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Table of Contents

VOLUME ONE

Introduction	vii
List of Contributors	ix
Transcription Tables	xiii
Articles A-F	I

VOLUME TWO

Transcription Tables	vii
Articles G-O	I

VOLUME THREE

Transcription Tables	vii
Articles P-Z	I

VOLUME FOUR

Transcription Tables	vii
Index	I

can only be determined by the context of its usage. The biblical verb עָיַן *ʿāyan* in *qal* means ‘to eye with hostility, hate’ (וַיַּעַן שָׂאוּל עֵינָיו) *wa-yhī šāʾul ʿōyēn ʿet-dāwīd* ‘So Saul eyed David’ [1 Sam. 18.9]), while in Rabbinic Hebrew the verb עִיַּן *iyyen* in *piʿel* means ‘to read carefully, peruse attentively’. The meanings of the two verbs are not motivated by the verbal pattern, and could in fact just as well have been reversed. A denominal verb may thus denote any action at all that is associated in any way with the noun from which it is derived.

Because of the unpredictable nature of the semantic connection between a denominal verb and its noun, the category called ‘privative’ (opposite meanings) that has been attributed to *piʿel* when contrasted with verbs from the same root in another *binyan* (see, for example, GKC §52h) is in fact non-existent. Usually fewer than ten examples of this kind are cited, not enough to establish a semantic category. Indeed, this semantic relation is merely a minor aspect of the denominals, and does not depend at all on the *binyan*, but derives directly from the semantic nature of this kind of verb. Take, for example, the verb pair הִשְׁרִישׁ *hišriš* ‘to strike root’ and שִׁרֵּשׁ *šereš* ‘to uproot’, about which it has been said that the *piʿel* form imposes the negative meaning (of ‘uprooting’ in this case) on the root. In fact, nothing makes this *binyan* more likely to possess a negative meaning than any other; this specific meaning is just one of many possibilities. Many different operations can be performed with and on a plant’s roots, including planting and uprooting, and it is only by pure chance that the negative meaning has become attached to the *piʿel* form.

The declarative meaning we saw above is also only one of the semantic aspects of denominalization. Thus in וְהִצְדִּיקוּ אֶת-הַצֹּדִיק וְהִרְשִׁיעוּ אֶת-הַרָּשָׁע *wa-hiṣḏīqū ʿet-ḥaš-šaddīq wa-hiršīʿu ʿet-ḥārāšāʾ* ‘they shall justify the just and condemn the wrong-doer’ (Deut. 25.1) the meaning is that the judges determine whether the accused is innocent or guilty, a meaning that does not depend on whether the denominal verb is in *piʿel* or in *hifʿil*.

The list of denominal verbs in pre-modern Hebrew that Kassovsky compiled from dictionaries and other sources (230 from Biblical Hebrew, 288 from Rabbinic Hebrew, and 248

from Medieval Hebrew) needs to be reexamined in light of the criteria discussed above.

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Denominal Verbs: Modern Hebrew

Denominal verbs are verbs which are derived from nouns or adjectives (henceforth: bases or base words), as in סבון *sabon* ‘soap’ > סיבן *siben*

‘to soap’, טלפון *telefon* ‘phone’ > טילפן *tilfen* ‘to phone’, and חם *xam* ‘hot’ > חימם *ximem* ‘to heat’. Regardless of whether the base word is native or borrowed, all denominal verbs fit into the *binyan* system (→ Binyanim).

1. THE BINYAN OF DENOMINAL VERBS

The *binyan* (verb template) of denominal verbs is usually *piʿel*, whose productivity has been attributed to the relative simplicity of its morpho-logical and morpho-phonological structure. As shown in Table 1, *piʿel* is the only Hebrew *binyan* which neither possesses a derivational prefix (morphological simplicity) nor exhibits a different prosodic structure in the past and future stems (Bat-El 1989; Schwarzwald 1996). All the other *binyanim* have an inflectional prefix and/or exhibit prosodic alternation in the paradigm, as in *qal*, whose past form stem is *CaCaC* while that of the future is *-CCaC* (e.g. גדל *gadal* ‘he grew’ versus יגדל *yigdal* ‘he will grow’).

Although *piʿel* is the most common *binyan* for denominal verbs, it is by no means the only one. In some cases *hifʿil* is used, for morpho-syntactic or phonological reasons (Bolzoky 1978, 1999; Laks 2009). In the case of שחור *šaxor* ‘black’ > הישחיר *hišxir* ‘to become black’, *hifʿil* is used due to its morpho-syntactic function in inchoative verbs, and in פליק *fliq* ‘slap’ > הפליק *hifliq* ‘to slap’, the *binyan*’s prosodic structure preserves the base intact, thus enhancing the phonological similarity between the verb and the base word from which it is derived. A similar case is the use of *qal* in the derivation חרפ *xrop* ‘nap’ > חרפ *xarap* ‘to take a nap’, although here it is the infinitive and future forms לחרופ *laxrop*, יחרופ *yaxrop* which preserve the phonological structure of the base noun. This is one of the few cases in which *qal* is used for a denominal verb.

2. THE DISTRIBUTION OF STEM CONSONANTS

Denominal verbs and their corresponding bases have one of several types of structural relations, with respect to the distribution of the stem consonants. The most common type is a one-to-one correspondence (Table 2a), where each consonant in the verb corresponds to one consonant in the base. In the two other types the verb stem has one consonant more than the base word. In the reduplication type (2b), two identical consonants in the verb correspond to one consonant in the base, while in the insertion type (Table 2c), a consonant in the verb (II-*y/v*) has no counterpart in the base.

The preferred structural type is only partially predictable. When the base consists of more than four consonants, there is always a one-to-one correspondence (e.g. טלגרף *télegraf* ‘telegraph’ > טלגרף *tilgref* ‘to telegraph’). When the base consists of three or four consonants, a one-to-one correspondence is very likely (e.g. תרגיל *targil* ‘exercise’ > תרגל *tirgel* ‘to exercise’, שפריץ *špriš* ‘squir’ > השפריץ *hišpriš* ‘to squirt’), but there are also cases of reduplication, often due to the tendency to preserve the consonant cluster of the base (see §3). For this reason, the verb derived from פקס *faqs* ‘facsimile’ is פקסט *fiqses* ‘to send a fax’ (reduplication) rather than **fiqes* (one-to-one correspondence), and the verb derived from פלירט *flirt* ‘flirt’ is פלירטת *flirtet* ‘to flirt’ rather than **filret*, **fliret*, or **flert*.

The derivation כדור *kadur* ‘ball’ > כידר *kidrer* (**kider*) ‘to dribble’, on the other hand, has been attributed to a semantic property of repetition, often associated with reduplication (Ussishkin 1999, 2000). However, the role of semantics in determining the type of denominal verb is sporadic, allowing *a posteriori*

Table 1. Structural simplicity of the *binyanim*

<i>Binyan</i>	Morphological (no prefix)	Morpho-phonological (no prosodic alternation)	Past	Future
<i>qal</i>	+	–	(CaCaC	yiCCaC)
<i>nifʿal</i>	–	–	(niCCaC	yiCaCeC)
<i>hifʿil</i>	–	+	(hiCCiC	yaCCiC)
<i>piʿel</i>	+	+	(CiCeC	yeCaCeC)
<i>hitpaʿel</i>	–	+	(hitCaCeC	yitCaCeC)

Table 2. Structural types of denominal verbs

a. One-to-one correspondence

Verb			Base		
<i>kimet</i>	כימת	‘to quantify’	<i>kamut</i>	כמות	‘quantity’
<i>kifter</i>	כפתר	‘to button’	<i>kaftor</i>	כפתור	‘button’
<i>ṭirped</i>	טרפד	‘to sabotage’	<i>ṭorpédo</i>	טורפדו	‘torpedo’
<i>ṭrnsfer</i>	טרנספר	‘to transfer’	<i>ṭransfer</i>	טרנספר	‘transfer’

b. Reduplication

Verb			Base		
i. One consonant—CV(C)C _i VC _i					
<i>ṣimem</i>	חימם	‘to heat’	<i>ṣam</i>	חם	‘hot’
<i>fiques</i>	פקסס	‘to send a fax’	<i>faq</i> s	פקס	‘facsimile’
ii. Two consonants—C _i VC _j C _i VC _j					
<i>qivqev</i>	קווקו	‘to draw a broken line’	<i>qav</i>	קו	‘line’
<i>difdef</i>	דפדף	‘to turn pages’	<i>daf</i>	דף	‘page’

c. Insertion

Verb			Base		
i. γ —CV γ VC					
<i>kiyes</i>	כייס	‘to pickpocket’	<i>kis</i>	כיס	‘pocket’
<i>tiyeg</i>	תייג	‘to label’	<i>tag</i>	תג	‘label’
<i>biyel</i>	בייל	‘to stamp’	<i>bul</i>	בול	‘stamp’
ii. ν —CV ν VC					
<i>ṣivet</i>	חיווט	‘to wire’	<i>ṣut</i>	חוט	‘wire’
<i>šiveq</i>	שיווק	‘to market’	<i>šuq</i>	שוק	‘market’

explanations in some cases, but not prediction (Bat-El 2006).

The greatest diversity is found with verbs derived from bases with two consonants. In such cases, either reduplication (2b) or insertion (2c) is possible. Insertion is more common when the vowel in the base word is high, but this is not always the case (e.g. שם *šem* ‘name’ > שייים *šiyem* ‘to name’). The inserted consonant is usually the glide *y* (2c-i), while the insertion of *ν* (2c-ii) is limited to certain verbs derived from bases with the vowel *u*.

Reduplication (2b) seems to be the most common strategy for deriving verbs from bi-consonantal bases. Whether one or two consonants are reduplicated has been attributed to semantic properties (Ussishkin 1999, 2000). Reduplication of two consonants (2b-ii) is found mostly in verbs denoting repetitive or

continuous action (e.g. דף *daf* ‘page’ > דפדף *difdef* ‘to turn pages’), while reduplication of one consonant (2b-i) is not associated with any particular meaning (i.e. it is the unmarked case).

3. THEORETICAL ANALYSIS

There are two competing analyses of denominal verbs, Root&Binyan and Stem Modification. According to both analyses segmental material from the base is mapped into a *binyan*, the latter consisting of a prosodic structure and a vocalic pattern. The two differ in that in Stem Modification the mapping is direct, while in the Root&Binyan analysis there is an intermediate stage that gives rise to the consonantal root.

According to the traditional Root&Binyan approach the derivation of denominal verbs

takes place in two stages: extraction and association (Ornan 1983; Bat-El 1986). In the first stage, the consonants are extracted from the base, yielding a consonantal root. In the second stage, the extracted root is associated with a *binyan*, where the consonants are associated with the prosodic elements (C-slots) in one-to-one left-to-right fashion (McCarthy 1981).

Table 3. Extraction and association:
One-to-one type (2a)

Base:	t e l e f o n	
	↓ ↓ ↓ ↓	Extraction
Root:	t l f n	
		Association ⇒ <i>tilfen</i>
Binyan:	Ci C Ce C	

The extracted consonants are not the primary root consonants of the base, as shown by derivations like מרכז *merkaz* ‘center’ > מרכז *mirkez* ‘to center’, where the initial *m* is a prefix in the base (cf. ריכוז *rikez* ‘to collect’), and קיצוני *qışoni* ‘extreme’ > הקצין *hiqšin* ‘to radicalize’, where the final *n* is part of the suffix *-on* of the base (cf. קצה *qaše* ‘edge’). Nor can borrowed nouns like *transfer* ‘transfer’ and *télefon* ‘phone’ be considered to possess a consonantal root at all. Extraction must therefore refer to phonological units, i.e. consonants. However, once the consonants are extracted they become a morphological unit, a consonantal root, traditionally referred to as secondary root.

Primary and secondary roots are semantically different even when phonologically identical, since a secondary root carries the specific meaning denoted by the base from which it is extracted. Consider the derivation עמוד *‘amud* ‘page’ > עימד *‘imed* ‘to paginate’. The consonantal root of עימד *‘imed*, extracted from עמוד *‘amud*, is phonologically identical to that of the verb עמד *‘amad* ‘to stand’, viz., *‘md*. Semantically, however, the root of עימד *‘imed* ‘to paginate’ bears a specific meaning related to עמוד *‘amud* ‘page’, not found in the root of עמד *‘amad* ‘to stand’. Moreover, it is impossible to define the meaning of *‘imed* ‘to paginate’ without reference to עמוד *‘amud* ‘page’, while the meaning of עמד *‘amad* ‘to stand’ does not have any direct relevance to עימד *‘imed* ‘to paginate’.

Within the Stem Modification approach (Bat-El 1994, 1992, 2003), the base noun is mapped directly into a *binyan*, which imposes its own prosodic structure and vocalic pattern. The *binyan* is represented in syllabic terms (McCarthy and Prince 1995), with independent specification of the vocalic pattern (McCarthy 1981). All the *binyanim* in Hebrew are disyllabic, either at the stem level (e.g. התרחץ *hitraxēs* ‘to shower’), the word level (e.g. הדביק *hidbiq* ‘to glue’), or both (e.g. דיבר *diber* ‘to talk’).

The input to the derivation is the segmental string (vowels and consonants) of a base noun or adjective. The disyllabic structure of the *binyan* is associated with the input in an edge-in fashion (Yip 1998), i.e. one syllable at the right edge of the base and another at the left. Thus, when the base consists of three syllables, its medial vowel remains unsyllabified and

Table 4. Stem Modification

Prosodic structure:	σ σ	
	↑ ↑	Syllabification (edge-in)
Base:	t e l e f o n	⇒ <i>tilfen</i>
	↓ ↓	Melodic overwriting
Vocalic pattern:	i e	

consequently does not survive in the derived verb. Once the prosodic structure is available, the vowels of the base word are overwritten by the vocalic pattern of the *binyan* (McCarthy and Prince 1990), and the denominal verb is then derived.

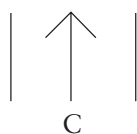
Support for Stem Modification comes from two phenomena, both involving the transfer of phonological information that cannot be carried by the extracted root.

The first is cluster transfer (Bolzky 1978, 1999, 2002; Bat-El 1986, 1989, 1994; Schwarzwald 2000, 2009), whereby adjacent consonants in the base remain adjacent in the derived verb (e.g. פקס *faks* 'facsimile' → פיקסס *fikses* 'to send a fax', פלירט *flirt* 'flirt' → פלירטט *flirtet* 'to flirt'). The root extraction process employed by the Root&Binyan analysis cannot preserve information regarding adjacency relations, and thus cannot account for cluster transfer.

In order to account for cluster transfer within the Root&Binyan approach, Bat-El (1989) and Bolzky (1999, 2002) postulate a level of representation above the root consonants, which allows holding more than one segment. This amounts to two levels of consonant slots, one for the root consonants and another for what Bolzky (2002) calls 'radicals'.

Table 5. Extraction of clusters

Radical slots: C C C



Root slots: C C C C



Base: t i l g r e f

However, from a theoretical perspective there is no motivation for an additional layer of consonant slots beyond this specific phenomenon in Hebrew. Note that the representation of words in a hierarchical structure is not unique to Hebrew but rather universal (Clements and Keyser 1983). A revision of the representation

would require support from more than one phenomenon in one language.

The second phenomenon supporting a Stem Modification analysis over Root&Binyan is vowel transfer (Bat-El 1994), which provides evidence for the effect of a base vowel in the selection of the form of the *binyan*. Specifically, denominal verbs derived from a monosyllabic base with the vowel *o* may select the marginal *po'el* form of *pi'el* (e.g. קוד *qod* 'code' > קודד *qoded* 'to codify', אות *'ot* 'sign' > אותת *'otet* 'to sign', חור *xor* 'hole' > חורר *xorer* 'to make holes'). That this is not obligatory is shown by cases of free variation such as קוד *qod* 'code' > קודד *qoded* ~ קידד *qided* 'to codify', but the crucial generalization is that *po'el* can be selected only when there is a vowel *o* in the base. As in cluster transfer, the information regarding the base vowel cannot be transferred by the extracted consonants, and thus only the Stem Modification analysis with its direct derivation can account for this phenomenon.

4. CONCLUSION

Every Hebrew verb belongs to a *binyan*, which indicates not only its phonological structure but also its inflectional paradigm (Aronoff 1994). That is, a verb cannot be inflected outside the *binyan* system. As a *binyan* implies a particular prosodic and segmental (vocalic) structure, a base must be structurally modified in its transformation into a verb. Two competing analyses of the derivation of denominal verbs were outlined above, with emphasis on the advantage of the direct derivation of Stem Modification.

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Denominative Nouns

In Biblical Hebrew many nouns are derived from verbal roots (deverbative), e.g., רָמָה *rāmā* 'high place', מָרוֹם *mārōm* 'height' from רוֹם *r-w-m* 'to be high'. But in some cases nouns originate from other nouns or adjectives, e.g., מַרְגְּלוֹת *margālōt* 'the place at the feet' from the noun רֶגֶל *regel* 'foot', עִוְרוֹן *iwwārōn* 'blindness' from the adjective עִוֵּר *iwwēr* 'blind'. Some verbs as well are derived from nouns, e.g., כָּהֵן *kihēn* 'to act as a priest' from כֹּהֵן *kōhēn* 'priest'. Such nominal and verbal derivatives are called denominative.

Early grammarians considered all nouns to be deverbals (GKC 1910:225), but the existence of denominatives and other types of nouns (primitive, etc.) indicate that a richer complexity existed within the Biblical Hebrew nominal system than was at first assumed (cf. Joüon and Muraoka 1991:237). The most common patterns in which denominative nouns occur are as follows (GKC 1910:239–241):

1. *Qōṭēl* (with the same nominal pattern as the Qal active participle) denoting a professional occupied with the object of the base noun, e.g., בֹּקֵר *bōqēr* 'herder' from בָּקָר *bāqār* 'cattle', חֹבֵל *hōbēl* 'sailor' from חֶבֶל *hebel* 'rope' (Kedar-Kopfstein 1977:162).
2. *Qaṭṭāl*, nouns indicating professions (*nomina opificum*), e.g., קַשְׁטָן *qaššāt* 'an archer' from קֶשֶׁת *qešet* 'bow'.
3. Nouns with a prefixed מ- *m-* indicating the location or neighborhood of a thing (*nomina loci*), e.g., מַעְיָן *ma'yañ* 'spring, a place of springs' from עַיִן *ayin* 'fountain', מִרְאֲשׁוֹת *mərə'ašōt* 'at the head of' from ראש *rōš* 'head'.
4. Nouns ending with ל- *-ān* or ון- *-ōn* expressing abstract, diminutive, or adjectival ideas, e.g., עִוְרוֹן *iwwārōn* 'blindness' from עִוֵּר *iwwēr* 'blind', אִישׁוֹן *išōn* 'little man' (in the eye) or אֵישׁ אֵישׁ 'man', נַחֲשָׁתָן *nəḥšān* 'brazen (serpent)' from נַחֲשֶׁת *nəḥšet* 'brass', etc.
5. Nouns terminating with וֹת- *-ūt* or ית- *-it* making concrete forms abstract, e.g., מַלְכוּת *mal kūt* 'kingdom' from מֶלֶךְ *melek* 'king', אֶלְמָנוּת *almānūt* 'widowhood' from אֶלְמָנָה *almānā* 'widow', רִאשִׁית *rēšīt* 'what comes first' from ראש *rōš* 'head'.

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