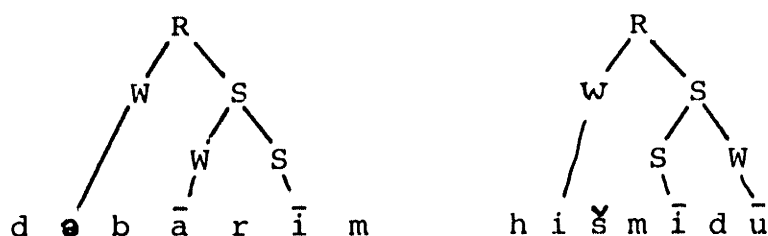
Main stress is determined by the same principle of
 Tonbruch: $V \rightarrow \begin{matrix} \text{[1stress]} \\ \text{[+H]} \end{matrix} / \begin{matrix} V^C \\ \text{[-H]}^O \end{matrix} \text{ --.}$

Low tone vowels are interpreted as stressless, and are accorded the appropriate treatment.

This formally successful resolution of the problem is rendered suspect by substantive aspects of tone rules. Alternating de-stressing is well-attested: but alternating tonal contours are not. (Recitativo or chant, rather than yodeling, is the preferred mode of laryngeal activity). Again, reduction to schwa is widely associated with lack of stress, but with low tone?

Another range of possibilities is suggested by recent work of my colleague Liberman (1975): the metrical. Hebrew is evidently a stress-timed language, witness the fact of extensive vowel reduction. (Observe the terrace-tone languages do not admit vowel reduction; or so goes the current lore). Liberman proposes that apparent stress-timing is correlate to the imposition of a metrical pattern, basically a tree-structure composed of S's and W's. The basic rule is that S must dominate a stressed syllable. In his work such a structure mediates between stress-assignment and tone-contour assignment. For our purposes we need to posit a basic metrical pattern (W) S, where S comprehends the last two syllables of a (polysyllabic) word.

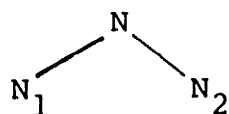
Thus, the 'big' S breaks into S W -- penultimate stress--
or W S -- final stress; the rule of Main Stress determines
which, as in these examples:



The idea is that the 'big' S always takes two syllables, if there are two, and the most highly stressed of those gets the lowest S. Main stress can be determined by following the chain of S's down from the root, R. When VD-VR affects the prominent vowel, de-stressing it, relations inside the big S are readjusted, by a convention of universal import.

Let us make the idea precise. Following Liberman (1975), we need (1) a principle that determines the basic geometry of the metrical tree, and (2) a principle that determines the assignment of S (strong position) and W (weak position) to the nodes of the tree whose shape is given by (1).

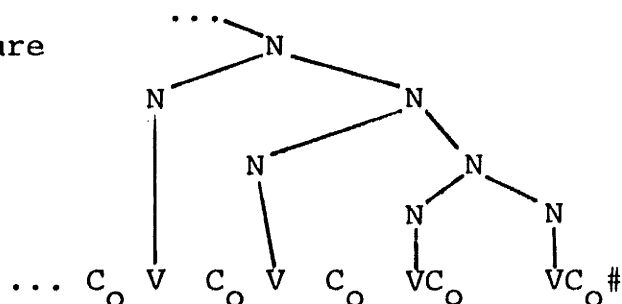
The essential fact of tree-structure is binary branching. If N is a node in the tree, it either dominates a vowel (or syllable), or it dominates a pair of nodes. The essential fact of labelling is that in a structure



one of the sister nodes N_1, N_2 must be S and the other W. The sense of this is that metrical structure is inherently relational; each metrically significant unit consists of two parts, one of which is relatively stronger than the other. The abstract notion of 'strength' plays a central role in formally reconstructing intuitive perception of degrees of stress, in assigning intonational contours, and in determining rhythm and timing. (This is the matter of Liberman 1975).

Individual languages impose more specific constraints on metrical tree shape, within the basic binary plan. Our proposal will be that in Hebrew the last two syllables always form a single metrical constituent (there being more than one syllable), so that the tree is built up in a right-branching fashion like this:

(55) Hebrew Tree Structure



How do the nodes get their labels? We convert the observation encoded in Main Stress, rule (2), originally couched as a statement about segments, into a statement about metrical nodes.

- (56) Node Labelling. In a metrical configuration [M N], where M,N are sister nodes in the metrical tree, N is S, unless it directly dominates V#.

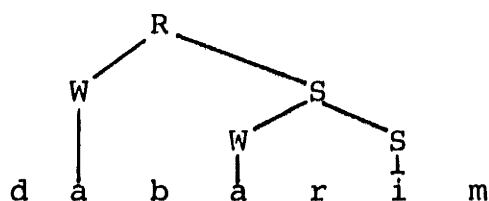
The principle is phrased so that it can be applied to every node in the tree. It means that the right hand node of every pair will be S (generating the pattern W S), except for the lowest, rightmost pair when the word ends in a vowel.

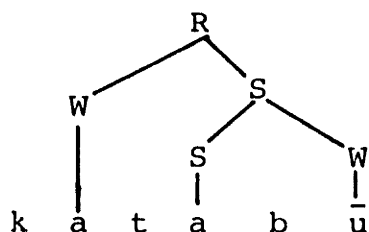
In order to get the W's into the tree, we state the following convention:

- (57) Principle of Relation. In a metrical configuration [M N], where

M, N are sisters, if M is S, then N is W; if N is S, then M is W.

Applying these three principles (Hebrew Tree Structure, the rule of Node Labelling, and the universal Principle of Relation) to examples which are familiar will generate the following representations:





What is the relationship between S and the segmental feature [+stress]? Although clever manipulation of the metrical system could undoubtedly eliminate the segmental feature, Liberman shows that this is inappropriate, that the notion 'degree of stress' is properly in the domain of metrical representation and that the distinction stressed-stressless is properly represented on segments, and implemented by segmental rather than metrical rules.

Nevertheless (and obviously) the two notions are not independent, or orthogonal, to use the language of linear algebra. Metrical S may directly dominate only vowels which are [+stress]. Since we are assuming all vowels in Hebrew to be underlyingly stressed, the metrical representations given just above are well-formed.

The rule that we have called VR, in its new form as a rule of de-stressing, is a segmental rule that wipes out stresses, including those which occupy the strong (S) metrical position. When this happens, the S is replaced by W, evidently; this indicates that the relationship between S and [+stress] must hold at all levels of representation,

throughout derivation. When a phonological rule disrupts the connection, as by removing stress, the metrical pattern is automatically re-adjusted. Let us specify this property as follows:

- (58) Weakening Convention. The metrical category label S must dominate a vowel that is [+stress]. If in the course of derivation a vowel dominated directly by S is marked [-stress], that S is turned to W.

Taken together with a suitable interpretation of the Principle of Relation, the Weakening Convention entails that in a metrical unit [S W], if the S is weakened concomitant to de-stressing, the W will automatically be re-interpreted as S, converting the unit to an iamb [W S].

This gives us exactly the desired description of the stress-shifting phenomenon we have studied, the change from /kātāb+ū/ to /kātāb+ū/ that is consequent upon the operation of the general de-stressing process we treated first as VD and VR. The only real enrichment of Liberman's theory that we have introduced is the Weakening Convention, and that is not so much an accretion as a making-precise of how the theory is to treat a situation that did not arise in the (English) data he is concerned with.

Further evidence that is indeed the correct theory of Hebrew stress phenomena comes from the regular retraction of stress in certain syntactic uses of the verb. The jussive (indirect imperative) is used after the conjunction wa-'and' to express perfect aspect in narration. In this use of the conjunction (only), the initial consonant of the verb is doubled: wayyiktōb /wa#ya+ktob/ 'and he wrote'. The conjunction wa+doubling is called 'waw-consecutive', 'waw' being the name of the consonant /w/ which is the root of the conjunction. In the regular or 'sound' triliteral Qal verb, the jussive is identical to the imperfect (yiktōb = 'he will write' or 'let him write'), and consequently traditional grammars (e.g. Gesenius) refer to this construction as the 'converted imperfect'. However, in certain places in the verbal system there is a distinction: Qal hollows -- yāqūm /ya+qūm/ 'he will arise', but yāqōm /ya+qom/ 'let him arise'; Verbs III-w,y -- tīpnē /ta+pnay/ 'she will turn', but tēpen /te+pn/ (by the truncation mentioned in 1.3) 'let her turn'; in the conjugation Hiṭṭāl -- yašmīd /y+ha+šmīd/ 'he will destroy', but yašmēd /y+ha+šmed/ 'let him destroy'. In all these cases it is the unmistakable jussive that shows up after waw-consecutive: wattēpen, wayyašmēd, wayyaqom. Hence we shall say 'converted jussive'.

Certain of the converted jussives, as the last example cited shows, are susceptible to a rule of stress

retraction when they do not immediately precede a major sentence boundary (occur 'in pause', vide 1.13). The form that this rule would take in conventional description where vowels are assumed to be underlyingly stressless and the features [± stress] is used to represent the prosodic peak of the word, would be approximately the following:

(59)	Consecutive Retraction	S.D.	V	C	V	C _o	##
					$\begin{bmatrix} -\text{lng} \\ -\text{lo} \end{bmatrix}$		
			1	2	3	4	
		S.C.	1	2	3	4	
			[+str]	[-str]			

The rule is responsible for alternations like:
 yāqōm/wayyāqom, yēšēb/wayyēšēb (from yāšāb 'to sit down, dwell', impf. and jussive yēšēb /ye+šēb/).

It is striking, in the context of the present discussion, that Consecutive Retraction pulls stress back exactly one syllable, just as stress shifts one syllable forward under the influence of VR. The overarching generalization is that stress remains on the last two syllables.

In the metrical theory proposed here this is a consequence of what we have called Hebrew Tree Structure, by virtue of which the last two syllables form a metrical unit. Consecutive Retraction, in our view, accomplishes a simple de-stressing of the final syllable, and the

(61)	Nāsōg	ʔāhōr	S.D.	V	C _o	V	C _o	#	(#)	C _o	V
	(Traditional			1	2	3					
	Version)		S.C.	1	2	3				4	
				[+stress]		[-stress]					

Here, again, the main stress goes back one syllable; and here again, the given rule is subject to the kind of criticism that was leveled against the preliminary version of Consecutive Retraction.

Nāsōg ʔāhōr is not really a rule of segmental de-stressing; like its English counterpart it accomplishes re-distribution of primary and secondary stresses on the phrasal. Note ʔōkēl léhem 'eater of bread', where the lengthened ē of /ʔōkel/ remains. The rule therefore pertains to metrical structure; this is an approximate version:

(62)	Nāsōg	ʔāhōr	S.D.		S	S
					VC	
					1	2
			S.C.	1	→	W

(Term 1 of the S.D. is meant to signify that the S affected must be on the lowest rank of the tree.)

The second phrasal rule moves stress forward one syllable in the 2ms perfect when it is used after wa- (no doubling) to express imperfective aspect in narration: /wa/ plus /katab+ta/ comes out wākātābtā 'and you will write'. Observe that the vocalism of the verb is exactly

that which it assumes elsewhere: $kā\bar{t}ā\bar{b}tā$ 'you wrote'. Here again, a (late) rule of metrical weakening is the optimal representation of the process.

- (63) 2ms-Forward S. $\begin{matrix} \S \\ V \\ l \end{matrix}$ / in 2ms perfect after wa-
 S.C. $l \rightarrow W$

To summarize the results of the present excursion: the 'reduced' vowels of Hebrew, the 'half-vowels' of Gesenius, -- schwas and hatephs -- are unstressed short vowels occurring in open syllables, and these properties account for their being traditionally described as 'extra-short', 'murmured', 'indistinct'. For example, the second vowel in the word $nahar\bar{o}tāy$ 'my rivers' falls into this category. But the first vowel does not, although it is short and in an open syllable. The notion of reduction thus demands a contrast: not only must the second vowel be [-stress], the first must be [+stress]. The most uniform way to implement the necessary contrast is to provide all non-reduced vowels with stress. It has been argued here that the correct way to achieve this pattern is to regard all vowels as underlyingly stressed, destressing certain of them according to the principle behind the rules VD and VR. This rule of alternating de-stressing, which supplants VR in the grammar, has this final form:

- (64) Alternating De-Stressing $V \rightarrow [-stress] / -- C \check{V}$
 [-long]

Heuristically, the rule may be conceived of as iterating leftward, although the proposals of Halle, Prince, Vergnaud 1975 allow its expression with the constraint of simultaneous application. As the rule is of the standard type that does not distinguish the iterative and (revised) simultaneous theories, I shall not urge the matter of exact formalization.

Coupled with the metrical theory, the rule AD permits an explanation of both the occurrence and the direction of stress shift. A metrical theory, based on that expounded in Liberman (1975), was articulated and argued for on grounds both descriptive and explanatory: namely, that by preserving the generalization that stress must fall on the last two syllables of the Hebrew word, it allowed significant clarification of all rules effecting movement of main stress; and that this simplification eliminated the need for 'two-operation' rules in this area, supporting the general claim that such rules do not exist.

1.10. Cumulative Rule Census

The adoption of Alternating De-Stressing compels the introduction of a rule mapping short stressless vowels onto schwa.

(65) Ultimate Reduction

$$\begin{matrix} V & \longrightarrow & \emptyset \\ \left[\begin{array}{l} -\text{lng} \\ -\text{str} \end{array} \right] \end{matrix}$$

Where does this fit in the ordering? The end is a likely spot: earlier rules affecting schwa could be rephrased to affect short, stressless vowels. But we know there are rules that produce or affect short stressless vowels -- Hateph Formation (43), Schwa-t-A (44) -- and the output of these rules is not reduced to schwa, although it meets the S.D. of Ultimate Reduction. Minimally, the new rule UR must precede Schwa-t-A, so that the stressless [a]'s produced by that rule don't get reduced.

Note that if UR did follow HF and Schwa-to-A, it would completely undo their effects. Under the Elsewhere Convention, proposed by Kiparsky (1973), this kind of relation between rules entails disjunctivity between them, and UR then could be the last rule of grammar. This actually opens a number of possibilities for reanalyzing the system of late rules dealing with inserted vowels: instead of schwa, an i-quality vowel might be inserted by Cluster Break-Up; the rule of Schwa Deletion could be refashioned as Short-Vowel Deletion, and have

as a side clause that those short unstressed vowels that are not deleted, turn (in the env. -- CV) to the real schwa.

This certainly deserves close scrutiny, as it bears on the interesting questions raised by Kiparsky (1973), For the present, however, we shall remain with the ordering solution.

At this point, we have accumulated a fair number of rules. So that the reader may be able to better evaluate the system, I pause here to present them in their order. I divide them into three classes heuristically.

(Table on next page.)

(I) Early Adjustments

Plural Breaking (19), p. 4

2nd Person Metathesis (48), p. 111

O-Closure (15), p. 35

(II) Node Labelling (56), p. 143

(III) Phonology Proper

Shortening (7), p.30

Lowering (8), p.31

Glide Voc. (53), p.129

Nas. Assim. (24), p.54

PTL (29), p.65

Echo (50), p.117

AD (64), p.151

A-to-I (20), p.42 [see comment below]

TL (11), p.34

DeGem (51), p.121

Cluster Break-Up (38), p.87

Spir (45), p.99

Schwa Del. (40), p.88

Schwa-to-I (41), p.89

Prefix-Strip (46), p.108

Y-Adjust (22), p.45

a → e (18), p.39

2fs Trunc. (21), p.44

Ult. Red. (65), p.153

HF (43), p.97

Schwa-to-A (44), p.98

The central spine of rules under (III) is linearly ordered; the arrows show the other ordering relations that arguments exist for. The partial order represented here could easily be collapsed into (one of several equivalent) strict linear orders; I have shown it as above to make clear where ordering arguments exist.

One aspect of the ordering that deserves comment is the placement of A-to-I. The rule we first posited as (20) cannot fit there, for it is fed by Schwa-Deletion, one of the last rules. Yet the rule must precede Prefix-Stripping, if facts like the stem-vowel alternation in *giddēl-y gaddēl-gaddēl* are to be handled by it: presence of the underlying prefix in the imperative inhibits the rule (vide 1.7).

The rule must also precede TL. Truncation of an imperfect like *yibke* /ya+bkay/ 'he will weep' puts main stress on the prefix vowel, and it lengthens by TL: *yēb'*. The non-high quality of the vowel suggests that the rule really should take /a/ to /e/. In Chapter 2, discussing this and related phenomena, we shall see that this occasions no complication of the grammar.

Now, it is not really necessary to postpone A-to-I (perhaps I should say A-to-E) all the way to the end. After AD has applied, those forms to which A-to-E applies are clearly distinguishable from all others: they have the structure #C--CC[-str]. The feature [-str] is, of course, implanted by the rule AD; but it is also an underlying

feature of all consonants. (This mode of analysis is developed with care in Vergnaud 1974, from which I borrow the idea.)

The final version of the rule will then be:

(66) A-to-E $a \rightarrow e$ / #C --C[-stress]

1.11 Residual Matters

(I) The ordinary feminine singular affix is clearly /at/, on the noun, on the adjective, on the 3rd person of the perfect verb. These are its characteristic alternations:

<u>Category</u>	<u>Citation Form</u>	<u>Gloss</u>	<u>Construct</u>	<u>+Suffix</u>
Noun	ʔēm-ā́	fear	ʔēmāt	ʔēmāt-ṓ 'his ...' ʔēm-at-kēm 'your m.p. ...'
Adjective	tī́ ā́	good	tōbāt	tōb-āt-ṓ tōb-at-kēm
Verb	kātḅ-ā́	write	---	kātāb-āt-am '... them mp.' kātāb-āt-nī́ '... me'
	qām-ā́	arise	---	---

(The peculiarities of the f.s. verb with suffixes are the subject of (III) below.)

Glancing over this table, one sees that the 3fs. ending's vocalism is just that of an underlying short a. It lengthens pretonically, shows up short in the env. --CC, otherwise lengthens under main stress. It also shows up long when final, as in qāmā́; it shares this property with all other word final a's, as for example the a of -ka and -ta in pīkā́ 'your mouth', kātābtā́ 'you ms. wrote'; the directional ending -a, as ʔārs-ā́ 'to the land'; the irregular vocalic final of

laylā 'night'. Clearly, a lengthening is at hand:

(67) a → [+long] / --#

But this is just a sub-clause of rule (9), V-final, which insures that all word-final vowels are long.

The most striking feature of the paradigm is the disappearance of the /t/ from the free form. Assuming that the construct state is marked by just one word boundary (justified below), the appropriate rule is simply

(68) T-Drop t → ∅ / +a -- ##

It is necessary to spell out the +a, because other t's do not delete, as for example the truncated form of this very affix visible in such forms as šēnī-t 'second f.', masc: šēnī; and the third root consonant of kārāt 'cut off'.

The rule T-Drop evidently precedes and feeds V-final.

But where does T-Drop stand in relation to Main Stress? In nouns and adjectives, the feminine suffix, when final, bears main stress, as if it ended in a consonant.

In verbs, the 3fs of the perfect is penultimately stressed, as if the ending were vocalic when Main Stress applies. Adjectives and nouns evidence the order Main Stress, then T-Drop; verbs, just the opposite.

There are two basic lines of approach to resolving the dilemma: (1) w.r.t T-Drop, (a) order the rule differently

depending on the category to which it applies (b) split it into Verbal T-Drop and Non-Verbal T-Drop, ordered before and after Stress; (2) w.r.t. Main Stress, (a) if T-Drop follows, complicate the rule to let /+at/ be skipped over, (b) if T-Drop precedes, disallow the parenthesized V of Stress from analyzing the nominal f.s. ending.

Line (1) is out: (a) is not possible in current theory, (b) amounts to dropping the obvious generalization about the f.s. affix. Line (2a) portrays as coincidental the fact that all regular penultimately stressed words end in vowels; the rule T-Drop just happens to make /+at/ conform to general case. If T-Drop is early, the penultimate stress of the 3fs perfect is because the form is vowel final. This leaves (2b); stipulating that nominal /at/ may not count as a vocalic final for purposes of stress.

If this argument is correct, then certain morphological adjustments (e.g. T-drop) must take place before the rule of Node-Labeling, which replaces Main Stress, can be allowed to work on phonological strings.

(II) There are some cases where stress-shift fails to occur although the environment for Alternate Deletion is met: (1) with certain pronominal suffixes, (2) with the directional affix /-a/, (3) in nouns like ʔāhū 'reeds', šāhū 'swimming', (4) in the 3rd person fem. sing of the perfect, suffixed: šōmārātām 'she guarded them m.'. (Case 4 falls under the next topic).

The characteristics of the pronominal suffixes are most clearly revealed in the imperfect, where the relevant morphology is quite simple. Two paradigms of attachment are available: one, irrelevant to the present issue, in which the suffixes are linked to the stem by the augment /-en-/. One in which the suffixes are linked by the vowel /-e-/. The second looks like this:

yišmōr + pron. suff. 'he will guard ...'

<u>Pers/Gen</u>	<u>Sing.</u>	<u>Pl.</u>
1	yišmār-é-nī	yišmār-é-nū
2 m	yišmār-kā	--
f	yišmār-é-k	--
3 m	yišmār-é-hū	yišmār-é-m
f	yišmār-é-hā	yišmār-é-n

(The 2nd person pl. suffixes do not attach to the verb.)

The paradigm speaks for itself. Of those suffixes which should occasion AD--namely, -nī (1s), -nū (1p), -hū (3ms), -ha (3fs), -ka (2ms) -- it is -ka alone that allows it.

This pattern repeats itself whenever the morphology sets up the right conditions. In the perfect, šamārkā /samar+e+ka/ contrasts with šamār-á-hū, šamār-á-nū, šamar-á-nī, (with an idiosyncratically short a). On the singular noun, dēbār-kā contrasts with dēbār-é-nū. On the prepositions l- 'to', b- 'in', lākā, bākā contrast with lā-nū, bā-nū.

(Forms not cited from other persons are rendered irrelevant by rules of morphological combination.)

A direct way to represent these data, given that AD applies in the env. --CV, is to lexically mark the non-2nd person suffixes as [-stress]. With this formulation of the environment of AD -- necessary if the rule is iterative, not so if simultaneous -- a lexical mark [-stress] comes to signify [-stressable]. Such a division of affixes into intrinsically stressed and intrinsically unstressed is familiar from the work of Halle and Kiparsky on Indo-European accentuation (Halle, Kiparsky, in preparation).

When AD fails to apply, TL lengthens the persistent main-stressed vowel, outputting the correct quantity, as this derivation illustrates:

	/šamar+a+hū/	/dabar+e+nū/
(Lexical Stress:	+ + + -	+ + + -
Main Stress	W S W S	W S W S
	W S	W S
	R	R
PTL	šamār-á+hū	dabār+é+nū
AD	- + + -	- + + -
TL	ā	ē
UltRed	ə	ə
Spir		b
Output:	šəmarāhū	dəbārénū

A similar remark holds for the directional suffix -a: midbār 'wilderness', midbārā 'to the wilderness'; tēmān 'south', tēmānā 'southward' -- not *midbārā, *tēmānā, as we'd expect under the most general assumptions. It's not possible to posit a word boundary separating affix from stem, for segholates show non-spirantized root final consonants: négeb 'Negev', négbā: Cluster Break-Up would certainly occur at a word boundary, and the results of such schwa-insertion would be clearly visible as spirantization. (The vocalism of the form is puzzling, but irrelevant; nāgbā is expected.)

Nouns ending in -ū are few in number and rare in occurrence: ʔāhū 'reeds' -- 3x, šāhū 'swimming' -- 1x, tōhū 'confusion, nothingness', bōhū -- always in the phrase tōhū wabōhū 'chaos'; maybe some others. Furthermore, they do not appear suffixed or in construct and therefore display no alternations that might give evidence about their inner form. Because of the replacement of the third root consonant by a long vowel -- just like the pərī, holī type --, and because of the relationship to the class of vowel final verbs, the example being šāhā 'to swim', paralleling pārā 'to be fruitful' related to pərī 'fruit', it can be concluded that these should be w-final underlying. This rule Glide Vocalization (53) can be generalized to apply to w; if the words are listed as exceptional to AD, the correct forms

result. Another possibility is that derivation proceeds without glide vocalization: $tóhw \xrightarrow{TL} tóhw \xrightarrow{CB^u} tóhəw$, which then goes to $tóhū$ by a rule $əw \rightarrow \bar{u}$. However, those with stem vowel a apparently do not follow the mélek pattern: $*?é\dot{h}ū$, $*sé\dot{h}ū$. As a final counter-quibble on this tiny point, it should be noted that the one occurrence of $śā\dot{h}ū$, at Ezech. 47.5, bears the accent $Zāqēp̄ Qātōn$, indicating that it ends the first half of the second hemistich of the verse, meaning that it may well be a pausal form, and thus regular, like $qā\dot{b}er$, $īā\dot{b}ed$, $hēs\dot{ī}$ for $qé\dot{b}er$, $īé\dot{b}ed$, $has\dot{ī}$.

At any rate, the solution via generalization of rule (53) and lexical exceptionality does the observational job, and the skimpy evidence certainly supports no enrichment of the grammar.

(III) The paradigm of the 3fs perfect plus pronominal suffixes displays several surprising features:

<u>Pers/Gen</u>	<u>Sing</u>	<u>Pl.</u>
1	šəmarát-nī	šəmarát-nū
2 m	šəmarát-kā (!)	--
f	šəmarát-ek (!)	--
3 m	{ šəmarát-hū šəmarát-tū	šəmarát-am (!)
f	šəmarát-tā	šəmarát-an (!)

A regular feature that we have not seen before is the assimilation retrogressively of h across a morpheme boundary: optional apparently in 3ms, obligatory elsewhere.

(69) H-Assimil. $h \rightarrow C_i / C_i + \text{--}$

The operation of the rule is visible in the augmented imperfect endings -ennū /en+hū/ 'him', -enna /en+ha/ 'her', and in the suffixing of the preposition min 'from' with pronouns: mimménnū /min+min+hū/ 'from him', mimménnā /min+min+ha/ 'from her' (the reduplication is idiosyncratic but obvious). In this last case, N-assimilation obviously occurs as well. The rule of H-Assimilation should be ordered before spirantization, as a non-spirantized element is copied.

Viewed as a self-contained unit, the paradigm appears severely regular. Stress falls always on the inflectional affix -at. The only stem-alternation in the paradigm is in the length of the vowel in -at, again completely regular: it's long in the env. --C V, short in the env. --C C.

This regularity is purchased, however, at the cost of considerable divergence from the phonological norms of the language. The consonant final forms should be finally stressed; they are penultimately stressed: šēmārā́tek, šēmārā́tām, šēmārā́tan. Some sort of special rule is needed to accomplish this stressing, and it must certainly be early,

for PTL, which applies to the same vowel throughout the paradigm, depends on the -at being stressed. Furthermore, in just these cases, the rule AD should apply to destress the -at being stressed. Furthermore, in just these cases, the rule AD should apply to destress the -at, fating its vowel to an eventual deletion which never happens. The morpheme -at must apparently be marked [-AD]. (Observe that this is the only morphological environment in which -at is susceptible to reduction.)

The form šamārátkā is also problematic. If it comes from /šamar+át+e+ka/, then the stressed vowel should be long, since it occurs in a syllable open at the time TL applies. Further, such a form contravenes the proposed generalization, not challenged by the consonant-final forms, that stress falls always on one of the last two syllables. If it comes from /šamar+at+ka/, then the stress and length properties are normal, but the /k/ of the pronoun should remain unspirantized.

The historical provenance of the situation is relatively clear. In Proto-North-West-Semitic -- Proto-Hebrew, the paradigm must have looked like this:

<u>Pers/Gen</u>	<u>Sing.</u>	<u>Pl.</u>
1	šamarát-nī	šamarát-nū
2 m	šamarát-ka	--
f	šamarát-ki	--
3 m	šamarát-hū	--
f	šamarát-ha	--

Assuming a Classical-Arabic type of accent rule -- accent the first heavy syllable from the end, skipping the last syllable -- or even the rule we have found in the later language, stress is always penultimate, on the -at.

The 2nd and 3rd person plural pronominal suffixes are reconstructable roughly as *kimm, *kinn, *himm, *hinn. The 3rd person form shows up in the independent pronoun: hēm 'ils', hēnnā 'elles'; after certain prepositions, lāhēm, lāhēn 'to them'; and on the plural noun, e.g. dibr-ē-hēm, -hēn. Elsewhere it is /am,an/: on the singular noun, dēbār-ām, -ān; on the perfect verb, šōmār-ām, -ān; on the imperfect, with truncation, yišmōr-ē-m, -n.

Now, in the Biblical period of the language, no 2nd person plural object pronouns are ever affixed to the verb; when a 2nd person pronoun is a verbal object, the free (object) form is always found. Because of this, I have left their position in the table blank, making the not implausible assumption that the Biblical situation accurately reflects Proto-Hebrew. Since the ur-3 pl. pronouns (*himm, *hinn) have the same shape as the ur-2 pl pronouns (*kimm, *kinn), and since the Hebrew 3 pl verbal suffixes (-am, -an) do not descend directly from these ur-forms, I assume that at some point both the 2nd and the 3rd pl. suffixes were banned from the verb, presumably for some phonological reason now obscure (stress?).

After the endings /am,an/ developed in the nominal system by phonological reduction involving the case-ending /a/ (acc.) plus /himm, hinn/, we can speculate that the new 3 pl endings (am,an) were introduced into the verbal system; thereby reintroducing the once excluded category of 3rd person plural object suffixes. Since all the available forms were stressed on the at, this feature was apparently maintained. If the stress had been normalized, considerable disruption of the stem would have followed: from /šamar+at+am/, the usual rules give šimrātām, just as from /dabar+ē+hem/, with the same structure, there comes dibrēhem.

Similarly, in the 2nd person fem., samarātki, when the ending -ki was replaced by -ik or -ek everywhere, the original stress was maintained, producing šomarātek, not šimrāték. This form cannot be derived from /šamar+at+k/, for although the e would be inserted properly, the stressed vowel would not lengthen, since it's in the env. --C C, and the output would have to be *šomārétek, like mélek /malk/.

In the 2nd person masc., nothing much happened--except that the k of -ka was spirantized, regardless of the fact that no vowel ever stood before it. This paradigm is the one place in the entire language where the pronominal suffixes were preceded by a consonant; elsewhere they followed the case-endings (-u nom., -i gen., -a accusative), or vocalic endings on the verbs, some of which were lost when final short

vowels dropped. Can it be said that -ka was simply re-analysed everywhere as -e+ka? Of the three consequences of such re-analysis, -stress-shift onto ka, lengthening of the vowel in -at and spirantization of the /k/, -only the last is visible, suggesting rather that the /k/ was simply spirantized to make the ending look like its other occurrences.

Rather than explore any of the various ad hoc mechanisms which can be concocted to force this paradigm into the rest of the grammar, I am going to let it stand as problematic, waiting for a real illumination of the something that is going on here.

1.12 The Construct State

A genitival relationship is expressed by concatenation:

- | | | | |
|----|---------------------------|---|---|
| a. | qōl
voice | han-nābī?
the prophet | 'the voice of the prophet' |
| b. | qōlōt
voices | han-nābī?
the prophet | 'the voices of the prophet' |
| c. | yād
hand | han-nābī?
the prophet | 'the hand of the prophet' |
| d. | bənōt
daughters | han-nābī?
the prophet | 'the daughters of the prophets' |
| e. | dəbār
word | ham-melek
king | 'the word of the king' |
| f. | dəbār
word | melek
king | 'a word of a king' |
| g. | nəhār
river | ham-melek
king | 'the river of the king' |
| h. | melek
king | han-nāhār
river | 'the king of the river' |
| i. | nəhār
river | ham-melākīm
kings | 'the river of the kings' |
| j. | malke
kings | han-nāhār
river | 'the kings of the river' |
| k. | dibre
words | melākīm
kings | 'words of kings' |
| l. | ben
son | Dāwīd
David | 'the son of David' |
| m. | ben- | Dāwīd
David | 'the son of David' |
| n. | dibre
words | lebed bənē Yisrā'el
servant sons of Israel | 'the words of the servant of the sons of Israel' |
| o. | šomer
one who observes | hat-tōrā
the Law | 'one who observes the Law' |
| p. | tōrat
law | Yisrā'el
Israel | 'the law of Israel' |
| q. | hoq
statute | Dāwīd
David | 'the statute of David' |
| r. | hoq- | Dāwīd
David | 'the statute of David' |
| s. | huqqē
statutes | Dāwīd
David | 'the statutes of David' |
| t. | dəbār
word | bənē hā'elōhīm
sons of the Lord | 'the word of the sons of the prophet of the Lord' |
| u. | ʔarsā
to | konāʕan
Canaan | 'to the land of Canaan' |

Every noun in the chain but the last is said to be in the construct state; the last is said to be in the absolute state, meaning that its form is just that which it assumes alone. The definiteness of each noun in the phrase is the same, and is determined by the definiteness of the last noun. Only the last noun, the noun in the absolute state may bear the definite article. Adjectives in Hebrew follow the noun they modify, but any adjective associated with a noun in construct must follow the whole phrase, and only one noun in a phrase may be modified. If a noun is intrinsically definite-- a personal name, for example -- the whole phrase is definite, as in exs. l-n,p-s,u. A genitival phrase with mixed definiteness -- 'a son of David', 'a horse of the king' -- must be expressed periphrastically with the preposition 'to', as, literally, 'horse to the king', 'son to David'. Similar constraints on definiteness hold true of the genitive in English, when it is expressed with a case-ending ('s), rather than a prepositional phrase; 'the king's horse' is 'the horse of the king', 'the king's cousin's army' is 'the army of the cousin of the king', 'my mother's piano' is 'the piano of my mother'; 'a king's horse' is 'a horse of a king', and so on.

The chief morphological feature of the construct state is the replacement of the (predominantly) masculine plural ending -īm by ē, which proves to be /ay/. This replacement also occurs when an -īm plural is suffixed, as in dibr-ē-hēm

'their m. books' = /dabar+īm/ + /hemm/.

The masoretic system of textual accents (*tefāmīm*) is quite detailed enough to indicate that the principal stress of the phrase falls on the last member, the word-stress of nouns in construct being subordinated to that of the noun in absolute; sometimes, when marked by a dash, to the point of complete loss, as in exs. (m), (r).

Perhaps the most striking difference between the absolute and the construct state lies in the realm of syllable structure: *dābār* shows up in construct as *dabār*, *bānīm* 'sons' as *banē*, *dabārīm* as *dibrē*, *tōrā* (a feminine) as *tōrāt*. Let us distinguish two classes of phonological characteristics: (1) the shape of the last syllable, and (2) the pattern of reductions.

In the last syllable of a word in construct, underlying short a appears short; but underlying e and o are lengthened as usual under the principal word stress: *dabār* (short), as against *šōmēr* (example o.), *bēn* (l.), *hōq* (q.). Underlyingly long vowels remain long, as in *qōl* (a.), *qōlōt* /*qōl+ōt*/ (b.). As noted above (1.11), the feminine singular ending /-at/ retains its t.

Reduction of vowels in the construct state affects the same class of segments as the processes we have studied so far--vowels which are underlyingly short: note the contrast between exs. (b.) and (d.), *qōlōt* /*qōl+ōt*/ vs. *banōt* /*ban+ōt*/ Further, it operates in the same basic environment, --CV, and in the same alternating manner, producing stem mutations that

are already familiar to us: $\text{dibr}\bar{\text{e}}$ (cstr.), from /dabar+ay/, recalls $\text{dibr}\bar{\text{e}}\text{h}\acute{\text{e}}\text{m}$, from /dabar+ay+hem/; $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}$ (cstr.) recalls $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\text{k}\bar{\text{a}}$ and $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\text{k}\acute{\text{e}}\text{m}$. Evidently, the same network of de-stressing-reduction-deletion rules is at work here, but different segments are affected: and the difference is quite straightforward. Where in the absolute state PTL removes pre-tonic vowels from the grasp of the reduction processes, in the construct state PTL simply does not apply and those same vowels now start the alternating chain of reduction:

	dabar (cstr)	dabar (abs)	dabar+ay (cstr)	dabar+im (abs)
(Lex.Str	+ +	+ +	+ + +	+ + +
Main St	+ S	+ S	+ + S	+ + S
PTL	n.a.	$\bar{\text{a}}$	n.a.	$\bar{\text{a}}$
AD	- S	n.a.	+ - S	- + S
Other:	$\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}$	$\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}$	$\text{dibr}\bar{\text{e}}$	$\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}\text{im}$

What changes in the rule system are needed to model this diversity of facts?

Let us suppose that the nouns in the construct chain are separated by a single word boundary, so that, for example, $\text{d}\bar{\text{a}}\text{b}\bar{\text{a}}\text{r}$ $\text{D}\bar{\text{a}}\text{w}\bar{\text{id}}$ 'the word of David' is underlyingly ##dabar#Dawid##. The import of such representation is that the whole phrase is analysed by the phonology as a single word. The rules we have discussed apply to words, hence to the construct phrase as a word, not to the individual nouns which make it up:

except for one rule, Main Stress, which must locate the peak stress of each constituent noun, even if that peak stress ultimately comes to have only secondary prominence in the entire phrase. Main Stress is thus a #-level, rather than ##-level rule. Note that both final and penultimate options are evidenced: dəb̥ar hammélek (e), ʔarsā kənáʕan (u).

The first consequence of this mode of representation is that the last syllable length facts -- a vs. ē ō -- are predicted by the rule of TL we have already established. Recall that whereas /e o/ lengthened under principal word stress without condition, /a/ lengthened only in the env --C## and --C V. This restriction was written into rule (11), p.34, of which we repeat the relevant subrule dealing with a:

$$(70) \quad \text{TL(a)} \quad a \rightarrow \bar{a} / \begin{array}{c} \text{---} \\ | \\ \text{S} \end{array} (V X) \# \#$$

The 'S' is meant to indicate that the affected vowel must occupy a 'strong' prosodic position, i.e. be under a principal word stress.

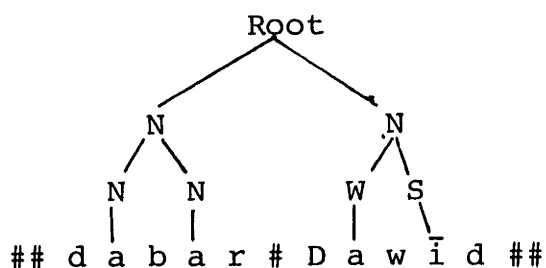
Now, it is quite clear that the main-stressed vowel of dəb̥ar in a phrase like ##dab̥ar#hammélek## does not satisfy the environmental conditions for the rule TL. It is not in the env. --C##, since only one word boundary follows; and it is not in the env. -- C V, nor can it ever be since (1) all words begin with a consonant or glide, and (2) even so, the env. -- C V does not allow a word-boundary to intervene

between the C and the V. Thus, the shortness of a in dābār is controlled by the same principle that governs the shortness of the stressed vowel in such words as kātābtī 'I wrote', šām 'people', mélek 'king'. There is in fact no elegant re-formulation of (70) to suspend the restriction in the construct; the best that could be done would be to re-write the env. as $--C(\left\{ \begin{smallmatrix} V \\ \# \end{smallmatrix} \right\} X) \#\#$, a monstrosity. The quantity situation in the final syllable of words in construct is actually a reflex of the situation in the language at large.

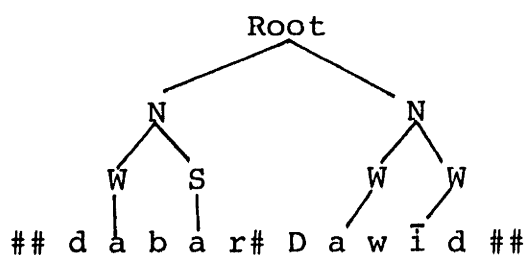
What of the pattern of reductions in the construct state? It was noted that if PTL does not apply to construct forms, the observed pattern falls out of the motivated rules. But, of course, PTL applies in the absolute state. The rule could be restricted to apply to the last word in the phrase by adding on to the r.h.s. of the Structural Description, like so, $--C \underset{\substack{| \\ S}}{V} Q \#\#$, where the interpretation of the Q-variable (see Halle, Vergnaud, Prince, 1975; Prince 1975 ms.) is such that only the nearest main-stressed vowel to the end of the phonological word (= construct chain) can satisfy the SD. However, this very vowel is independently identified as the peak stress of the whole super-word. If the rule PTL is modified as suggested, then it is portrayed as a grammatical accident that PTL is conditioned only by the principal stress of the entire phonological word: PTL happens to apply in the absolute state only, and peak-stress happens to fall on the absolute noun. Let us eliminate this 'coincidence' -- and maintain the

simplicity of PTL -- by conditioning PTL upon a ##-peak stress and not just a locally strong one.

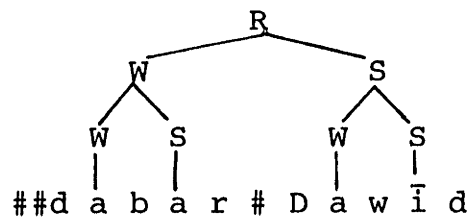
How is this peak to be located? Let us articulate the Libermanesque 'metrical' theory presented above. The prosodic structure of a phrase like *dabār Dāwīd* at a point before any rules apply, according to the principles given, would be:



The rule of Main Stress places final stress on the constituent words by labeling the metrical nodes as follows:



To complete the labelling of the tree, a W must be assigned on the left, an S on the right.



What principle stands behind this assignment? Recall the principle of node labelling that functions in the #-domain:

- (71) In a metrical configuration [M N], where M, N are sister nodes in the metrical tree, N is S, unless it dominates V#.

This was be stated in the familiar format for phonological rules as:

- (72) Node Labelling
$$N \rightarrow S \text{ / } \text{---} \left(\begin{array}{c} N \\ | \\ V\# \end{array} \right)]$$

(The left-bracket in the rule represents the end of metrical 'foot', and the rule applies 'cyclically', i.e. it determines the relationship between sisters, insuring that each foot is either WS or SW.)

Now, this principle, unless further articulated, gives exactly the correct assignment of labels; for the node N above Dawīd directly dominates a pair of metrical codes, not V#, and therefore, as the rightmost of the pair, it receives the designation S.

Main Stress, as in 1.9, is determined by following the

S's down from the root.

Thus, under the rather obviously necessary assumption that a phonological word forms a metrical unit, the pattern of the construct state appears as the simplest projection of the #-word pattern, requiring no enrichment of the principle of main-stress assignment (node-labelling). If this result is correct, then it provides strong support for the general hypothesis of metrical structure, and for the particular way we have chosen of expressing node-labelling, via the parenthesis-disjunction formalism of SPE.

At this point, a little notation is needed to permit direct reference to the peak stress. Let us use the symbol S_{\max} with a vowel to indicate that it is dominated in prosodic structure by a maximal chain of S's -- maximal within the domain of application of the rule. We may now state a final version of PTL:

(44) Pre-Peak Lengthening

$$\left[\begin{array}{c} V \\ (-low) \\ a \end{array} \right] \xrightarrow{\quad} [+long] / \# \# C_O (X (V)_b C \text{--} C \overset{\vee}{S}_{\max}$$

Condition: $a \succ b$

Under these assumptions, the construct chain derives like this:

	##D a b a r # D a w ī d##			
(Lex.Str.				
	$\begin{array}{cc} + & + \\ & \\ W & S \\ \diagdown & / \\ & W \end{array}$		$\begin{array}{cc} + & + \\ & \\ W & S \\ \diagdown & / \\ & S \end{array}$	
Node-Labelling				
Pre-Peak Lengthening				\bar{a}
A.Destressing	-	+	+	+
T.L.	n.a.		vacuous	
Ult. Reduct.				
Spir.		\underline{b}		\underline{d}
<u>Output:</u>	də̃b̃ar		Dāwīd	

The phonology of the construct chain emerges from its inner architecture. A string of nouns separated by single word boundaries, it is treated as a single word. The boundary structure entails the failure of TL to apply to a inside the chain. It does not entail the restriction on PTL, that it apply only before main stress of the phonological word (defined by ##), but it provides the necessary context for expressing the restriction. Its being a single word is compatible with allowing the principle of node-labelling for lexical items to determine its stress pattern; perhaps the theory should be enriched so that this is a necessary consequence of the ##-word representation, not just a plausible happenstance. Thus the use of single word boundaries (#)

to separate members of the construct chain provides a successful reconstruction of the descriptive notions 'close connection' and 'partial proclisis', and, through a single refinement in the rule PTL, allows construct phonology to be understood as a principled reflex of the situation in the language at large.

Those cases where word stress on the construct noun is completely absent, such as ben-Dāwīd̄ (m.), hoq-Dāwīd̄ (r.), the cases of real procliticization, might be marked by reduction of the original ## all the way to +. Thus the construct nouns would lose their right to the S assigned to the last two syllables of all independent words (p.143), and no cycle takes place on them. As these words have no S position, TL cannot apply to them, and underlying short vowels appear short. Another possibility is that the boundaries remain constant but that a special rule of proclisis optionally applies to wipe out all S's from the word in construct. Evidence that this approach is to be preferred comes from the behaviour of underlyingly long vowels such as the one in hōd̄ /hōd̄/ 'glory'. They remain long even under proclitic S-loss, but, as we saw above (1.2), long vowels shorten in the env. --C+C. In a phrase like hōd̄-?ēl 'the glory of God', retention on the long vowel militates against a representation ##hōd̄?ēl##. On the basis of this evidence, then, we reject the reduction to +-boundary solution, and adduce a rule of proclitic

destressing that may optionally apply in the construct state. We leave the exact formulation of the rule open. A natural constraint on rules of boundary adjustment would be that ## can be weakened only one step to # and no further. This would rule out the +-boundary solution in principle, setting a limit on the extent to which syntactic juxtaposition can affect the phonological integrity of words. The failure of the +-boundary solution in this instance supports such a constraint.

The boundary structure of the construct chain provides an unambiguous environment for certain processes of suppletion. The most general, mentioned above, is the replacement of the plural suffix /-īm/ by /ay/. This occurs as well when the plural is pronominally suffixed, most clearly see in the 2fs. *d bārāyik* /dabar+ay+k/ 'your words' = /dabar+īm/ + /k/. Interestingly, the feminine plural ending /-ōt/ is supplemented by /ay/ before the suffixes, e.g. *tōrōt-āyik* /tōr+ōt+ay+k/ 'you- fs. laws' = /tōrōt/ + /k/. This suggests that rather than simple replacement of īm in a certain environment, we have first insertion of the augment -ay-, then truncation of -īm:

$$(74) \text{ Plural Augmentation} \quad \emptyset \rightarrow + // \left[\begin{array}{c} [+plural] \\ (+fem) \\ a \end{array} \right] \left[\begin{array}{c} -seg \\ (-WB) \\ b \end{array} \right] \left[\begin{array}{c} [+seg] \end{array} \right]$$

Condition $a \supset b$

$$(75) \text{ Emasculation} \quad \bar{im} \rightarrow \emptyset / - +$$

The condition on rule (74) states that $\bar{o}t$ is augmented before + but not #, i.e. before pronominal suffixes, not in the construct state. Rule (74) need not mention ay specifically, because this is the one place in the language where $\bar{i}m$ is followed by a morpheme boundary. The rules work like this:

	#dabar+ $\bar{i}m$ #malk#	#dabar+ $\bar{i}m$ +k#	# $\bar{t}or$ + $\bar{o}t$ +k#
Pl. Aug.	#dabar+ $\bar{i}m$ +ay#malk#	#dabar+ $\bar{i}m$ +ay+k#	# $\bar{t}or$ + $\bar{o}t$ +ay+k#
Emasc.	#dabar+ ay+malk#	#dabar+ ay+k#	--

The forms are then input to the phonology we have described.

This example raises a couple of points of some theoretical interest. For one thing, it illustrates the existence of a natural class of single unit boundaries #,+ , showing that the boundaries are not each primitive, but are sub-classified among themselves along the lines suggested by the SPE feature analysis. For another, it gives clear evidence that rules of morpheme truncation are a necessary part of the descriptive apparatus made available to the language learner by the theory of grammar. The evidence is not only grammar-internal but comes as well from the historical development of the distributional data just presented.

Originally -- or rather, as far back as we need to go -- the language had the following system of case endings:

	<u>Sing.</u>	<u>Dual</u>	<u>Pl.</u>	
			m.	f.
Nom.	u	ā	ū	u
Gen.	i			
Acc.	a	ay	ī	i

These endings were added on to the bare stem of the masculine, e.g. *dabaru, and onto the derivational ending of the feminine, -at in the singular and dual, -āt in the plural, as in *nabilatu, *nabilātu 'corpse, corpses nom.'. In addition to the case-system, Proto North-West Semitic distinguished between bound and unbound forms of the noun: a noun was bound if pronominally suffixed or if in the construct state, unbound otherwise. Unbound forms were marked with memation (or nun-ation), a suffix added on to the case ending, consisting of an m (or n) plus V, where V = a or i depending on category of case, no., gender: *dabaruma 'word nom.', *dabarāmi 'two words nom.', *dabarūma 'words nom.', *dabarīma 'words gen-acc.'

Then the language was rent by change. Final short vowels drop everywhere, wreaking havoc with the case system. Furthermore, the memated forms of words that ended in short vowels (all singulars, fem. plurals) disappear as well. The earlier *dabaru-, *dabaruma, *nabilatu-, *nabilatuma become simply *dabar, *nabilat; *nabilātuma (nom pl.), *nabilātima (gen-acc pl) likewise become *nabilāt. At this point the case-

system of the unpossessed noun can be maintained only in the dual (-ā nom., -ay gen-acc.) and the masculine plural (-ū nom., -ī gen. -acc.). However, a contrast between *dabarū(m)* and *dabarī(m)* does not last long, and it is resolved in favor of the oblique form in both dual and plural, yielding the system:

	Sing. <u>bound/unbound</u>		Du. <u>bound</u>	<u>unbound</u>		Pl. <u>bound</u>	<u>unbound</u>
m.	<i>dabar</i>		<i>dabaray</i>	<i>dabaraym</i>		<i>dabarī</i>	<i>dabarīm</i>
f.	<i>nabilat</i>		<i>nabilatay</i>	<i>nabilataym</i>		<i>nabilāt(i)</i>	<i>nabilāt</i>

The final change that brings the masculine noun into direct ancestry of Hebrew is the replacement of the plural bound form in -ī by the dual in -ay; this yields ultimately constructs like *dibrē/dabar+ay/* and suffixed forms like *dabarāyik/dabar+ay+k/* and *dibrēhēm/dabar+ay+hēm/*. What of the feminine?

It is clear that no such replacement of the plural by the dual took place in the feminine bound forms; otherwise the feminine plural construct would come from e.g. *nabilatay*, leading to the incorrect *niblōtē /nabel+at+ay/*. The actual form is, of course, *niblōt /nabel+ōt/*, from the historical plural bound form *nabilāt*. Similarly, if such a replacement had taken place, the suffixed feminine plural would be in Hebrew *niblātāyik /nabel+at+ay+k/*, from the historical *nabilatayk*. The actual form, *niblōtāyik /nabel+ōt+ay+k/* cannot descend from *nabilatayk*, but only from a form based on the authentic plural *nabilātayk* (long a in the feminine morpheme).

The question is, how did the -ay- morpheme get attached to the fem. pl. -āt in pre-suffixal position? The feminine dual uses -ay- as a straightforward number marker, and therefore provides no source for an 'empty' augment. But the new masculine plural pre-suffixal form, dabaray-, shows the morpheme in a way that demands special interpretation, since it is not dual and since the free plural form looks quite different: dabarīm. Suppose that a suffixal form like *dabarayk (pl.) is analyzed as coming from *dabarīm +ay+k (by the speaker-learner) via a process of truncation. This means that the -ay- is here interpreted as the augment of the pronoun bears when it suffixes plurals. The interpretation is re-inforced by the fact that pronouns are augmented (by selected remains of the case endings) on the singular noun, suggesting a canonical form stem+augment+pronoun. The next step is to generalize the augment -ay- to all plurals, masculine and feminine, producing the necessary ancestor (nabilātayk.

It should be noted that there is no plausible analogical source for the innovation. A proportion $dabarīm : dabarayk :: nabilāt : x$ solves as $x = nabilayk$. Only when the analysis is mediated by special rule of -īm truncation does the re-interpretation of -ay- begin to make sense.

Certain other processes also take place in the phonological environment of the construct chain. Quite regularly, feminine nouns of the shape CVCCVC+at undergo truncation of the suffixal vowel: so mamlāḳā /ma+m^lak+at/ 'kingdom' has for the construct mamlēket, transparently derived from /ma+m^lak+t/ by the same route that mēlek comes from /malk/. This truncation is apparent also in the pronominally suffixed forms: mamlaktī /ma+m^lak+t+ī/ 'my kingdom'. This means that there is an early rule of adjustment:

(76) Fem.Sing.Syncop: a + ∅ / C V C C V C + -- t [-seg][+seg]

Other examples of this type are mišpāḥā /ma+š^pah+at/, cstr. mišpāḥat, suff. mišpaḥtī; milḥāmā /ma+l^ham+at/ 'war', cstr. milḥemet, suff. milḥamtī. Observe in rule (76) the appearance of the class 'single boundary' (+ or #), which accurately defines the notion 'bound form', insofar as it is relevant to the grammar.

Some words assume a different underlying stem shape in the construct state: yarek /yarek/ 'thigh' has cstr. yerek /yark/; kāteṣ /katēp/ 'shoulder', cstr. kēteṣ /katp/; ʕarēl /ʕarel/ 'uncircumcised', cstr. ʕèrel /ʕarl/; səlaʕ /selaʕ/ 'rib', cstr. səlaʕ /selʕ/. Evidently these forms are susceptible to a minor rule -- a rule that applies only to specially marked forms -- that syncopates the 2nd stem vowel in the construct state. (The suffixed forms are regular, e.g. yarekī /yarek+ī/ 'my thigh'). There seems to be some sort of curious

output of derivational morphology. Aronoff (1976) argues for elimination of the diacritic feature-minor rule apparatus in favor of what he calls rules of allomorphy, which are basically morpheme-specific rules of adjustment limited in domain to the lexical word. For example, he argues that the relationship between nouns in ism, e.g. formalism, and adjectives in -istic, e.g. formalistic/*formalistic, should be expressed as an allomorphy rule replacing ism by ist (actually m by t) in the env. -ic. Although Aronoff's theory may well be suitable for the area of morphology it is aimed at, i.e. derivational, it does not extend to the type of case dealt with the rule Minor Surgery, for which the minor rule device is well-motivated, --cases involving the phonological rather than the lexical word. Further, Aronoff's theory, with its rules specifying the shape of a single morpheme, predicts no relation between the suppletive processes that apply to different morpheme; the minor rule theory favors cases like the present one in which irregularities can be subsumed under a structural generalization.

Halle (1973) notices that although the output of the rules inflecting Russian words for case and number are by-and-large regular, there are occasional idiosyncrasies; so word W (for example) is exceptional to rule N but only in the inessive singular. Halle suggests that each and every form produced by inflection be listed in the dictionary so that

the entry for the inessive case of W has the annotation [-rule N]. The Halleic principle of full disclosure is only necessary if it's hypothesized that rule features are simply listed with each entry; if we assume greater richness in the structure of an entry, allowing implicational conditions, say, we could enter the observation [+instr] \supset [-rule N] beside the word W. Now the case at hand falls under the narrow conception of entry-form, since, as has been shown, it is incorrect to assume a feature [+cstr] that would play a role in a conditional [+cstr] \supset [rule 48]. (Note that this would allow a slight simplification of rule (77); the environment need only be --C#, not -- C#C). The environmental condition on rule (48) permits a simple listing of the feature [+rule MS] in the entry for a word like yā[/]rēk.

However, the example does undermine a kind of intuition that Halle's proposal appeals to: that exceptionality is a property of items in themselves, rather than of items in context. Since the inessive case of W, W_i, a surface word, is irregular, from this point of view W_i must be an autonomous item in the lexicon, not just a function of W in the context [+instr]. In the interests of uniformity, all inessives must be listed, and indeed, all case forms. The construct state is clearly not a lexical category -- as [inessive] may be thought to be -- but rather a phonological reflex of syntactic structure; yet it is the locus of a certain amount

of irregularity, showing that idiosyncrasy can creep into, or be preserved in, surface as well as deep categories. Given this, it would seem that since W_1 is a surface word, it can suffer irregularity; and it is not necessary to read it back into the dictionary as a full entry -- a deep word -- in order to give grounds for its exceptionality. Real uniformity of treatment can be obtained through the minor rule mechanism, perhaps extended to assign rule-features as well, so that our word W would have in its entry [+minor rule M], where rule M says something like [+iness.] \rightarrow [-rule N] just as $y\bar{a}r\acute{e}k$ has in its entry [+Minor Surgery], a rule which also applies in a syntactically given environment.

1.13 The Pausal Forms

In a series of coruscating essays, J. W. Bresnan has argued that the Nuclear Stress Rule of English -- the rule that locates the phrasal peak stress -- applies as the last rule of the syntactic cycle. The most elegant implementation of this idea would have the other rules of word and phase stress (MSR, CSR) apply with the NSR, so that the NSR functions to re-shape their output directly, marking as prominent phrasally a syllable that has already been singled out for prominence in a narrower domain. This formulation is not, of course, logically necessary, for one could easily concoct an accounting system in which the NSR marked not words (or rather syllables in words) but phrase nodes, these marks being stored throughout the syntactic derivation; then at the surface after the other stress rules run through their own cycle assigning local prominence, the results of the NSR calculation, tabulated on phrase nodes, could be transferred onto the appropriate segmental location.

Let us explore the first alternative, which is more native to the genius of Bresnan's proposal. The syntactic cycle and the phonological cycle are identified; grammar is a single movement from part to whole. Starting from the smallest bracketed domain, in which only the rules of word stress apply, the grammar advances to the lowest cyclic nodes, where first the syntax and then the phonological rules of

prosody accomplish their processing; thence upward to the root, in the same fashion. At the surface, the cycle completed, the rules of word-level phonology confront a string of segments punctuated only by boundaries: +, #, ##. These rules do not apply cyclically, do not refer to bracketing, and concomitantly, do not refer to lexical category type (noun, verb ...), as prosodic rules may.

This picture is rather different from the one limned by the authors of S.P.E. For them, all phonology must await the end of syntax, after which it re-begins the cycle, defined this time on the bracketting of surface structure. The word-level rules fall in the middle of this cycle, applying when the boundary sequence ## comes into the expanding purview of the phonology. Such an organization has as an important consequence that phonology has no access to the inner workings of syntax, the deeper stages of derivation whose geometry may be all but lost in the spare architecture of the surface. This proposition could not be sustained, and J. W. Bresnan demonstrated the syntactic configurations to which the NSR is sensitive are exactly those which obtain at the end of a cycle; hence the Ordering Hypothesis.

Now, the Ordering Hypothesis -- and its articulation into what might be called Unified Cycle Theory -- entails that a certain amount of phonological information will be available as syntactic processing is under way. Why then do

transformations never refer to phonological properties? Actually, the question is ill-conceived; even under the earlier, bi-cyclic view, lexical insertion involved phonological material -- underlying forms -- and yet transformations could not depend on any phonological feature that a lexical item might possess. It is simply the case that the vocabulary in which syntactic rules are couched does not contain expressions that refer to phonological entities, just as it does not contain expressions referring to semantic or pragmatic entities. We should no more expect a rule of syntax to depend on nasality or stress-prominence than we should expect it to depend on co-reference or speaker-attitude.

A more interesting consequence of the distribution of information within the Unified Cycle Theory is this: since the word-level rules apply after all prosodic processing has been completed, they should be able to refer to aspects of phrasal prosody and not merely to the word-internal accentual information to which SPE theory limited them. In short, we should expect to find cases where the segmental form of a word varies lawfully with its position in phrase and clause. Does morphophonemics have access to phrasal information? In the Unified Cycle Theory there can be no good reason why not, since the phrasal information is both available and of the type the rules refer to anyway. The question thus provides

a useful demarcation between the two theories: if it is answered affirmatively, the S.P.E. theory is basically disconfirmed; if negatively, the Unified Cycle Theory must be modified ad hoc to meet the facts, i.e. to accommodate what SPE effortlessly predicts.

In Hebrew, words which lie immediately before a major phrase boundary -- usually a sentence (clause) -- are said to be in pause, and they undergo certain modifications there, producing what are known as pausal forms. In terms of the rule system developed in this essay, the principal pause effects are two in number: (1) the condition on lengthening of a under stress is suspended, so that all a's, even those in closed syllables, may be lengthened by TL; (2) the rule A.D. does not destress any vowel which bears peak word stress, so that no stress-shift occurs in pause. Characteristic examples of these phenomena look like this:

	<u>Word</u>	<u>Gloss</u>	<u>Underlying Form</u>	<u>Sentence-Final (Pausal) Form</u>
(1)	kāṭābtā	you m.s. wrote	/katab+ta/	kāṭābtā
	ʿām	people	/ʿamm/	ʿām
	māyim	water	/may+m/	māyim
	ʔeres	land	/ʔars/	ʔares
(2)	kāṭbū	they wrote	/katab+ū/	kāṭabū
	zāqnu	they're old	/zaqen+ū/	zāqenū
	yiktābū	they m will write	/ya+ktob+ū/	yiktōbū

<u>Word</u>	<u>Gloss</u>	<u>Underlying Form</u>	<u>Sentence-Final (Pausal) Form</u>
parí	fruit	/pary/	pérí
ḥasí	half	/ḥesy/	ḥesí
ḥolí	sickness	/ḥoly/	ḥolí
dəbārka	your m.s. word	/dabar+e+ka/	dəbārēka
yišmorka	he will guard you	/ya+šmor+e+ka/	yišmarēka

A third effect of the "pause" is to inhibit the retraction of stress in the converted jussive (given as rule (32), p. 64), evoking a contrast like that between wayyāmōt ?ādām 'and Adam died', with retraction, and wayyāmōt: 'and he died:', without retraction because the word ends a sentence.

What is it about clause-final position that could produce this constellation of effects? The traditional answer is that pausal phenomena are reflexes of the peak stress associated with the last word in a clause. This strikes me as a highly plausible account: first, because the type of phenomenon -- lengthening, resistance to stress removal (by A.D. and by rule (2), Consecutive Retraction) -- are characteristic correlates of high stress; secondly, because it is reasonable to believe that the clausal prosodic prominence really did fall at the end -- this is because it is a usual pattern (English has it, essentially), and because it accords with the end-stressing clearly visible in the lexical word and in the construct state.

Notice too that the restitutions in pause (see (2) on the table) are neither random nor superficial -- the full

vowels of the pausal forms which stand where schwas and zeroes do in non-pausal forms cannot be inserted late, for they are not surface-predictable; they faithfully reflect the character of the underlying representation.

Under the reasonable assumption that the pausal alternations are stress-conditioned, we are presented with a clear case of word phonology (A.D., T.L., Consec. Retraction) being dependent upon phrasal prosodic information of exactly the type that Unified Cycle Theory predicts should be available. A more compelling and systematic exploitation of the theory's resources could hardly be hoped for.

It might be argued that the data is not to be taken seriously, that it is a literary artifact, the result of distortions introduced by exaggerated liturgical cantillation of the text, and perhaps further ramified by the corrective activities of regularity-mad grammarians. This argument is not deep. To effectively discredit the pausal data, it must assume that the pausal forms were literally invented, begotten from the normal forms by essentially extra-linguistic (oratorical, cantillatory) pressures. For even if the present text contains a somewhat regularized and extended -- literarified -- version of a true earlier phenomenon, there remains the earlier phenomenon, which must have been in the same mode of phrasal influence on word-shape as the pausal data found in the text. But on the face of things, it would seem unlikely

that the pausal forms could have been projected from the ordinary forms by a desire to restore reduced vowels when they should bear stress: for in such a case we would expect a simple law of replacement, operating on the surface, a rule uniformly replacing penultimate schwas with some favored vowel, like \bar{a} or \bar{o} . What we find, of course, is morphophonemics. Looking more carefully into the full range of forms, we find a certain amount of irregularity in both the distribution and the phonological shape of pausal items, and it is the kind of non-uniformity that indicates the milled grain of reality, not mere lacunae in the smooth pages of the grammarian.

For example, the word mélek retains its vocalism in pause, never becoming málek . Certain verbs with a perfect show up occasionally with e in pause: qārāb 'to be near', qārēbā 'she is near'; gādāl 'to be big', gādēlā 'she is big'; šāmāʿ 'to hear', šāmēʿū 'they heard'. Why? Because these verbs originally had e (actually *i) perfects, cf. Arabic samiʿa 'hear', and the relic forms are preserved in pause. Verbs which were originally III-y restore the archaic glide in pause: for ḥasū 'they sought refuge', ḥāsāyū (Dt 32.37); this must of course be represented in the consonantal text, and can hardly be ascribed to the vowing of the masoretes. And the 2nd person masculine pronominal suffix -ka usually

shows itself as -ekā, in pause, but on the prepositions l-,b- it attaches as in lāk, bāk, for ordinary lakā, bakā, rather than the lékā, bekā which might easily be expected.

A more considered line of counter-argumentation would concentrate on the assumption that it is stress per se that conditions the pausal effects. Perhaps it is the syntactic position alone that determines the distribution of pausal forms; the feature \pm pause, then, is not a correlate of + Clause Peak Stress, but functions more like \pm accusative, say, and is implanted by a syntactic rule before phonology, in the SPE manner, begins on surface structure. In this view it is a mere coincidence that the chief phrasal stress falls also on the word marked [+Pause]; and a coincidence that the pausal effects are by-and-large of the type induced by high stress. There are important empirical differences between the syntactic and the phonological approaches: no language is so rigid as to not allow some variety in the patterns of clausal stressing; if the occurrence of pausal forms is stress-determined, we might expect them to turn up non-finally where stress has been wrenched from its normal course by emphasis or parallelism, and not to occur finally in just those circumstances. Now, according to Gesenius, there is great regularity under the two major accents Sillūq (at verse-end) and ?Atnāḥ (mid-point), optionality with the lesser accents marking further subdivisions of the verse (Soḡōltā, Zāqēp Qātōn, Rəbīlāī), dwindling to infrequency (Paštā, Tīphā, Gereš, even Pāzēr).

It may well be that the pattern of 'optionality' can be explained in terms of stress; but I have not made a serious inquiry into this complex area, and I shall have to leave the issue open, contenting myself and the indulgent reader with an outline of the logic of the situation and a pointer to the data that may decide.

Ultimately, however, it's hard to imagine that phenomena of the pause could have arisen any other way than through the phonological influence of stress. If this is correct, then at some stage the full descriptive resources of Unified Cycle Theory were called upon as phrasal prosodic structure played a direct role in morphophonemics. Of course, that was in another country and the language is dead; no details are forthcoming. But the character of the available data suggests that the Unified Cycle Theory deserves serious consideration.

Formal note 1: Both sides of the binary distinction phrase-peak --non-phrase-peak play a role in rules. The negative side is apparent in the three major phenomena. The rule AD must be re-written as:

$$(78) \text{ AD } \begin{bmatrix} V \\ [-\text{long}] \\ [-P] \end{bmatrix} \rightarrow [-\text{stress}] / \text{ -- C } \begin{bmatrix} V \\ [+str] \end{bmatrix}$$

The rule TL as

$$(79) \begin{bmatrix} V \\ [+low] \\ F \end{bmatrix} \begin{matrix} a \\ \end{matrix} \rightarrow [+long] / \text{ -- C } ((V)_b X) \#\#$$

Condition: a) b

The rule Consecutive Retraction as

$$(80) \begin{bmatrix} V \\ [-low] \\ [-P] \end{bmatrix} \rightarrow [-\text{stress}] / \text{ V C -- C } \#\#$$

The import of these revisions is that AD and CR apply only to non-peaks, and the condition on the tone-lengthening of a holds only when the relevant a is not under maximal phrase stress.

The notion [+P] functions in some rules of smaller scope. For example, in Hitpa^{cc}l̄el, the stem final e shows up in pause as ā, e.g. yithallāk /y+hi+t+hallek/ 'he will walk about' (Jb 18.8). This can be accommodated in an early rule:

(81) Hitpa^{cc}l̄el Pause $V \rightarrow a / \text{ -- } C \# /$ in Hitpa^{cc}l̄el
[+P]

Two words show stress peculiarity: ?ānokī 'I' (archaic, majestic, divine) is pausally ?ānōkī ; ?attā 'you m.s.' , ?āttā. Notice that it is really the non-pausal forms that are peculiar; the pausal penultimate pattern is what's expected in both cases. Evidently these two words are subject to their own rule of forward stress (in our metrical terms, penultimate de-stressing), which rule, like AD --which is mimics-- is inhibited in pause. This rule follows PTL, hence the always long first vowel of ?ānōkī.

(82) Minor Movement $V \rightarrow \text{[stress]} / \text{ -- } C_o V$
[-P]

This is the kind of 'pernicious' stress-shifting, which would if it were widespread disconfirm the assertion that stress-shift is a concomitant of AD, since neither form meets the SD of AD, /?ānōkī/ having a long vowel penultimate, /?āttā/ having a closed penultimate syllable. Formal Note 2: The relic forms in pause require a suppletory apparatus to relate them to their non-pausal incarnations. Here, as with the construct state, we are dealing with an obviously non-lexical category, and the device of minor rules is similarly appropriate.

Retrospective Glance

At this point all the stress-related alternations in syllable structure have been discussed. The method of exposition has been to call upon particular fields of data as they are relevant to the working of a posited rule or system of rules. This stands in contrast to the traditional, pedagogically motivated manner of progressing through the form-classes of the language, exploring each in detail, giving many rules of rather narrow scope, often limited to a morphological or syntactic class. Behind our method is the hypothesis that the morphologically diverse alternations reflect the interaction of a few general principles. In order to better fix in mind the look of the territory covered, let us for a moment change our focus from the inner form to the outer articulation of the data.

A more-or-less traditional account of deletion-reduction phenomena would distinguish the following cases:

- (1) Propretonic Reduction. i.e. of short vowels
in open syllables 2 (or more) syllables
before the stress, as dābār^{\prime} -- $\text{dābār}^{\prime}\text{īm}$
- (2) Post-Heavy Syllable Reduction. Of non-low
vowels after VCC or $\bar{\text{V}}\text{C}$, as šōpēt^{\prime} -- $\text{šōpt}^{\prime}\text{īm}$,
- (3) Verbal Vowel Reduction
 - (a) in the perfect and imperfect: kātab^{\prime} --
 katbū^{\prime} ; yiktōb^{\prime} -- yiktābū^{\prime}

(b) In the imperative: $k\bar{a}t\bar{o}b$ -- $kit\bar{b}\bar{u}$,
 $t\bar{e}n$ -- $t\bar{a}n\bar{u}$

(4) Infinitive with Suffixes: $k\bar{a}t\bar{o}b$ -- $kot\bar{h}\bar{i}$

(5) Weak Segholates: $p\bar{a}r\bar{i}$ -- $per\bar{y}\bar{a}k\bar{a}$ -- $p\bar{e}r\bar{i}$

(6) The Construct State

This welter of mutations is generated by a single rule, Alternating De-Stressing, as it interacts with the stress pattern and with pre-tonic lengthening. A certain amount of morphologically conditioned variation feeds into the crucial AD-PTL nexus -- differential treatment of /-at/ in nouns and verbs, amplification of imperatives and infinitives by the rule Echo, the distinction between -ka and the other pronominal suffixes -- and the real character of these phenomena is illuminated by the central principles we have studied.

The regular cases where main-stress has undergone some kind of movement are these:

(1) The Verb: $kat\bar{b}\bar{u}$, $yikt\bar{a}b\bar{u}$, $kit\bar{b}\bar{u}$

(2) The Weak Segholates: $hol\bar{i}$, $p\bar{a}r\bar{i}$

(3) The Pronominal Suffix -ka: $d\bar{a}bark\bar{a}$, $\check{s}m\bar{a}rk\bar{a}$,
 $yi\check{s}mork\bar{a}$

(4) Consecutive Retraction: $wayy\bar{a}mot$ vs. $y\bar{a}m\bar{o}t$
 ('and he died ...' vs. let him die)

(5) $N\bar{a}s\bar{o}q$? $\bar{A}h\bar{o}r$: $t\bar{o}k\bar{a}l$ $l\bar{e}h\bar{e}m$ + $t\bar{o}k\bar{a}l$ $l\bar{e}h\bar{e}m$ 'she will
 eat bread

(6) 2ms-Forward: $k\bar{a}t\bar{a}bt\bar{a}$ vs. $w\bar{a}k\bar{a}t\bar{a}bt\bar{a}$

The last two syllables of a word are grouped into a single prosodic unit by the principle of right-branching we called Hebrew Tree Structure (1.9). In terms of the general theory we elaborated, based on the work of Liberman (1975), a de-stressing or a metrical weakening of either one of the last two syllables automatically puts the other into prominence. An immediate consequence is that cases (1), (2), and (3) are governed by the same principle that determines the location of reduced vowels. Cases (4), (5), and (6) require rules of their own; the rules are simple de-stressings or weakenings rather than complex and un insightful two-change transformations. Both the direction of shift and the distance travelled by the shifting stress (one syllable) follow from the character of the tree-structure under general principles of metrical theory.

Successful integration of data of this degree of categorial diversity into a grammar of phonological rules basically confirms the hypothesis of generality that has guided the investigation.

Chapter 2

Segmental Issues

2.1 Geometry of the Vowel System

The canonical form of Hebrew lexical items is severely limited. The simple noun or adjective, unadorned by affixes, unreduplicated, has three consonants in it, arrayed CVCC (mélek), CVCC (gəbúl), or CVCVC (dābār). Holding the consonant frame constant and allowing the vowel(s) to vary will trace the basic dimensions of the underlying vowel-system. If there are n vowels, we expect there to be (at most) n monosyllable types, n^2 bisyllable types, and so on.

In the segholates (CVCC) we have seen three basic types: (i) mélek -- malk-í, (ii) séper -- sipr-í, (iii) qódeš -- qodš-í. We know these to be underlyingly short, first because of their reducibility (pl. mōlākīm, sēpārīm), secondly because of the general restriction on morpheme structure that allows only short vowels in the env. -- C C. So this subclassification of the segholates argues for a three member short-vowel set. There is, as it happens, a fourth alternation type, a kind of hybrid of (i) and (ii), that goes like sédeq -- sidq-í. We shall look into the matter below, finding a phonological rule rather than an underlying distinction; the segholates like

sedeq will prove to be vagrants from type (ii).

In monosyllables CVC_i , a perfectly parallel typology is manifest: (i) $rāb$ -- $rabbīm$, (ii) $ʔēm$ -- $ʔimm-ī$, (iii) $hōq$ -- $huqqīm$. Again, a fourth, mixed type shows up, as $sāp$ -- $sippīm$ 'thresh-hold, sing. and pl.', $sād$ -- $siddīm$ 'side'.

These typologies point toward a triangular short vowel system, but do not suffice to establish the exact quality of the two non-low vowels. Let us represent them expositively as I, U, as we investigate which of /i,e/ and /u,o/ should be chosen.

The type CCVC, in native words, has always a long vowel, and the classification, as among the short vowels, is tripartite: (i) $hazīr$ 'swine' (ii) $gabūl$ 'boundary' (iii) $hamōr$ 'ass:Equus asinus'. Recall that the a of examples (i) and (ii) is a reflex of schwa after gutturals. These vowels are demonstrably long because they neither reduce under the influence of AD, nor appear short in enclisis. This form-type clearly suggests a long vowel system / \bar{i} \bar{u} \bar{o} /. There are a very few words which display an / \bar{a} / that is sturdily constant in shape, neither reducing nor shortening, like $kotāb$ 'book', but they are pretty obviously loan-words from Aramic.

With a tripartite short vowel system -- a, I, U -- and a tripartite long vowel system -- \bar{i} \bar{u} \bar{o} -- the canon CVCVC

should beget 36 fully-vowelled subclasses; but the number of possibilities is substantially smaller. In the frame CaCVC, however, substitution is free, and there are as expected six instances, three long, three short:

- | | | | | | | |
|-----|-----|-------|----------|-----|-------|------------|
| (1) | /a/ | dābār | | /o/ | gādōl | 'big' |
| | /I/ | zāqēn | 'old' | /ī/ | pāqīd | 'overseer' |
| | /U/ | ʔāyom | 'afraid' | /ū/ | ʔārūm | 'subtil' |

Of the remaining 30 possibilities, only 5 are realized, and most of these rather scantily:

- | | | | | | | |
|-----|----------|-------|---------------|---------|-------|---|
| (2) | /I/ -/a/ | lēbāb | 'heart' | /ī/-/ō/ | qītōr | 'smoke' |
| | | šekār | 'beer' | /ū/-/ā/ | šūfāl | 'goat' |
| | | šelār | 'hair' | | gūnāb | 'pipe' |
| | | lēnāb | 'grape bunch' | /ō/-/ā/ | lōlām | 'eternity' |
| | | šelāl | 'rib' | | šōpār | 'ram's horn' |
| | | | | /ō/-/I/ | šōpēt | 'judge' + Qal particip.
=1000's of items |

The lists here are not meant to be exhaustive, but suggestive of relative size. Of these classes only the \bar{o} -I series, which is characteristic of Qal participles and of the agentive nouns related to them, is heavily populated. The other long-vowel classes are indeed rather undernourished. The question of frequency is not identical with the question of phonological possibility, and it might be asked, what sort of general patterns are reflected in the range of admissible word shapes.

Observe that /a/ retains popularity as a second vowel. A rule of distributional thumb might be: a goes with everything (a-V), everything goes with a (V-a). The second clause needs emendation: (1) there are no types /CUCVC/ (2) the type \bar{i} -a is not attested, (3) the type \bar{i} - \bar{o} is, (4) Qal participles have i, not a in the second syllable.

Now, the vowel pattern of the Qal participle (and its nominal derivatives) must be specified by a rule of Ablaut or its equivalent, so we can rule it out of consideration as we focus on the patterning of underived nouns (and adjectives). Of the other 3 restrictions, only (1) carries much weight; except for the Qal participle type, the others shaped $C\bar{V}CVC$ are quite rare, and it can be considered accidental that \bar{i} - \bar{o} is in and \bar{i} -a is (apparently) out. The central formal requirements can thus be expressed in two clauses:

$$C \ V_1 \ C \ V_2 \ C$$

(3) Either $V_1 = /a/$ or $V_2 = /a/$

(4) $V_1 \neq /U/$

Most important for the present inquiry is the fact that the range of forms CVCVC falls well within that predicted by assuming an essentially tripartite division within the short and long vowels. This gives us the geometry of the system, leaving open the question of the exact location of the underlying vowels. The short vowel system has its

complexities, so let us first explore the simplicities of the long vowels.

The long vowels present two issues: (I) can you really get away with just 3? (II) is \bar{o} really \bar{a} , from which it came?

(I) The appearance of $\bar{a}/$ in a few loan words like $k\bar{a}t\bar{a}b$ /ktāb/, and in a few anomalous native forms like $\dot{h}\bar{a}r\bar{a}\check{s}$ 'artificer', which has pl. cstr. $\dot{h}\bar{a}r\bar{a}\check{s}\bar{e}$ /harraš+ay/ rather than $*\dot{h}ar\check{s}\bar{e}$, shows merely that there is an \bar{a} marginally present in the lexicon, and indeed that it is not integrated into the mainstream of the language.

A little more problematic is the appearance of \bar{e} in a certain few words: $\check{c}\bar{e}d$ 'witness', $\bar{r}\bar{e}a\check{c}$ 'companion', $\check{h}\bar{e}q$ 'bosom, lap', $?e\bar{d}$ 'final disaster', perhaps some others. This \bar{e} is non-deletable, non-shortenable; hence long. It stands out, because the other irreducible \bar{e} 's of the language occur as a reflex of -ay-, which de-diphthongizes when it does not bear main-stress. The forms of $\dot{b}\bar{a}y\bar{i}t$ 'house' tell the story:

$\dot{b}\bar{a}y\bar{i}t$ 'house' $\dot{b}\bar{e}t-\bar{i}$ 'my house'

$habb\bar{a}y\bar{t}\bar{a}$ 'to the house' $\dot{b}\bar{e}t\ hamme\bar{e}lek$ 'the king's house'

Parallel facts obtain with underlying -aw-: compare $\dot{m}\bar{a}w\bar{e}t$ 'death', $\dot{m}\bar{o}t-\bar{i}$ 'my death'. A diphthongal sequence does not undergo the rule if it is followed by a glide or a vowel, as in $\dot{h}ayy\bar{i}m$ 'life', $\dot{h}aww\bar{a}$ 'tent-camp', $\dot{h}\bar{a}y\bar{a}$ 'to live'. The

rule thus takes the form:

$$\begin{array}{ccccc}
 (5) \text{ Coalescence} & \text{SC.} & \begin{bmatrix} +\text{back} \\ -\text{hi} \end{bmatrix} & \begin{bmatrix} -\text{cns} \\ +\text{hi} \\ \alpha\text{back} \end{bmatrix} & \begin{bmatrix} +\text{cns} \end{bmatrix} \\
 & & 1 & 2 & 3 \\
 & \text{SD.} & 1 \ 2 & \rightarrow & \begin{bmatrix} \alpha\text{back} \\ -\text{lo} \\ +\text{long} \end{bmatrix}
 \end{array}$$

Condition: 1 is not S_{max} , i.e. is dominated at some level by W in metrical structure.

The effects of rule (5) are regularly felt in words like $\text{?ēma} / \text{?aym+at} /$ 'fear', clearly related to ?āyōm 'afraid', where the diphthong is always coalesced, and in derivationally prefixed forms beginning with y or w, as hōlīd 'he begat' $/\text{ha+wīlīd}/$ hētīb 'he did good to' $/\text{ha+ytīb}/$.

Apparently, rule (5) overshoots the mark in certain cases, disregarding the stipulation that the affected vowel not bear main-stress. So we find šōr 'ox' taking segholate-type broken plural sawārim , clearly pointing to an underlying form $/\text{šawr}/$. Noting that the word hēl 'outer bulwark' is clearly related to the noun hayil 'power', we can hypothesize that the cases of $/\bar{e}/$ under stress are due to the same over-application, or relaxation, of rule (5) that produces šōr from $/\text{šawr}/$.

(II) About 1500 B.C., in the land of Canaan, speakers commenced to say \bar{o} where their fathers and grandfathers, mothers and grandmothers had said simply \bar{a} . To eastward the wandering Aramaeans paid no heed (hence kəṭāb).

Did this new mode of phonation force a change in the underlying vowel system, from the maximally simple and unmarked / ī ā ū/ to the marked /ī ō ū/? The answer to the question depends essentially on theoretical assumptions about lexical complexity: if simplicity of the segmental paradigm is granted ascendancy, held to be a goal worth a little phonological complexity, then it can be argued: there's nothing to stop you but the marginal cost of an early rule ā→ō; on the other hand, if it's assumed that divergences between the underlying and superficial segment repertory must be justified in language-specific terms, there exists very little in Hebrew sound structure that argues for maintaining the archaic analysis.

There is one alternation that is mediated by the historical "Canaanite Shift". Among verbs I-? there is a small class which do not form the imperfect in a perfectly straightforward fashion. From ʔāmár 'to say', we'd expect something like yaʔamōr /ya+amor/ 'he will say'; what we find is yōmār. The a-stem vowel, though marked and unpredictable, is found elsewhere; what's surprising is the coalescence of the prefix vowel and the stem-initial /ʔ/ to form ō. Evidently this coalescence took place before the Canaanite Shift, producing the natural outcome ā, which fell together with all the other ā's of the language, and like them was rounded and raised when the time came. In synchronic terms however there

This narrowly circumscribed a- \bar{o} alternation does not provide the grounds for symmetrizing the vowel system by taking / \bar{o} / to be deeply / \bar{a} /.

2.2 Short Vowels

It is the short vowels that take part in the major vocalic alternations of the language, and which therefore provide the most interesting problem for analysis. The vowel /a/ behaves in a straightforward fashion, lengthening and shortening in accord with the principles of Chapter 1. But the non-low vowels alternate between high and non-high variants in a way that wants a little scrutiny.

The underlying three-way distinction gives rise to a surface series of five distinct vowels (disregarding schwa): [i e a o u]. Due to the effects of the rules of lengthening, reduction, and deletion, these vowels appear mostly in the environment -- C C, i. e., in closed syllables. The principal exceptions to the generalization are the reflexes of schwa in a guttural environment (ḥalōm 'dream', never **ḥəlōm) and at word-end in segholates (mélek), the hateph.vowels (yeḥēzaq), the o's that fail to reduce (qodāšīm). These 'exceptions' fall under rules of their own.

The distribution of the round vowel's alternants is quite clear, and has been frequently noted in the literature: u appears before geminate consonants, o elsewhere. Consider, for example, the fate of the passive marker - u:

<u>Conjugation</u>	<u>Root</u>	<u>Active</u>	<u>Passive</u>
Doubled ('intensive')	gdl	giddēl 'he grew s.t.'	guddāl 'he was grown'
H- ('causative')	gdl	higdīl 'he made st. big'	hoḡdāl 'he was made great'
	ngd	higgīd 'he told'	huggād 'he was told'

There's a few exceptions, like *sulḥān* 'table', but they have apparently no systematic import.

The distribution of *i-e* is not so transparent, but it is in the main lawful. As *u* is, so is *i* necessary before geminates: *qissī* 'my end' ?imm-ī 'my mother, ḥāsibbōtēm 'you m.p. make s.t. go around', ?ikkātēb 'I will be written'. The high front vowel appears elsewhere as well: initially in closed syllables (of course, unstressed) as in *siḡrī* 'my book', *yiktōb* 'he will write', *dibrēhēm* 'their m. words'; medially, in the underlying environment -- C+C as *yālidtēn* 'you f.p. gave birth' /yālid+ten/, *ḡābirt-ī* 'my mistress' /ḡbir+t+ī/. Observe that the surface env. --C+C is not appropriate, for as typified by *šōmerkā* /šōmer+e+ka/ 'your ms guardian', the non-high *e* is found there. Gutturals -- low sonorants / ? h ḡ / -- discourage the high vowel: *i* never shows in the env. -- G C, only *e* as *yehēzaq* 'he will be strong' (the *ē* being a hateph, introduced by rule (43), ch. 1.); further, in the env. G--C C, the non-high variant usually shows: *ḡezr-ī* 'my help', *?ektōb* 'I will write', with just a couple of exceptions: *ḡīmḡ-ī* 'my valley', *ḡizq-ī* 'my strong one'. Observe that the selection of high variants before geminates triumphs over the guttural restriction: *?ikkātēb* 'I will be

written', $\text{f}^{\text{inn}}\text{əb}^{\text{e}}$ 'grapes of' (irreg. construct plural of $\text{f}^{\text{en}}\text{əb}$ 'grapes').

We may summarize the discussion in four statements of distribution:

- (7) a. i,u in the env. -- $C_i C_i$
 b. i in the env. # C_1 -- $C_2 C$, where C_2 is never
 C_1 almost never guttural
 c. i in the env. --C + C (underlying)
 d. e,o elsewhere

These distributional properties do not enforce a choice of underlying system, but they do rather suggest one. Since it is the high variants that occur in natural, positively characterizable environments, it is a small matter to raise the non-high /e o/ in just these positions. Actually, there's a technical way to duck this argument: instead of writing e.g.:

- (8) $o \rightarrow u / \text{-- } C_i C_i$

one could write

- (9) a. $u \rightarrow u / \text{-- } C_i C_i$
 b. o / elsewhere

In fact, rule (9ab) can be compactly expressed in SPE-type notation as

$$(10) \begin{bmatrix} +\text{high} \\ +\text{rnd} \end{bmatrix} \text{ --- } [(+\text{high})_a] \text{ -- } (C_i C_i)_b^X \text{ ##}$$

Condition: $a \equiv b$

Rule (10), by feature counting, is no more complex than rule (8), which only makes reference to the natural environment 'before a geminate'. Rule (10) manages to sneak in the complementary notion 'everywhere except before a geminate' as the environment for the non-vacuous part of the rule.

A priori, the device of vacuity and disjunction used in rule (10) is undesirable because it allows a tremendous range of descriptive license; a posteriori, it simply does not accord with the wealth of phonological practice to identify in complexity the notions 'natural environment' and 'complement of natural environment'. The notion of complement may have its uses (vide Kiparsky 1973, Halle, Prince, Vergnaud 1975), but the sheer infrequency with which an environmental complement is significant (outside, perhaps. of stress rules) argues that the complement notion, if admitted, involves a complexity not present in a simple positive statement. Although a principled resolution of the issue is well worth seeking, ad hoc prohibition of sub-rules that are always vacuous improves the theory, eliminating (10) from the canon of possible rules.

Assuming, therefore, that the facts of distribution do imply a direction of derivation from /e o/ to /i u/, it does

not follow that /e o/ are underlying, only that the short vowels must be non-high at the stage of derivation when the rules of distribution apply. At the latest, this is just prior to schwa-deletion, which collapses the pronominal ending structure +V+C ... with the inflectional ending structure +C..., thus obscuring the relevant distinction between, for example, +ten (y^lalid^ltén) and +e+ka (gaddel^lkā). To probe the earlier stages of derivation, working back toward the lexicon, we must examine the character and effects of the centrally important rules that lengthen vowels.

It is the effect of TL, when it applies to vowels underlyingly short, to output non-high vowels /ē ā ō/. The following table registers the typical facts:

	<u>Products of TL</u>	<u>Gloss</u>	<u>Short Occurrence</u>	<u>Reduced Occurrence</u>
ē	ʔem ^l	mother	ʔimm-i ^l 'my ...'	--
	kābed ^l	he's heavy	-	kābdū ^l 'they're ...'
	giddel ^l	he raised (grew)	giddelkā ^l '... you ms'	giddolū ^l 'they ...'
	seper ^l	book	sipr-i ^l 'my...'	səpārīm ^l 'books'
	yebk ^l	let him weep	yibke ^l 'he will...'	--
ō	hoq ^l	statute	huqqīm ^l 'statutes'	--
	ʔāyom ^l	afraid	ʔayummīm ^l 'pl.'	--
	qodeš ^l	holiness	qodš-i ^l 'my...'	qodāšīm ^l 'pl.'
	sōb ^l	go around (inf.)	subb-i ^l 'for me to...'	---
	yiktōb ^l	he will write	yiktob-kā ^l '...you m.s.'	yiktobū ^l 'they m. ...'

These data suggest that at the time of TL the short vowels are /e a o/. If not -- if the non-low vowels are /i u/ -- a special lowering clause must be written into TL.

The rule PTL outputs the same class of segments as TL:

<u>PTL Product</u>	<u>Gloss</u>	<u>Short Occ.</u>	<u>Gloss</u>	<u>Red. Occ.</u>	<u>Gloss</u>
sem ^ˈ to _t	names	sim ^ˈ ka	your ms. ...	š ^ˈ mo _t	names of
le ^ˈ ba _b	heart	--		la ^ˈ ba _{bo} t	hearts
ye ^ˈ da _i	he will know	---		ye ^ˈ da _i le ^ˈ ha	he'll know her

As noted above (1.5), the vowel u-o never occurs in the environment of pretonic lengthening, because (1) it doesn't occur in stems C-CCVC, and (2) even when it occurs in the env. CVC-C, the final consonant is doubled by O-Closure, thereby ousting the round vowel from the --C ^ˈV configuration demanded by PTL.

Here again the non-high output militates for a non-high input, /e o/ rather than /i u/. If we hold on to /i u/, we are stuck for an account of why both PTL and TL accomplish a lowering: to write lowering into each rule is to claim a merely accidental resemblance. And this is an accident which is all the more striking because the surface distributional facts imply that short vowels are basically non-high, *high* only in special circumstances. The generalization that seems to be emerging is this: for purposes of phonology, short vowels -- lengthened or not -- behave as if they were non-high.

There is in the grammar of Hebrew yet a third rule of lengthening. The gutturals -- /ʔ h ḥ ʕ r / -- may not stand geminated at the surface. Whenever the grammar produces a doubled guttural, there is simplification; and if the geminate is not word final, there is lengthening (compensatory one might say) of the preceding vowel. Such clusters arise (1) when gemination of the 2nd radical is used as a derivational device: in the conjugations Piʕʕēl, Puʕʕal, Hitpaʕʕēl; in the nomina opificum, as gannāb 'thief' from ganāb 'to steal'; in the adjectives of defect, as gibbēn 'hump-backed'; (2) when n assimilates to a following consonant: as in the verbs I-n like nāpāl, impf. yippōl /ya+npol/; with the preposition min- 'with' (optionally), as mibbāyit 'from a house' /min#bayt/; in the imperfect Niʕʕal, e.g. yikkātēb 'it will be written' from /ya+n+kāteb/, where the n- is the marker of the conjugation; (3) in roots where the second and third consonants are identical, as rbb, which is connected with a verb rāb 'to be numerous' (3 pl. rābbū), and adjective rab (pl. rabbīm), and nouns rəbābā 'myriad', rāb 'captain, chief (great one)' (pl. rabbīm); (4) after certain grammatical particles, most prominently the definite article ha-, as habbāyit 'the house' and the conjugation wa- in the convert-d jussive construction wayyiktōb 'and he wrote'. (Geminates also arise through morpheme concatenation, as in kārattī 'I cut' /karat+ti/, but since no suffixes begin with gutturals, this

configuration never produces relevant material.) In all these categories there are cases where the consonant geminated is guttural. The results are tabulated below:

<u>Category</u>	<u>Root</u>	<u>Expected Form</u>	<u>Form</u>	<u>Gloss</u>
Pi ^{CC-} l ^l	m?n	*mi??ēn	mē?ēn	he refused
	brk	*birrāk	bērāk	he blessed
	b ^{CC} r	*bi ^{CC} r	bi ^{CC} r	he burned
Pu ^{CC} l ^l	brk	*burrāk	bōrāk	he was blessed
Hit ^{CC-} pa ^{CC-} l ^l	brk	*hit ^{CC-} barrēk	hit ^{CC-} bārēk	he called himself happy
Nom. Op.	prš	*parrāš	pārāš	horseman
Adj. Def.	hrš	*hirrēš	hērēš	deaf
Verb I-n	nht	*yinhāt *yihhāt	yēhāt	he marched down
Ni ^{CC-} p ^{CC-} l ^l	?mn	*yi??āmēn	yē?āmēn	he will be trustworthy
	nhm	*ninham *nihham	nihām	he was sorry (/na+nham/)
Min + ...	ʿbd	*mi ^{CC} ʿēbed	mēʿēbed	from a servant
Gem. Root	r ^{CC} l ^l	*rā ^{CC} l ^l	rā ^{CC} l ^l	evil, or 'he is evil'
		*ra ^{CC} l ^l im	rā ^{CC} l ^l im	evil ones
		*rā ^{CC-} l ^l u	rā ^{CC-} l ^l u	they are evil
		*ra ^{CC-} l ^l otēm	rā ^{CC-} l ^l otēm	you m.p. are evil
Gram. Part.		*wa??ektōb	wā?ektōb	and I wrote (/wa#?a+ktob/)
Gram. Part		*ha ^{CC} l ^l ir	hāl ^{CC} ir	the city (/ha#l ^{CC} ir/)

These data testify to the existence of a rule like this:

(11) Guttural Lengthening S.C. V $\begin{bmatrix} + & \text{C.P.} \\ +\text{son} \end{bmatrix}$ $\begin{bmatrix} + & \text{C.I.} \\ +\text{son} \end{bmatrix}$

1 2 3

Condition: 2=3

S.D. a. 1 → [+long], b. 2 → ∅

The rule must be ordered after Degemination (rule 1.51). The doubled guttural of $\text{ra}^{\text{C}}\text{f}$ 'evil' / $\text{ra}^{\text{C}}\text{f}$ / does not induce lengthening: indeed, like any other two consonant sequence word-final guttural geminates thus does not proceed by Guttural Lengthening; and application of WFD to a form like / $\text{ra}^{\text{C}}\text{f}$ / destroys the crucial geminate context in which lengthening occurs. It is advantageous to order Guttural Lengthening before Hateph-Formation, because H.F. in its most general form ($\bar{\text{V}} \text{ G C} \rightarrow \text{V G V C}$) would disrupt the environment for Guttural Lengthening. A form like $\text{**ra}^{\text{C}}\text{f}^{\text{C}}\text{im}$ is totally impossible; this is expressible without complication of the rules by ordering the loss of geminate gutturals before H.F. (Observe that, if the opposite order is permitted, and HF allowed to apply to geminate guttural forms, the S.D. of Guttural Lengthening must be complicated to $\text{V G}_i (\text{V}) \text{G}_i$, where the first three terms are mapped onto $\bar{\text{V}}$; the optionality of the 3rd term is required because in a form like $\text{ra}^{\text{C}}\text{f}^{\text{C}}\bar{\text{u}}$, H.F. would never apply to the stressed vowel: yet the output is $\text{ra}^{\text{C}}\text{f}^{\text{C}}\bar{\text{u}}$.)

Most pertinent to the present inquiry is the character of the rule's output: the non-high vowels /ē ā ō/. This means that there are three widely separated and formally dissimilar rules in the grammar which accomplish the same mapping of short vowels onto non-high long vowels. Taken with the distributional evidence, the behaviour of the three rules, PTL, TL, and GL virtually demonstrates that the short vowels of the language are /e a o/ at the quite early point of derivation when PTL applies. The question then arises, whether there is any motivation for an early lowering rule: whether in fact the underlying system is not simply /e a o/.

Before we turn to tighten the garrotte of ratiocination around the neck of this question, let us look a little harder at the phenomenon and the rule of Guttural Lengthening.

In the doubled conjugations (pi^{cc}ēl, Pu^{cc}al, Hitpa^{cc}el), there is a considerable amount of exceptionality to the lengthening provision of GL. In the table, the verb bi^cēr 'burn' was presented as a characteristic example. The rule seems to be (cf. Lambdin 1971, p. 195) that r always causes lengthening but that with the others /ʔ h ḥ ʕ/ there is a free choice which is made consistently for each verb. Thus mēʔēr undergoes the rule in all persons, numbers, tenses; niʔēs 'spurn' undergoes the rule in none of them. (Exception to generalization: root nhl, which gives rise to nēhēl 'he

guided' in the perfect, but $yānahēl$ / $ya+nahel$ / 'he will guide' in the imperfect, for expected $*yānahēl$; part. $mānahēl$ / $ma+nahhel$ /, $*mānahēl$.) Patterns of exceptionality give evidence about the organization of the lexicon; this one supports the view, put forward by Aronoff (1976) among others, that exception features adhere to the morpheme -- in this case to the stem morpheme of the doubled conjugations.

Regarding exceptionality as an intrinsic property of morphemes -- formally allowing simple exception features $[-R_i]$ to be attached lexically to morphemes rather than segments or polymorphemic words-- predicts that any exceptionality not so definable is of greater complexity, therefore less likely to be found, more likely to be regularized, and so on. Contextual exceptionality -- such as that of a word in the construct state, a syntactic environment; or of a word in certain case; or of a morpheme when it abuts another morpheme -- is relegated to the mechanism of minor rules, which is appropriately unwieldy and feature-consuming. Following the proposal of chapter 1, if a word W is exceptional to a phonological rule R in a (morphological or syntactic) context C , let us stipulate that this is expressed by a minor rule of feature assignment of the form (12).

$$(12) \quad [+D] \rightarrow [-R] / --C$$

where [+D] is an ad hoc diacritic mark entered with W in the lexicon. Any exceptionality displayed by a polymorphemic complex thus eats up a considerable number of features in being expressed.

It is not surprising, then, that when the context for Guttural Lengthening is supplied by combination of morphemes, the rule is uniformly regular. In the Nip̄āal imperfect, which has the structure Prefix-n-Stem, the rule always applies when assimilation of the conjugation marker n to a stem-initial guttural creates the context: as in the given example yē?āmēn, from /ya+n+?āmen/. With the preposition min- 'from', when the optional assimilation of the final n produces a geminate guttural, the word takes the form mē always, as in mēhabbāyit 'from the house' /min#ha#bayt/. Without assimilation, you get min-habbāyit, of course, since the rule is simply not invoked. The conjunction wa- always shows up as wā before the 1 pers. sing. jussive, the only form which begins with a guttural: wā?ektōb /wa#?a+ktob/, where the prefix ?a- signifies ego.

The situation with the definite article ha- is a little more complicated, but still revealing. Since ha- causes gemination of the word-initial consonant that follows it (and all words begin with a consonant), the form hā is expected to occur uniformly before words beginning gutturally. This is not the case. Lambdin summarizes the article's alternations as follows (1971, p. 8):

- a. Before ʔ and r the article is hā-
- | | | | |
|----------------|----------|------------------|------------|
| <u>ʔ</u> īš | a man | hā <u>ʔ</u> īš | the man |
| rā <u>ʕ</u> āb | a famine | hārā <u>ʕ</u> āb | the famine |
- b. Before ʕ the article is normally hā-, but if the ʕ is followed by an unaccented ā, the article is he-
- | | | | |
|---------------|--------|------------------|------------|
| <u>ʕ</u> īr | a city | hā <u>ʕ</u> īr | the city |
| <u>ʕ</u> ārīm | cities | he <u>ʕ</u> ārīm | the cities |
| <u>ʕ</u> āpār | dust | he <u>ʕ</u> āpār | the dust |
- c. Before h and ḥ the article is normally ha- [short a].
But if h is followed by an unaccented ā, or if ḥ is followed by an accented or unaccented ā, the article is he-
- | | | | |
|----------------|------------|---------------------------|---------------|
| hē <u>k</u> āl | a palace | ha <u>h</u> ē <u>k</u> āl | the palace |
| hē <u>r</u> eb | a sword | ha <u>h</u> ē <u>r</u> eb | the sword |
| hā <u>k</u> ām | a wise man | he <u>ḥ</u> ā <u>k</u> ām | the wise man |
| hārīm | mountains | he <u>ḥ</u> ārīm | the mountains |

The reference to the accented-unaccented distinction can be eliminated in favor of a special rule dealing with the accented (for the most part monosyllabic) cases. Monosyllables--even those which end in two consonants, like gān /gann/ 'garden', ʕām /ʕamm/ 'people' -- generally take on a long vowel when prefixed with the definite article, contrary to the usual restriction on TL: haggān, hāʕām. Correlate to this is the appearance of ā in the article where it's not expected, i.e., before h, which never induces lengthening of the article's

When the pronominal suffixes are added, this is what happens:

	Sing	Plural
1	?aḥáy, pause: ?eḥáy	?aḥénū
3 m.	?eḥāw [ʔahhāw]	?aḥēhém
f.	?aḥéhā	?aḥēhém

It is clear from the orthography that before stress only a short vowel appears; and when the stress does not immediately follow the ḥ, a reduced vowel, a schwa-reflex, is written, indicating that doubling has never taken place. Of interest to the present discussion is the 1 pers sing. pausal form ?eḥáy, and the 3 pers. m. sing. form ?eḥāw, in which the underlying /a/ has dissimilated in exactly the same environment that the process occurs in the definite article. The numeral ?eḥād 'one' appears as ?aḥād in the construct state, indicating that to the underlying form /ʔaḥad/ the rule (13) applies. In construct, the final /a/ is not lengthened, so no dissimilation occurs. The forms evidence a rule of this form:

(14) Guttural Dissimilation a → e / -- G_i G_i ā

There are certain problems in building rule (14) into the grammar, mainly due to the ambidextrous character of $\bar{\Gamma}$. Concentraint on other gutturals /ʔ r h ḥ/, it is efficacious to order Guttural Dissimilation after Guttural Lengthening. Since GD applies to short vowels, it functions to pick up

the pieces--the unlengthened exceptions -- left behind by Guttural Lengthening. This ordering explains why there are no he- type articles before ʔ, r: because GL is totally successful before them, always outputting hā-, which is not susceptible to GD by virtue of its long vowel. This ordering accords as well with the data from the plural of ʔāh: since the morpheme is exceptional to GL, it provides material for dissimilation. The opposite situation, a non-exceptionality that would produce *ʔāḥáy from /ʔaḥhay/, along with a pausal form, ʔeḥáy, does not occur, as the ordering predicts.

But ʔ stands in the middle: whereas /h h/ associate shortness and dissimilation, /ʔ r/ length and non-dissimilation, before ʔ, ha- either lengthens or dissimilates, never surfacing with a short a. Compare these derivations under the GL-GD hypothesis:

	/ha#ʔadam/	/ha#ʔīr/	/ha#ʔārīm/	/ha#hakam/
Early Rules	haʔʔādam	hāʔīr	hāʔārīm	haḥhakam
Gutt. Length.	hāʔʔādam	hāʔīr	hāʔārīm	hāḥhakam
Gutt. Diss.	--	--	*--	heḥhakam
Other:	hāʔādam	hāʔīr	**hāʔārīm	heḥhakam

The correct form, of course, is heʔārīm 'the cities'. Various possible modifications come to mind, all deficient. Inverting the order of the rules (1) drops the explanation for non-dissimilation before /ʔ r/, necessitating an ad hoc complication of GD to exclude them, and (2) leaves one wondering why the form is not *heʔārīm, with the dissimilated vowel

lengthening. Keeping the order GL-GD requipes either a special restriction on GL to the effect that lengthening is blocked before $\bar{\text{f}}$ just in case the environment for dissimilation is met, an egregious pleonasm, or a complication of GD so that it takes \bar{a} to e but only before $\bar{\text{f}}$, and only when the following vowel is unstressed--i.e., when the $\bar{h}\bar{a}$ has not arisen from the special rule dealing with $\bar{h}\bar{a}\bar{h}\bar{a}\bar{r}$, $\bar{h}\bar{a}\bar{\text{f}}\bar{a}\bar{m}$.

Even without resolving the problem, however, we can perceive the salient features of the phenomeon. It seems likely that there were historically two principal stages of simplification: the first, affecting mainly $/\text{? r } \bar{\text{f}}/$, accomplished a compensatory lengthening; the second simply and thoroughly degeminated all remaining double geminates, without lengthening, leaving the vowel structure as it was. In between the two events dissimilation occurred at those places where failure of the first compensating simplification had left a short vowel in the appropriate environment. The morpheme-internal exceptionality so abundant in the doubled conjugations is a testament to the somewhat sporadic character of the first change. But all such testimony is absent from the morpheme-concatenatory environment of definite article-plus-noun. Here the effects of the change have been completely regularized, and the regularized alternations of the definite article have been cast in entirely phonological terms. Under the proposal advanced here, any contextual

exceptionality would have to be expressed in the format

$$(15) \quad ha \rightarrow [-R_i] / \text{--}W, \quad W - \text{a word.}$$

Rule (15) says that for the particular word W , its definite form $ha\#W$ fails to undergo the Rule R_i (which would be either GL or GD). Any word that displayed peculiarity would be associated with one such rule; a tremendous cost. This stands opposed to a theory which allows features like $[-\text{context } R_i]$ to indicate that a certain morpheme or segment does not condition R_i ; it also stands opposed to a theory which would list every definite form in the dictionary, allowing the form to bear a simple exception feature $[-R_i]$. The proposal at hand is essentially equivalent to putting only non-predictable material in the lexicon, and charging for it -- the classical idea that the lexicon is the repository of idiosyncrasy. What is interesting is that the idea has actual predictive power, and that the predictions are borne out in data of some complexity.

We have seen a variety of forms in which Guttural Lengthening fails to take place, but none in which by consequence a guttural appears on the surface geminated. There is, evidently, a rule that simplifies all doubled gutturals.

(13) Gutt. Simp. $G_i G_i \rightarrow G_i$

By the logic of parsimony used above in reference to GL, rule (k3) must precede Hateph-Formation. It follows, GL, cleaning up after it.

Rule (13) is the synchronic image of the second historical stage of loss. Under current assumptions about phonological structure, it obviates the necessity for rule (11b), the deletion of 1/2 of Guttural Lengthening which accomplishes degemination. Guttural Lengthening is therefore merely a lengthening, and not a combination of two correlative processes. This accords with the claim of Chapter I that phonological rules are limited to making but one 'change'.

However, there was, if the historical account given is correct, a period before Gutt. Simp. entered the language during which Guttural Lengthening was operative in its original form, as a rule of degemination-and-compensatory lengthening. In this period no bifurcation of function could be maintained, for those doubled gutturals that did not degeminate-and-lengthen apparently remained in the language in geminate form. To posit two separate single-change rules for this stage compels marking the survivor geminates exceptional to both rules, missing the point. (The point being that degemination occurred if and only if lengthening did.) This does not imply that we must loosen our control of the formalism, but rather that we should improve our grasp of phonological structure.

Under this laudable aegis, then, let us indulge in a little speculation.

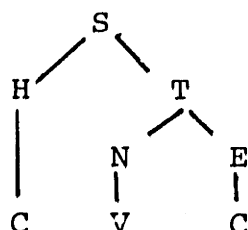
(A) Assume that any (tautosyllabic?) sequence

of two identical short vowels is, according to universal convention, analysable as a single long vowel. The rule GL can be reconceived as a rule of total assimilation:

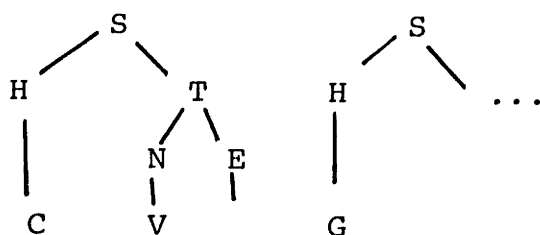
(14)	Gutt. Assimil.	S.D.	V	G	G	
			1	2	3	Cond. 2=3
		S.C.	2	→	1	

From an input $V_j G_i G_i$, the rule outputs $V_j V_j G_i$, and the convention allows $V_j V_j$ to be interpreted as \bar{V}_j , even though the language does not otherwise make use of 'moras' in the rules we have studied. The basic empirical claim of an approach like this is that rules of compensatory lengthening will be constrained by the notion 'possible assimilation'. In the case at hand, assimilation is not wildly unthinkable, since gutturals are, like vowels, sonorant and non-consonantal. Unexplained, perhaps, is why the rule should affect only geminate gutturals, and not just any guttural in the environment $V \text{ -- } C$.

(b) Assume that the syllable is a unit of phonological organization, and further that syllables are given a hierarchical structure along the often suggested lines:



(Syllable, Head, Tail, Nucleus, End). In this conception length is regarded not as an intrinsic property of segments, but as structural property given by the syllable tree: a long vowel holds down two slots, a short vowel but one. Suppose that the rule of Guttural Lengthening consists in deleting the first of a sequence of two identical gutturals, without altering the syllable structure. This leaves a structure like this:



What could such a configuration signify? A plausible interpretation is that E is to be associated with the material under its sister node N. The vowel V thus 'expands' to occupy both slots under T, making it long.

THis approach associates compensatory lengthening with thy class of natural deletions, perhaps also with re-syllabifications.

2.3 The Short Vowels Analyzed

To return to the theme of the investigation: we have assembled what amounts to proof that, for purposes of phonology, short vowels must be treated as non-high. Evidence has come from two conceptually distinct areas. We saw first that the distribution of high and non-high variants could be naturally expressed by taking the non-high vowels /e o/ as (relatively) basic and raising them in a certain few environments. Second, we reviewed the phonological lengthening rules of the language and found that they all output non-high vowels, a generalization that should not be scattered among the various rules as a (coincidentally) repeated stipulation.

Assuming a non-high input, then, let us formulate the rules of distribution implicit in (7) above. Raising occurs universally before geminates:

$$(17) \text{ Pre-Geminate Raising} \quad \begin{matrix} V \\ [-\text{low}] \\ [-\text{lng}] \end{matrix} \longrightarrow [+hi] \quad / \text{ -- } C_1 C_1$$

Rule (17) can be quite tightly ordered in the grammar. It must follow Guttural Lengthening, rule (11); otherwise Guttural Lengthening would output not bōrāk 'he was blessed', from /borrak/, but **būrāk. And it must precede Gutt. Simp., rule (16), because geminate gutturals, even though simplified on the surface, induce raising, as in words like bīēr /bīēr/ 'he burned'.

The high-vowel i is seen in the env. --C+C: cf. yəlidtēn / *y ledten; g birtī / *g birtī from gāberet / g bīrtt/. These contrast, as noted above, with forms in which the two-consonant cluster is created by pronominal suffixation: šōmerkā / šōmert+ka/. Since the pronominal suffixes are

attached with a linking vowel (Ch. 1.4), such clusters are brought about only through the process of Schwa-Deletion.

We therefore posit rule (18), ordered anywhere before Schwa-Deletion:

(18) Pre-Suffixal Raising $e \rightarrow i / \text{ -- } C + C$

Rule (18) is not quite as universal as rule (17); the word $\check{s}ak\bar{e}n$ / $\check{s}aken$ / 'neighbor, inhabitant', when derivationally feminized and subsequently affixed, shows $\check{s}ak\bar{e}nt\bar{a}h$ 'her woman neighbor', for expected $*s\bar{a}k\bar{e}nt\bar{a}h$, from / $\check{s}aken+t$ / plus / $a+ha$ /.

In closed initial syllables, / i / appears.

(19) Initial Raising $e \rightarrow i / \begin{matrix} \#C \text{ -- } C & C \\ [-gutt] & [-gutt] \end{matrix}$
(preliminary)

The feature $[-gutt]$ is, of course, an abbreviation for $\begin{Bmatrix} -lo \\ -son \end{Bmatrix}$. Restricting the rule in this way means that e.g. $tehdar$ 'she will favor', rather than $*tihdar$, will be output. As noted above, there are some exceptions when the first consonant is guttural: $\check{f}imq\bar{i}$ 'my valley', $\check{h}izq\bar{i}$ 'my strong one'. Exceptions when the second consonant is guttural are found in the imperfect inflection of the verbs $\bar{h}ay\bar{a}$ 'to be', $\bar{h}ay\bar{a}$ 'to live': $yihy\acute{e}$, $y\bar{a}hy\acute{e}$.

This pattern of exceptionality suggests that we purify Initial Raising of its restrictions, and introduce a rule to deal with the guttural phenomena.

(20) Guttural-E $i \rightarrow e / \# \begin{Bmatrix} \begin{Bmatrix} \uparrow lo \\ \uparrow son \end{Bmatrix}_a \\ -syl \end{Bmatrix} \text{ -- } \begin{Bmatrix} \begin{Bmatrix} \uparrow lo \\ \uparrow son \end{Bmatrix}_b \\ -syl \end{Bmatrix} [-syl]$

Condition: a or b

Rule (19) then appears as:

(21) Initial Raising $e \rightarrow i / \# C \text{ -- } C C$
(2nd Vers.)

Now, the rule Initial Raising (in either version) is virtually identical to Schwa-to-I, rule (41) of chapter 1, and indeed falls in the same place in the ordering, since both are fed by Schwa-Deletion.

We therefore combine the two rules:

$$(22) \text{ Initial Raising } \begin{bmatrix} +\text{syl} \\ -\text{rnd} \\ -\text{lo} \end{bmatrix} \rightarrow [\text{hi}] / \# [-\text{syl}] \text{ -- } [-\text{syl}] [-\text{syl}]$$

The obvious question raised by rule (22) is whether it can be identified with the rule responsible for raising the vowel in $\text{dib}\bar{\text{r}}\text{eh}\acute{\text{e}}\text{m} / \text{dabar} + \text{ay} + \text{hemm} /$, $\text{y}\bar{\text{i}}\text{:}\text{tob} / \text{ya} + \text{ktob} /$ and in cases of $\text{th}\bar{\text{a}}\text{ilk}$, the rule first identified as A-to-I (rule (20), chapter 1). Let us briefly defer this question until we've completed the analysis of short vowels.

Is there an early rule lowering short vowels? The evidence for such a rule comes from the shortening of any underlying long vowels which end up in the env. --CC due to processes of derivation or inflection. This is quite palpably visible in the Hollow verbs like $\text{q}\bar{\text{a}}\text{m}$, in which the morphologically lengthened $\bar{\text{a}}$ of the stem appears short whenever a consonant-initial affix is attached, e.g. $\text{qam}\acute{\text{t}}\text{em}$, $\text{qam}\bar{\text{t}}\text{l}$.

The question then becomes: what happens to the high long vowels $/\bar{\text{i}} \bar{\text{u}}/$ when they are shortened. Do they fall into the paradigm of the underlying short vowels, behaving as non-high with respect to the lengthening and distribution processes, or do they retain an identity of their own? The answer is, as foreshadowed in 1.2, that they merge completely with the short vowels. We reviewed some of the data of $/\bar{\text{u}}/$ in 1.2; here let us look at $/\bar{\text{i}}/$ data, of which there is an abundance in the $\text{Hi}\bar{\text{p}}\bar{\text{il}}$.

First, observe that when geminate roots $(\text{C}_1\text{C}_2\text{C}_2)$ are mapped onto a stem that is prefixed, they never adopt the otherwise universal shape

hišmīd 'destroy'

	<u>s</u>	<u>pl</u>
3m	hišmī <u>d</u>	hišmī <u>dū</u>
f	hišmī <u>dā</u>	
2m	hišma <u>d</u> tā	hišma <u>d</u> tem
f	hišma <u>d</u> t	hišma <u>d</u> ten
1	hišma <u>d</u> tī	hišma <u>d</u> nū

Everywhere but in the 3rd person, the inflection affix begins with a consonant, and the vowel appears short.

What of the quality change? A quite general process in the language, prominent especially in verbal inflection, produces /a/ in the env. --C+C. A similar alternation is found in Qal verbs like kābēd 'to be heavy', and in those conjugations (Piffēl, Hitpaffēl) which regularly have e-perfects.

	<u>kābēd</u>		<u>giddēl</u>	
	<u>s</u>	<u>pl</u>	<u>s</u>	<u>pl</u>
3m	kā <u>bēd</u>	kā <u>b</u> dū	gidd <u>ēl</u>	gidd <u>ē</u> lū
f	kā <u>b</u> dā		gidd <u>ē</u> lā	
2m	kā <u>b</u> a <u>d</u> tā	k <u>b</u> a <u>d</u> tem	gidd <u>a</u> ltā	gidd <u>a</u> ltem
f	kā <u>b</u> a <u>d</u> t	k <u>b</u> a <u>d</u> ten	gidd <u>a</u> lt	gidd <u>a</u> lten
1	kā <u>b</u> a <u>d</u> tī	kā <u>b</u> a <u>d</u> nū	gidd <u>a</u> ltī	gidd <u>a</u> lnū

These data call for a rule that looks like this:

(26) Philippi's Law $[-\text{rnd}] \rightarrow \text{e} \quad / \quad \text{--C+C}$

The morpheme boundary is necessary to keep the rule from applying in geminate roots, as in hēsēbbū, hasibbōtem.

The rule is not limited in domain to the inflected verb. Qal participles are formed from a stem /kōteb/, transparently visible in the unaffixed masculine singular kōtēb. To form the feminine singular, the affix /-t/ is attached, yielding kōtēbet /kōteb+t/. It can only be the intervention of Philippi's Law that produces the short stressed vowel; otherwise, we should expect *kōtēbet, like sēper, rather than kōtēbet, like mēlek.

This result is consistent with the ordering necessitated by the finite-verbal data. Philippi's Law must precede TL, because the /a/ it outputs remains short, as the low-vowel restriction on TL would predict.

The forms that we cited to motivate Pre-Suffixal raising, rule (18), are exceptional to Philippi's Law: yōlīdten should be yōladten. They are relics left over from original form of the rule (as it was actually proposed by Philippi in the 19th century), in which it applied only to stressed vowels. It was generalized in the verb to the form it has in (26), regularizing the paradigm. In the participle, too, it attained freedom from the exigencies of stress-placement: the participle yōlēdet 'giving birth', used nominally (agentively) can be suffixed, and comes out, e.g., yōladtō /yoled+t+a+hū/. The appearance of /a/ under suffixation confirms the proposal to invoke Philippi's Law in yōlēdet, showing that after the application of the rule, the feminine participle merges with the mēlek /malk/ class of segholates.

However, there are scraps of the old stress-dependency left in the language. Derivation of infinitives by affixation of /-t/, discussed in 1.8, sets up the context for Philippi's Law, and it does apply, netting us šēbet (rather than *šēbet) 'to dwell', where the imperative from the

same stem is šēb. Suffixed pronominally we find šibtām /seb+t+a+m/ 'for them m. to dwell', where Philippi's Law is passed by when stress is drawn away.

Again, the noun gāberet 'mistress' is derived from the noun gābir 'master' by affixation of /-t/. A form like /gbīr+t/ will undergo shortening, but without the intervention of Philippi's Law, the stem vowel would be lengthened to ē under stress by TL, to produce *gāberet. Suffixed, the high front vowel shows its colours: gābirtō 'his mistress', the stress falling on the ending.

Finally, if our discussion of the hybrid class of segholates (qēber - qibrām) in 1.3 is correct, then in these forms we are witnessing application of a rule very like the Philippi's Law we have seen in the t-infinitives and nouns, a rule that turns /e/ (or /i/) to /a/ under stress, before TL. This rule differs from TL in that it doesn't require a morpheme boundary to separate the consonants of the conditioning cluster; and, of course, in that it is minor, since forms must be marked to undergo it. But these are mere fine-print riders: the rule is the same as the ordinary rule of Philippi's Law in its effects, its environment (stressed, closed syllable), and in its ordering. Therefore, we enrich rule (26), the first statement of Philippi's Law, to comprehend this range of collateral phenomena.

$$(27) \text{ Philippi's Law} \\ \text{(Annotated)} \quad \left[\begin{array}{c} \text{-rnd} \\ (+D)_a \end{array} \right] \rightarrow [+low] \quad / \quad \left[\begin{array}{c} \text{--} \\ (+str)_b \end{array} \right]^C (+)_c^C \\ \text{Conditions (1) } a \succ -c$$

(2) In nouns and infinitives, b.

The diacritic [+D] is to be assigned to those nouns like qéber /qebr/ which undergo the rule.

There are certain words like yiggāš (root ngš) 'he will approach' (no perfect), which have an imperative in /a/: gaš 'approach! m.s.' Even these participate in the e-i vowel alternation in the infinitive gēšet--gīštī. If we assumed that the imperative stem vowel persists in the infinitive, we'd expect *gaštī. Now, the infinitive vowel of the regular kaṭōb -type is /o/ even when the imperfect/imperative axis uses /a/ (vide supra 1.8), showing that the infinitive stem-vowel cannot be simply associated with that of the imperf.-imperative. Similarly, we may stipulate that infinitives in /-t/ -- stem-shape CVC -- must always take /e/.

One might attempt to account for forms like gīštī by invoking the rule of A-to-I. However, if the i-a alternations occasioned by prefixation --as in ʿiddēl-yagaddēl --are to form a basis for explaining the vocalism of imperatives (gaddēl) and infinitives (gaddēl), as was proposed in 1.7, then the rule of prefix-stripping must crucially follow A-to-I, since the underlying prefixes block application of the rule. Now, gīštī is an infinitive, and therefore prefixed underlyingly, and that prefix removes the possibility of A-to-I just as it does in gaddēl /laʔgaddel/. So we settle on the first solution, stipulating /e/ for the 'short' infinitive, noting that this is supported by the fact of a parallel type of stipulation in the regular triliteral infinitives.

This necessary ordering A-to-I -- Prefix Stripping effectively isolates A-to-I from the similar process of Initial Raising. Prefix-Stripping must precede Cluster Break-Up, so that the initial cluster it

reveals (tik**ṭ**ob → ktob) can be schwa-inserted. But Initial Raising affects some of these inserted schwas (kit**ṭ**ī), and so must follow the insertion rule. If Initial Raising is generalized to affect /a/ as well, it will undo all the good work that Prefix Stripping accomplished, for the /a/ of gaddē**l**, yašmī**d** /y+ha+šmid/, and so on, will no longer be protected from the rule.

As was pointed out in 1.10 (when we re-named the rule A-to-~~E~~), there is yet another force that stands between the proposed rule A-to-I and its confrere Initial Raising, and that is TL. For the i-vowel of the imperfect-jussive prefixes can come to bear stress, and when it does, it often lengthens just like any other vowel. The process of truncating the last syllable to form jussives in verbs III-y (vocalic endings on the surface) exposes the prefix vowel to main-stress, so from yib**kē** 'he will weep', comes yē**k** 'let him weep'. The transmutation from underlying /ya/ must come before TL. And TL is right in the middle of the ordering, whereas as Initial Raising is at the bottom. (The reader is invited to re-access the chart in 1.10 so that these structural matters may be clearer.)

An alternative choice of /ye/ as a basic, with a rule turning it to /ya/ in the env. -- C V, loses the connection with the giddē**l**-yagaddē**l** and the dābār-dib**rē**hēm phenomena, and makes initial syllable vocalism even more conspiratorial than does the separation of A-to-I and Initial Raising.

The final statement of the rule A-to-I given at 1.10 was this:

(28) a → e / # C -- C [-stress]

It is unfortunate that the rule cannot be ordered on principled grounds

before Lowering. Lacking such a principle, it becomes coincidental that the rule outputs a non-high vowel, suitable for lengthening by TL. In terms of the present proposal, it could just as well output /i/, giving *yībk, which is clearly not possible. And, in fact, if we do ultimately opt for /i u/ as the short non-low vowel system, Lowering must precede PTL: but A-to-I has to follow AD, since its environment is crucially determined by the operation of the de-stressing rule. In such a grammar, there is no way that A-to-I could be placed before Lowering.

These considerations indicate that there is still thinking to be done about the system of rules that handles the short vowels. The principle that the lengthening rules must non-vacuously output /ē ā ō/ is almost, but not quite, captured by introducing the rule Lowering. The fact that rules of raising fail to intercede before the lengthenings must, in present system, be regarded as a providential accident; but the feel of the language is that this failure is a necessity, a defining feature of the lengthening system.

The rule A-to-I does not leave its mark when a guttural is the first root consonant: contrast ya^ḥamōd 'he will stand' with yiktōb 'he will write'. Is this due to a restriction written into the rule? There is actually a rule in the grammar that accomplishes a lowering in the env. --G C#. It is visible in Hīp^ḥīl, if you play your radicals right. Pick a geminate root where the last two consonants are guttural, like rīl 'pertaining to evil'; in Hīp^ḥīl it comes out hērā^ḥ /hetrīl^ḥ/ 'to do evil' (represented after Like-Consonant Metathesis). All other things equal, we'd expect *hērē^ḥā, but apparently the vowel, once shortened, is lowered: recall the similar process at work in Pīl^ḥīl.

producing e.g. šillāḥ for *šillēah. That it only applies to short vowels is evident from roots where only one guttural follows the ī-stem vowel, as in hišmīāī 'cause to hear: announce'. We therefore revise rule (32), chapter 1.5, to accord with the Hiṣṣīl data:

(29) Guttural Lowering $e \rightarrow a / \text{ --G(C) \#}$

This rule can easily be expanded to accomodate the yaḥamōd cases:

(30) Gutt. Low $e \rightarrow a / \text{ -- (+) }_a G (C X)_b (C) \#$

Condition: b>a

The condition is necessary because the rule doesn't operate inside morphemes, such as, for example, the Piḥīl stem. Found are bēreḥ or biḥēr, not bāreḥ or baḥēr (in the perfect). This rule can be fitted in between A-to-I and TL. It must precede TL so that the a-vowel of šillāḥ is kept short.)

What then of the forms where A-to-I has apparently applied to verbs I-guttural: those like yeḥezaq, tehdaṛ, which have e-prefix vocalism throughout the paradigm? The central fact about these verbs is that they always have a-imperfects. This suggests a dissimilation of the prefix vowel, over-riding the guttural preference for lowness expressed in rules like (30). And indeed we have seen just such a dissimilation in the definite article, given above as rule (14), Guttural Dissimilation. There is a distinction between the two cases, in that the definite article requires a long a in the next syllable to occasion the dissimilation, and the verbal prefix never even catches sight of a long a, but this a mere detail, a morphological dependency can easily be encoded, in the spirit of reckoning the obvious

generality of the process and maintaining the non-essential details in a subordinate position.

$$(31) \text{ Gutt. Dissim. } a \rightarrow e \text{ } / \text{--G } (\#)_a^C \left[\begin{array}{c} a \\ (+\text{lng})_b \end{array} \right]$$

Condition: $a > b$

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