ROOTS IN MODERN HEBREW[*]

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1 Introduction

The present study attempts to describe the formal structure of roots in Modern Hebrew syncronically after a brief survey of the word-formation of Modern Hebrew including morphological units such as stem, base, root, radical, and radical component as well as types of word-formation. Roots will be analyzed as composed of three slots of radicals, each of which can include up to three radical components; this is a minor modification of the analyses proposed by Rosén (1977) and Goldenberg (1994). And an inventory of the radical components – different from the traditionally accepted one – will be proposed on the basis of their synchronic morphophonological behavior. Types of secondary roots, vis-à-vis primary roots, will be classified with several examples.

It must be emphasized that the term "root" is employed throughout this study as a synchronic unit as is presented by Cantineau (1950: 121) and Goldenberg (1994: 21). Goshen-Gottstein (1964), in spite of its title, is actually concerned exclusively with the morphological structure of Biblical Hebrew, and maintains that "all root-morphemes consist of consonants only" (105), whereas Goldenberg (1994), while proposing a rigorous framework of Semitic word-structure, warns that "the repeatedly mentioned characterization of Semitic roots as being purely consonantal is not to be taken simplistically" (31); he also emphasizes that "the syllabic and non-syllabic actualizations of u/w and i/y are, in the main, positional variants, so that the discussions about whether "weak" roots had u or w, i or y, are really pointless" (30). Schwarzwald (1977), on the contrary, proposes to treat these "weak" roots as biconsonantal. Concerning the status of the alternations of b/v, k/x and p/f manifested, e.g., in the word-formation and inflection of verbs, she concludes that they are remnants of the

phonological rule manifested in certain morphophonemic alternations, while Ornan (1990b: 105) argues that these pairs constitute single phonemes. Rosén (1977: 121) discusses the number of radical components occupying the slot of each radical. Types of secondary roots are discussed by Bar-Lev (1978a: 16), Werner (1982a), Werner (1982b), and Werner (1983: 46-48). Yannai (1973/74) is a detailed diachronic study of "multiradical roots".

All the Hebrew forms excluding citations are rendered in phonological transcription as shown below, followed by glosses in single quotes. Roots are indicated morphophonemically and are as such explained in detail in Chapter 3.

m	voiced bilabial nasal			
n	voiced alveolar nasal			
b	voiced bilabial plosive	**p**	voiceless bilabial plosive
d	voiced alveolar plosive	**t**	voiceless alveolar plosive
g	voiced velar plosive	**k**	voiceless velar plosive
		'	voiceless glottal plosive
		c	voiceless alveolar affricate
ǧ	voiced postalveolar affricate	**č**	voiceless postalveolar affricate
v	voiced labiodental fricative	**f**	voiceless labiodental fricative
z	voiced alveolar fricative	**s**	voiceless alveolar fricative
ž	voiced postalveolar fricative	**š**	voiceless postalveolar fricative
r	voiced velar fricative	**x**	voiceless velar fricative
		h	voiceless glottal fricative
l	voiced alveolar lateral			
j	voiced palatal approximant			
i	unrounded close front vowel			
e	unrounded mid front vowel			
a	unrounded open central vowel			
o	rounded mid back vowel			
u	rounded close back vowel			

´ is placed over a vowel when stressed in non-ultimate syllables. There are five diphthongs **ia**, **ea**, **aa**, **oa**, and **ua** as in *gavia*, *mafteax*, *šamaa*, *zroa*, and *ruax* respectively, and they constitute single syllables. The second **a** never bears a stress, so ´ is not placed over the first vowel of any of these diphthongs when they bear a stress in ultimate syllables.

2 Overview of Word-formation

In the present study morphology is conceived as an autonomous level of linguistic description dealing with the internal structure of words independently from phonology, syntax, and lexicon. Of the two major divisions of morphology, inflection is concerned with the relation between different grammatical forms of the same lexemes, while word-formation is concerned with the relation between different lexemes related to each other formally.

Terms such as stem, base, root, and radical are often used confusingly by various scholars of different linguistic schools in the morphological description and analysis of diverse languages of the world. It is often the case that the same term is employed to refer to different morphological units, while the same morphological unit is designated by different terms. This is also the case with Semitic languages in general and Hebrew in particular, which maintain their own tradition of terminology. In order to avoid terminological confusion, it will therefore be necessary to define these terms upon which all the subsequent discussions in the present study are based.

The word "word" – one of the most fundamental units in the study of morphology cross-linguistically – is ambiguous in that it is used in three different ways, each bearing a different significance: word-form (also referred to as "orthographic word" for writing and "phonological word" for speech), lexeme, and grammatical word. Consider, e.g., the first two sentences of the Declaration of Independence of the State of Israel:

> *Be'érec jisra'el kam ha'am hajehudi, ba 'ucba dmuta haruxanit, hadatit vehamedinit, ba xaj xajej komemijut mamlaxtit, ba jacar nixsej tarbut le'umijim uxlal-'enošijim vehoriš la'olam kulo 'et séfer hasfarim hanicxi. Le'axar šehugla ha'am me'arco bexoax hazroa, šamar la 'emunim bexol 'arcot pzurav, velo xadal mitfila umitikva lašuv le'arco ulexadeš betoxa 'et xeruto hamedinit.*

Word-forms are the units bounded orthographically by space; thus the above sentences contain 52 word-forms. Word-forms like *be'érec, me'arco* and *le'arco* can be divided into *be-* and *'érec, me-* and *'arco,* and *le-* and *'arco* respectively, and *'érec* and *'arco* can be grouped together into the abstract lexical unit underlying them. This unit is called lexeme, and each one of the inflectional forms which are realizations of a lexeme is called grammatical word. In other words, lexemes (e.g., *'érec* in the above example) are realized as grammatical words (e.g., *'érec, 'arco,* and *'arcot*), which in turn realize word-forms independently or combined with other grammatical words (e.g., *be'érec, me'arco,* and *le'arco*). Lexemes in Hebrew are conventionally represented by singular forms in absolute states with no personal suffixes for nouns, by masculine, singular forms for adjectives, and by third person, masculine, singular, past forms

for verbs as citation forms. In what follows, "word" is retained for grammatical word vis-à-vis word-form and lexeme. In this regard one can say that word-formation is actually lexeme-formation.

A stem is an input which undergoes an inflectional process leading to a word. It is not necessarily equal to a lexeme. The lexeme *kélev* 'dog', for example, can appear in the following stems according to the inflectional suffixes attached to them: *kélev*, *kalb-* (as in *kalbo* 'his dog' or *kalbejhem* 'their children', etc.), and *klav-* (as in *klavim* 'dogs', *klavav* 'his dogs', etc.). Other examples of stems are *kalbon* and *klavlav* from the lexemes *kalbon* 'puppy' and *klavlav* 'puppy' respectively.

A base is an input which undergoes a word-formational process leading to a stem. In the above examples, only *kélev* is a base, while the other forms including *kalbon* and *klavlav* are not. Those bases which can and cannot be analyzed further into discontinuous morphemes will be designated here as non-primitive and primitive bases respectively. A non-primitive base is composed of two discontinuous morphemes, a root and a pattern.

A root is a sequence of three discontinuous radicals,[1] and a pattern is a type of template with its own characteristic vowels and with or without a preformative and a postformative. The slot of the first, second, and third radicals can be filled with up to two, three, and one element respectively, and these elements are designated here as radical components. Since the formal aspect of roots, radicals, and radical components will be discussed in detail in the next chapter, only one example will be cited here which will illustrate to what these morphological units refer. The verb *tilgref* 'to telegraph' for example is composed of the root *t-lgr-f*[2] while the pattern $\square i \square e \square$; *t*, *lgr*, and *f* comprise the first, second, and third radicals respectively. In this example the slot of the second radical is occupied by three radical components, i.e., *l*, *g*, and *r*, with five radical components in total.

While there are scholars who interpret roots with four or five radical components as consisting of four and five radicals, viz., they do not analyze radicals into smaller units or what I call here "radical components". The above-mentioned verb *tilgref*, for example, will be analyzed into the root *t-l-g-r-f* with five radicals and the pattern $\square i \square \square \square e \square$ (in distinction from $\square i \square e \square$) in this approach. The issue of the internal structure of roots will also be dealt with in detail in the next chapter, arguing against this approach.

What characterizes Hebrew word-formation is a clear division in the internal composition between nouns and adjectives on the one hand and verbs on the other. One of the major

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[1] Rosén (1966: 262), Rosén (1977: 120-121) and Allon (1995: 17-18) use the term "radical" referring to what is called "secondary root".

[2] Roots are rendered here with hyphens separating radicals.

differences between the two is that a verbal base is always a stem, viz., there is no morphological process which modifies a verbal base and forms a new stem; however, this is not always the case with nominal and adjectival bases. A base, if nominal or adjectival, is a cyclical unit, viz., a form formed from a base through some word-formational strategy can in turn become a new base as an input to another word-formational process, and can also be a stem at the same time.

For the formal classification of types of word-formation, the following four criteria are postulated: 1) whether the base is a form resulting from the type of word-formation in question [+] or not [−]; 2) the number of bases involved in the type of word-formation in question; 3) whether the type of word-formation in question is linear [+] or nonlinear [−]; 4) whether inflectional affixes are placed inside a stem boundary [+] or not [−].

The first criterion distinguishes root-pattern formation from the remaining types, which presuppose the existence of a base or bases as an input to word-formation. Of the remaining six word-formation types, conversion is distinguished from the others by the third criterion in that it does not affect outer shapes of existing bases and only converts their parts of speech, hence the criterion of linearity is irrelevant. The division between reduplication and affixation on the one hand, and blending, compounding, and acronyming on the other lies in the number of bases involved, i.e., one vs. more than one; this being the second criterion. The first two of these five types are distinguished from each other by the third criterion in terms of linearity of the morphological process involved, viz., reduplication is a non-linear process modifying a single base, while the morphological process involved in affixation is linear. The fourth criterion, which concerns the degree of internal cohesiveness between the two bases involved, distinguishes compounding from blending and acronyming, which in turn are distinguished from each other by the third criterion, i.e., whether the coalescence of the two (or more) bases involved is linear or non-linear respectively. Clipping and abbreviation – two other types of word-formation involving shortening of a base – are not included here since the former is mainly restricted to personal names, is very limited in number in other parts of speech, and therefore occupies a very marginal position in the word-formation of Modern Hebrew. The latter, abbreviation, affects only the graphical shape of existing bases and therefore is not word-formational in the strict sense of the word.

Those forms which are formed through the above-listed seven types of word-formation, i.e., root-pattern formation, reduplication, affixation, blending, compounding, acronyming, and conversion, will be designated simplex, complex$_1$, complex$_2$, blend, compound, acronym, and conversion respectively.

3 Internal Structure of Roots

Although it is unanimously accepted that one of the hallmarks which formally characterize the verb formation of Semitic languages including Modern Hebrew is that root-pattern formation is its sole strategy, the very concept of root is neither understood nor used in the same way by all the researchers. As Goldenberg (1980: 285)[3] and Goldenberg (1994: 30)[4] point out, the distinction between the root as a historicaletymological unit and the root as a synchronic unit is sometimes blurred, even in studies of Modern Hebrew which are purported to be synchronic. Furthermore, in many cases only roots are rendered etymologically even when other forms are transcribed phonologically on a synchronic basis. Being that in word-formation the distinction between diachrony and synchrony is not always clearcut, this does not justify, even for convenience sake, the separate treatment of roots on the one hand and other morphological units on the other in a synchronic investigation of the word-formation of Semitic languages including Modern Hebrew. This separate treatment blurs the distinction between diachrony and synchrony. In the present study, dealing with aspects of the verb formation of Modern Hebrew synchronically, the term "root" is taken strictly synchronically as a skeleton of consonants shared by all the bases formed from it – excluding preformative and postformative consonants – in accordance with Cantineau (1950: 120-121)[5] but not in the sense of Brockelmann (286-287).[6]

Roots are divided into primary and secondary roots. The former are those roots which do not

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[3] ‏"מושג ה"'שורש" הובן בדרך כלל גם כצורן היסוד הלקסיקלי, ופעמים רבות בלי לחוש בהבדל שבין שורש אטימולוגי לשורש‏
‏מורפולוגי."‏

[4] ""Root" in the morphological sense, as it has mostly (though not universally) been used in reference to Semitic languages, should better not be confused with "etymon", but be conceived as the primary lexical representative in a paradigm."

[5] "La racine dans les langues sémitiques est, si l'on veut, une abstraction, mais c'est une abstraction d'un type courant dans le système de la langue: le phonème, le préfixe, le suffixe, et, comme on le verra plus loin, le schème, sont aussi des abstraction. D'une façon plus précise, il s'agit d'éléments implicites dégagés par *analyse associative*, pour reprendre un terme de F. de Saussure (*Cours de linguistique générale*, pp. 179-186). Dans le cas de la racine, on reconnaît dans chacun des groupes de mots un *élément formel commun* et un *élément sémantique commun à tous les mots du groupe* [...]. [...] Il ne faudrait pas croire que la notion de racine ait en sémitique un caractère historique, que ce soit un élément plus ancien et originel d'où les mots auraient été successivement dérivés. Bien au contraire la racine est une notion *actuelle*, qui dans presque chaque langue sémitique fait partie du système linguistique envisagé au point de vue synchronique."

[6] "Mit dem der hebr. Originalgrammatik entlehnten t. t. "Wurzel" bezeichnet man die drei Konsonanten, an denen der gemeinsame Grundbegriff einer Wortgruppe haftet. Aber diese Wurzel ist nur eine Abstraktion, die allerdings für die systematische Anordnung des Wortschatzes im Lexikon treffliche Dienste leistet, so gut wie die traditionelle Reihenfolge der Lautzeichen im Alphabet. Aber wie diese Reihenfolge für die wissenschaftliche Lautlehre nicht nur unpraktisch, sondern gradezu ein Hemmschuh wäre, so ist auch der Begriff der Wurzel für die Formenlehre unbrauchbar. Diese hat vielmehr auszugehn von den Wortformen, die nachweislich eine eigene Existenz geführt haben oder noch führen. Die Analyse der nominalen und der verbalen Ausdrucksmittel führt uns schließlich auf gewisse einfache Grundformen, die wir nach dem Vorgang der Indogermanisten "Basen" nennen."

presuppose the existence of other roots or nonverbal stems, while the latter are those roots derived either from primary roots through the reduplication of part of their radicals or from nonverbal stems through the extraction of a part or of all their consonants. Types of secondary roots will be treated in detail in the following chapter. This bipartite division is also followed in this study, but on a synchronic basis. It follows that there are roots which must be considered primary synchronically, though secondary etymologically; for example, the root *n-m-k* was formed from *nimuk* 'argument' etymologically, but synchronically speaking, *nimuk* is formed through the root-pattern formation of the root *n-m-k* and the verbal pattern $\square i \square u$ for all intents and purposes.

Canonical roots contain three consonants, each of which is called a radical. When dealing with quadriconsonantal and quinteconsonantal roots, two opposing approaches exist to interpret them. One approach is to consider that each of the four or five consonants constitutes a single radical with the slot of each one containing one consonant, thus the roots in question are quadriradical or quinteradical. Ariel (1973), Yannai (1973/74), Werner (1982b), Junger (1987), and Ravid (1990), for example, take this approach as can be assumed implicitly from their renderings of roots. The other approach is to admit only (up to) three radicals with up to three consonantal elements occupying the slot of each radical; Rosén (1977) and Goldenberg (1994), for example, take this approach. The second approach is adopted in this study for the following reason, and the consonantal elements occupying the slot of each radical will be referred to as radical components.

The main argument to opt for the second approach is the economy of description. Empirically, as the following examples will show, the total number of consonants a root can contain is between two and five. In addition to biconsonantal roots – with the slot of each radical filled with one radical component – tricosonantal, quadriconsonantal, and quinteconsonantal roots are classified. This classification will be employed later in this chapter, using the following four types in terms of the number of radical components the slot of each radical can contain in the second approach: 1-1-1 (compatible, or concurrent, with the verbal patterns Pa'al, Nif'al, Pi'el, Pu'al, Hitpa'el, Hif'il, and Huf'al), 1-2-1 (compatible with Pi'el, Pu'al, Hitpa'el, and Hif'il), 1-3-1 (compatible with Pi'el), and 2-2-1 (compatible with Pi'el). If the first approach is adopted, it is necessary to assume separate verbal patterns to the types of forms which correspond to 1-2-1 (in Pi'el, Pu'al, Hitpa'el, and Hif'il), 1-3-1 (in Pi'el), and 2-2-1 (in Pi'el), in spite of the fact that the types 1-2-1, 1-3-1, and 2-2-1 in Pi'el, for example, behave exactly in the same way as the type 1-1-1 in Pi'el in terms of inflection. It would, therefore, only complicate the description, paying a rather high price if a separate treatment was made of a disproportionally small number of quadriconsonantal and quinteconsonantal roots compared to

triconsonantal roots.

Those roots where only two consonants shared in the derived bases surface synchronically are treated here as biconsonantal roots with each of the two radicals comprising one radical component in spite of what Goldenberg (1994: 30-31) warns.[7] It would be necessary to have recourse to etymological information to postulate an additional radical for these biconsonantal roots. This approach is in accordance with the analysis by Schwarzwald (1977), among others.

For traditionally oriented researchers the inventory of radical components (or simply radicals if the first approach concerning radicals mentioned above is taken) in Modern Hebrew is equal to the letters of the alphabet, each of which corresponded to a separate phoneme in an earlier phase of the language. This is taken for granted rather uncritically even by those with a modern linguistic approach such as Junger (1987: 10)[8] and Ravid (1990: 290).[9] This approach, however, is hardly tenable in a synchronic study since some etymological knowledge is presupposed. To the best of my knowledge, Rosén (1977: 120-124) is the first to render roots in Modern Hebrew, whether primary or secondary (or what he calls "radicals"), on the basis of actually observable synchronic data, paying attention to morphophonological alternations and liberating himself from the shackles of the conventional historical orthography. Although the examples he gives are not many, they are sufficient enough to illustrate his principle. I adopt and develop his idea further by covering the whole lexicon of Modern Hebrew.

In the inventory of radical components in Modern Hebrew I include all the consonantal phonemes[10] and the following archiphonemes showing morphophonological alternations: P = p~f (as in *pagaš* 'he met' vs. *jifgoš* 'he will meet'), B = b~v (as in *biker* 'he visited' vs. *jevaker* 'he will visit'), K = k~x (as in *katav* 'he wrote' vs. *jixtov* 'he will write'), N = n~Ø (as in *natan* 'he gave' vs. *jiten* 'he will give'), V = v~Ø (as in *met* 'he died' vs. *mávet* 'death'), J = j~Ø (as in *jašav* 'to sit, dwell' vs. *tošav* 'inhabitant'), and A = '~a (as in *šam'a* 'she heard' vs. *šamaa* 'he heard').
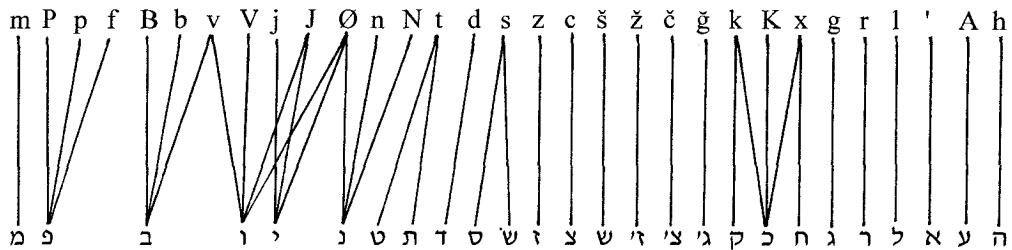
The following is a comparison chart between the inventory proposed in this study and the conventional one using the letters of the alphabet:

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[7] "[I]t should well be remembered that the syllabic and non-syllabic actualizations of *u/w* and *i/y* are, in the main, positional variants, so that the discussions about whether "weak" roots had *u* or *w*, *i* or *y*, are really pointless, and the repeatedly mentioned characterization of Semitic roots as being purely consonantal is not to be taken simplistically."

[8] "The transcription of roots follow the Hebrew spelling found in the sources."

[9] "Hebrew forms are in broad phonemic transcription, with consonantal roots indicated by means of the historical elements attested in conventional orthography."

[10] Cf. Chapter 1.

m P p f B b v V j J Ø n N t d s z c š ž č ğ k K x g r l ' A h

מ פ ב ו י נ ט ת ד ס שׁ ז צ שׂ ז׳ צ׳ ג׳ ק כ ח ג ר ל א ע ה

The following are examples of roots containing those radical components which correspond to multiple ones or are not recognized in the traditional inventory; verbs, nouns, and adjectives derived directly from these roots through root-pattern formation are added. To show the contrast between the inventory proposed here and the traditional one, the corresponding radical components in the latter were added.

P (= p~f)[11]

פ

'-s-P [א-ס-ף]: 'asaf, ne'esaf, hit'asef; 'isuf, 'asif, 'asif, 'ósef, 'asefa, 'asupa, 'asfan, he'asfut, hit'asfut | z-k-P [ז-ק-ף]: zakaf, nizkaf, hizdakef, hizkif; hizdakfut, hazkafa, zikuf, zkif, zikpa; zakuf, zakif | '-l-P [ע-ל-ף]: 'ilef, 'ulaf, hit'alef; hit'alfut, 'ulpe, 'ilafon | k-l-P [ק-ל-ף]: kalaf, niklaf, kilef, kulaf, hitkalef; hitkalfut, maklef, malkefa, kiluf, klifa, klipa; kaluf, kalif

p

פ

'-p-k [א-פ-ק]: hit'apek; 'ipuk, hit'apkut | g-p-f [ג-פ-ף]: gipef, hitgapef; gipef, hitgapfut | x-p-s [ח-פ-ש]: xipus, xupas; xipus | x-p-s [ח-פ-ש]: xipus, xupas, hitxapes; hitxapsut, taxpóset | t-p-l [ט-פ-ל]: tipel, tupal; tipul | t-p-s [ט-פ-ס]: tipes; tipus | m-p-J [מ-פ-י]: mipa, mupa; mipuj | c-p-n [צ-פ-ן]: hicpin; hacpana, macpen ‖ d-pr-s [ד-פר-ס]: dipres | h-pn-t [ה-פנ-ט]: hipnet, hupnat | š-pr-c [ש-פר-ץ]: hišpric; hašpraca ‖ '-šp-r [א-שפ-ר]: 'išper; 'ašpara | m-sp-r [מ-ספ-ר]: misper, muspar; mispur | '-rp-l [ע-רפ-ל]: 'irpel, 'urpal, hit'arpel; hit'arpelut, 'irpul | k-mp-l [ק-מפ-ל]: kimpel, kumpal, hitkampel | š-xp-l [ש-כפ-ל]: šixpel, šuxpal, hištaxpel; šixpul ‖ x-r-p [ח-ר-פ]: xarap

f

פ

f-br-k [פ-בר-ק]: fibrek, fubrak; fibruk | fl-rt-t [פל-רט-ט]: flirtet; flirtut | f-nt-z [פ-נט-ז]: fintez; fintuz | f-ks-s [פ-קס-ס]: fikses | f-rg-n [פ-רג-ן]: firgen; firgun | f-r-z [פ-ר-ז]: hifriz, hufraz; hafraza | f-rm-t [פ-רמ-ט]: firmet; firmut ‖ '-f-J [א-פ-י]: 'afa, ne'efa; 'afija, ma'afe,

[11] Examles of **P** in the first and second radicals are so numerous that they are not listed here.

ma'afija | '-f-r [ר-פ-א]: he'efir; 'afor, ha'afara; 'afor || '-fj-n [ן-פי-א]: 'ifjen, 'ufjan, hit'afjen; 'ifjun | '-fš-r [ר-פש-א]: 'ifšer, 'ufšar, hit'afšer | d-fd-f [ף-פד-ד]: difdef; difduf, dafdaf, dafdefan, dafdéfet | t-ft-f [ף-פת-ט]: tiftef, tuftaf; tiftuf | K-ft-r [ר-פת-כ]: kifter, kuftar, hitkafter; kiftur | s-fr-r [ר-פר-ס]: sifrer, sufrar; sifrur | c-fc-f [ף-פצ-צ]: cifcef; cifcuf | š-fš-f [ף-פש-ש]: šifšef, šufšaf, hištafšef; hištafšefut, šifšuf, šafšéfet | t-f'-l [ל-פע-ת]: tif'el, tuf'al; tif'ul | t-fk-d [ד-פק-ת]: tifked; tifkud || b-lf-f [ף-לפ-ב]: bilfef || '-gr-f [ף-גר-א] 'igref, hit'agref; 'igruf, hit'agrefut | '-x-f [ף-כ-א]: 'axaf, ne'exaf; 'axifa; 'axif | b-l-f [ף-ל-ב]: bilef; biluf, balfan | g-l-f [ף-ל-ג]: gilef, gulaf, giluf, gluf, galaf, taglif | g-p-f [ף-פ-ג]: gipef, hitgapef; gipuf, hitgapfut | g-r-f [ף-ר-ג]: garaf, nigraf, geref, goraf; geruf, grif, grófet, higarfut, magrefa; garuf | d-x-f [ף-ח-ד]: daxaf, nidxaf; dxifa, dáxaf, hidaxafut, madxef | d-l-f [ף-ל-ד]: dalaf, nidlaf, hidlif; dlifa, délef, hadlafa | h-d-f [ף-ד-ה]: hadaf, nehedaf; hadifa, hédef; haduf | z-j-f [ף-י-ז]: zijef, zujaf, zijuf, zajfan | x-t-f [ף-ט-ח]: xataf, nextaf, hextif; xatif, xatifa, xataf, xatfan, mextaf; xatuf | x-n-f [ף-נ-ח]: hitxanef, hexnif; haxnafa, hitxanfut, xanufa, xanfan | x-P-f [ף-פ-ח]: xafaf; xafifa | x-r-f [ף-ר-ח]: xaraf | x-s-f [ף-ש-ח] xasaf, nexsaf; hexasfut, xisuf, xasifa, xasifut, xésef, xasfan, maxsof; xosfani, xasuf | t-lgr-f [ף-לגר-ט] tilgref | t-r-f [ף-ר-ט]: taraf, nitraf, hitarfuf, trifa, téref, torfani, taruf | J-s-f [ף-ס-י]: (jasaf), nosaf, jisef, jusaf, hitosef, hitvasef, hosif, husaf; hosafa, hivasfut, hitosfut, jisuf, tosaf, toséfet | k-j-f [ף-י-כ]: kijef; kijuf | K-s-f [ף-ס-כ]: hixsif, huxsaf; haxsafa; kasuf | K-š-f [ף-ש-כ]: kišef, kušaf; kišuf, kéšef; kašuf | l-t-f [ף-ט-ל]: lataf, litef, lutaf, hitlatef; hitlatfut, lituf, letifa, lotfani, latfani | m-k-f [ף-ק-מ]: mikef; mikuf | k-f [ף-ק-נ]: hikif, hukaf; hekef, hakafa, makof | n-š-f [ף-ש-נ]: našaf, hitnašef; hitnašfut, nišuf, nešifa, našfan | '-j-f [ף-י-ע]: 'ijef, 'ujaf, hit'ajef; hit'ajefut; 'ajef | '-k-f [ף-ק-ע]: 'akaf, ne'ekaf; ma'akaf, 'ikuf, 'akifa; 'okfani, 'akif | c-r-f [ף-ר-צ]: ceref, coraf, hictaref; hictarfut, micraf, ceruf, céref, tacref | r-d-f [ף-ד-ר]: radaf, nirdaf; mirdaf, redifa; raduf | š-'-f [ף-א-ש]: ša'af, niš'af; še'ifa, maš'ef | s-r-f [ף-ר-ש]: saraf, nisraf; hisarfut, misrafa, srefa; saruf | š-t-f [ף-ת-ש]: šitef, šutaf, hištatef; hištatfut, šituf, šutaf | t-k-f [ף-ק-ת]: takaf, nitkaf, hitkif, hutkaf; hetkef, hatkafa, hitakfut, mitkafa, tokfan, tkifa; takuf

B (= b~v)[2]

ב

B-t-n [ן-ט-ב]: biten; mevutan | B-lg-n [ן-לג-ב]: bilgen, bulgan, hitbalgen | B-n'-m [ם-נא-ב]: bin'em || x-r-B [ב-ר-ח]: xarav, nexrav, hexriv, huxrav; haxrava, hexarvut, xurba, xorba, xurban; xarev | c-h-B: [ב-ה-צ]: cahav, hichiv; hachava, hictahavut,

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[2] Examles of **B** in the first and second radicals are so numerous that they are not listed here.

chivut; cahov (chuba) | <u>k-c-B</u> [קצ-ב]: kacav, nikcav, hikciv, hukcav; hakcava, kicba, kcuba, kicuv, takciv | <u>r-t-B</u> [רט-ב]: nirtav, hitratev, hirtiv, hurtav; hartava, heratvut, hitratvut, retivut; ratov (retuba), ratov | <u>š-l-B</u> [של-ב]: šilev, šulav, hištalev; hištalvut, mišlav (mišlabim), šiluv, šliva, tišlóvet; šaluv

b

ב

<u>b-h-m</u> [בה-ם]: hitbahem; hitbahamut | <u>b-l-f</u> [בל-ף]: bilef (jebalef), biluf, balfan | <u>b-lf-f</u> [בלפ-ף]: bilfef (jebalfef) || <u>'-b-n</u> [א-ב-ן]: 'iben, hit'aben; 'ibun, hit'abnut | <u>'-b-k</u> [א-ב-ק]: 'ibek, 'ubak, hit'abek; 'ibuk, hit'abkut | <u>g-b-J</u> [ג-ב-י]: giba, guba; gibuj | <u>g-b-s</u> [ג-ב-ס]: gibes, gubas; gibus | <u>d-b-v</u> [ד-ב-ב]: dibev; dibuv | <u>b-A</u> [נ-ב-ע]: hibia, hubaa; habaa, mabaa | <u>s-b-n</u> [ס-ב-ן]: siben, suban, histaben; histabnut, sibun | <u>s-b-r</u> [ס-ב-ר]: hisbir, husbar; hesber, hasbara || <u>s-bs-d</u> [ס-בס-ד]: sibsed, subsad; sibsud | <u>f-br-k</u> [פ-בר-ק]: fibrek, fubrak; fibruk || <u>B-zb-z</u> [ב-זב-ז]: bizbez, buzbaz, hitbazbez; bizbuz, bazbezan, hitbazbezut | <u>B-lb-l</u> [ב-לב-ל]: bilbel, bulbal, hitbalbel; bilbul, hitbalbelut | <u>x-šb-n</u> [ח-שב-ן]: xišben, xušban, hitxašben; hitxašbenut | <u>'-cb-n</u> [ע-צב-ן]: 'icben, 'ucban, hit'acben | <u>t-gb-r</u> [ת-גב-ר]: tigber, tugbar; tigbur | <u>t-rb-t</u> [ת-רב-ת]: tirbet, turbat; tirbut

v

ב

<u>v-x-n</u> [ב-ח-ן]: hivxin, huvxan; hevxen, havxana | <u>v-t-x</u> [ב-ט-ח]: hivtiax, huvtax; havtaxa | <u>v-l-g</u> [ב-ל-ג]: hivlig; havlaga || <u>x-v-r</u> [ח-ב-ר]: hitxaver; hitxavrut | <u>J-v-l</u> [י-ב-ל]: hovil, huval; hovala, tovala; javil | <u>'-v-d</u> [ע-ב-ד]: 'avad, he'evid, ho'ovad; ha'avada, 'avoda, 'éved | <u>'-v-r</u> [ע-ב-ר]: 'avar, ne'evar; 'avera, 'avarjan || <u>'-vz-r</u> [א-בז-ר]: 'ivzer; 'ivzur | <u>'-vx-n</u> [א-בח-ן]: 'ivxen, 'uvxan, 'ivxun, 'avxana | <u>'-vt-x</u> [א-בט-ח]: 'ivteax, 'uvtax; 'avtaxa | <u>d-vr-r</u> [ד-בר-ר]: divrer; divrur | <u>h-vh-v</u> [ה-בה-ב]: hivhev; hivhuv | <u>'-vr-t</u> [ע-בר-ת]: 'ivret, 'uvrat, hit'avret; 'ivrut | <u>c-vr-x</u> [צ-בר-ח]: civreax, hictavreax; mecuvrax || <u>g-B-v</u> [ג-ב-ב]: gibev, gubav, hitgabev; gvav, gvava, gibuv, hitgabevut, migbav | <u>g-n-v</u> [ג-נ-ב]: ganav, nignav, hitganev, higniv, hugnav; ganav, gonva, gneva, ginuv, hagnava, hitganvut; ganuv | <u>g-r-v</u> [ג-ר-ב]: garav | <u>d-b-v</u> [ד-ב-ב]: dibev; dibuv | <u>z-h-v</u> [ז-ה-ב]: hizhiv, huzhav; hazhava; zahov | <u>x-t-v</u> [ח-ט-ב]: xatav, nextav; xatav, xituv, xativa; xatuv | <u>x-c-v</u> [ח-צ-ב]: xacav, nexcav; xaciva, maxcav, maxcava; xacuv | <u>K-'-v</u> [כ-א-ב]: ka'av, hix'iv, hax'ava, ke'ev, max'ov; ka'uv, nix'av | <u>k-x-v</u> [כ-כ-ב]: kaxav (jekaxev); kixuv | <u>l-h-v</u> [ל-ה-ב]: nilhav, hitlahev, hilhiv, hulhav; halhava, hitlahavut | <u>n-g-v</u> [נ-ג-ב]: nigev, nugav, hitnagev; hithagvut, magev, magévet, niguv | <u>n-d-v</u> [נ-ד-ב]: nadav, nidev, nudav, hitnadev; hitnadvut, nedava, nadvan; nadiv | <u>s-x-v</u> [ס-ח-ב]: saxav, nisxav; hisaxavut, sáxav, saxvan, saxévet, sxiva | <u>s-r-v</u> [ס-ר-ב]: serev; sarvan, seruv | <u>'-z-v</u> [ע-ז-ב]: 'azav,

ne'ezav, he'eziv, ho'ozav; he'azvut, ma'azeva, 'izavon, 'aziva, 'azivut; 'azuv | '-c-v
[ע-צ-ב]: 'icev, 'ucav, hit'acev; hit'acvut, 'icuv | k-r-v [ק-ר-ב]: karav, kerev, korav,
hitkarev; hitkarvut, kirva, kiruv, krivut, tikróvet, takriv; karov | š-v [ש-ו-ב]: šav, hešiv,
hušav; hašava, mašov, švut, šiva | š-K-v [ש-כ-ב]: šaxav, niškav, hiškiv, huškav;
haškava, miškav, šxiva; šaxuv | š-xt-v [ש-כת-ב]: šixtev, šuxtav; šixtuv | t-xš-v [ת-חש-ב]:
tixšev; tixšuv | t-xt-v [ת-כת-ב]: tixtev; tixtuv | t-kc-v [ת-קצ-ב]: tikcev, tukcav; tikcuv

ו

v-k-x [ו-כ-ח]: hitvakeax; hitvakxut, vikuax, vakxan | v-r-d [ו-ר-ד]: hivrid; havrada;
varod || g-v-n [ג-ו-ן]: given, guvan, hitgaven; givun, migvan | g-v-A [ג-ב-ע]: gavaa; gvi'a
| h-v-J [ה-ו-י]: hiva, hithava; havaja, hithavut | h-v-n [ה-ו-ן]: hiven, huvan; hivun | z-v-g
[ז-ו-ג]: ziveg, zuvag, hizdaveg; hizdavgut, zivug | K-v-n [כ-ו-ן]: kiven (jexaven), kuvan,
hitkaven; hitkavnut, kavana | K-v-c [כ-ו-ץ]: kivec (jexavec), kuvac, hitkavec; hitkavcut,
kivuc | l-v-x [ל-ו-ח]: liveax; livuax | n-v-t [נ-ו-ט]: nivet, nuvat; nivut, navat | r-v-x
[ר-ו-ח]: hirviax, hurvax; révax | s-v-g [ס-ו-ג]: siveg, suvag; sivug | '-v-t [ע-ו-ת]: 'ivet,
'uvat, hit'avet, hit'avtut, 'ivut | k-v-J [ק-ו-י]: kiva; tikva | š-v-c [ש-ו-ץ]: hišvic | š-v-k
[ש-ו-ק]: šivek, šuvak; šivuk | t-v-x [ת-ו-ך]: tivex; tivux || '-vr-r [א-ור-ר]: 'ivrer, 'uvrar,
hit'avrer; 'ivrur, hit'avrerut | g-vn-n [ג-ון-ן]: givnen, hitgavnen; givnun, hitgavnenut |
K-vn-n [כ-ון-ן]: kivnen (jexavnen), kuvnan, hitkavnen | k-vk-v [ק-וק-ו]: kivkev,
kuvkav; kivkuv

V (= v~Ø)

ו

m-V-t [מ-ו-ת]: met, hemit, humat; hamata, mávet, mita, tmuta

j

י

j-B-v [י-ב-ב]: jibev; jevava, jabevan, jibuv | j-B-š [י-ב-ש]: javaš, jibeš, jubaš, hitjabeš;
hitjabšut, jibuš, jóveš; javeš | j-d-J [י-ד-י]: jida; jiduj | j-x-d [י-ח-ד]: jixed, juxad,
hitjaxed; jixud | j-xc-n [י-חצ-ן]: jixcen | j-m-n [י-מ-ן]: hejmin | j-s-r [י-ס-ר]: jiser, jusar,
hitjaser; hitjasurt, jisurim | j-'-l [י-ע-ל]: ji'el, ju'al, hitja'el; hitja'alut, ji'ul; ja'il | j-'-r
[י-ע-ר]: ji'er, ju'ar, ji'ur | j-P-J [י-פ-י]: jafa, jipa, jupa, hitjapa, hitjaput, jipuj, jófi, jafe |
j-r-k [י-ר-ק]: jarak; jerika | j-s-m [י-ש-ם]: jisem, jusam; jisum; jasim | j-š-r [י-ש-ר]: jašar,
jišer, jušar, hitjašer, hejšir; jišur, jóšer; jašir, jašar | j-t-m [י-ת-ם]: hitjatem; hitjatmut;
mejutam || '-j-š [א-י-ש]: 'iješ, 'ujaš; 'ijuš | '-j-t [א-י-ת]: 'ijet, 'ijet; 'ijut | B-j-l [ב-י-ל]: bijel,
bujal; bijul | B-j-c [ב-י-ץ]: bijec; bijuc | B-j-t [ב-י-ת]: bijet, bujat, hitbajet; bijut,
hitbajetut | d-j-k [ד-י-ק]: dijek; dijuk; dajkan, medujak | z-j-f [ז-י-ף]: zijef, zujaf; zijuf,
zajfan | x-j-g [ח-י-ג]: xijeg; xijug, xajgan | x-j-x [ח-י-ך]: xijjex, hitxajex; xijux, xajxan;

mexujax | K-j-s [כ-י-ס]: kijes, kujas; kijus, kajas | k-j-f [כ-י-ף]: kijef; kijuf | m-j-n [מ-י-ן]: mijen, mujan, hitmajen; hitmajenut, mijun | n-j-d [נ-י-ד]: nijed, nujad; nijud; najad | s-j-m [ס-י-ם]: sijem, sujam, histajem; histajemut, sijum, sijómet | s-j-A [ס-י-ע]: sijea, histajea; histaje'ut, sijua, saj'an, sajá'at | '-j-f [ע-י-ף]: 'ajaf, 'ijef, hit'ajef; hit'ajefut; 'ajef | c-j-d [צ-י-ד]: cijed, cujad, hictajed; hictajedut, cijud | c-j-n [צ-י-ן]: cijen, cujan, hictajen; hictajenut, cijun, cajan | c-j-r [צ-י-ר]: cijer, cujar, hictajer; hictajerut, cijur, cajar | t-j-g [ת-י-ג]: tijeg, tujag; tijug | t-j-k [ת-י-ק]: tijek, tujak; tijuk || n-jl-n [נ-יל-ן]: nijlen; menujlan || b-xj-n [ב-כי-ן]: hitbaxjen | d-mj-n [ד-מי-ן]: dimjen, dumjan | '-nj-n [ע-ני-ן]: 'injen, hit'anjen; hit'anjenut | k-rj-n [ק-רי-ן]: kirjen | r-'j-n [ר-אי-ן]: ri'ajen, ru'ajan, hitra'ajen; ri'ajun | š-rj-n [ש-רי-ן]: širjen, šurjan; širjun

J (= j~Ø)[13]

‚

J-v-l [י-ב-ל]: hovil, huval; hovala, hovala; javil | J-n-k [י-נ-ק]: janak, hejnik, hunak; hanaka, jenika, jankut | J-c-' [י-צ-א]: jaca, hoci, huca; hoca'a, jeci'a, moca | J-r-d [י-ר-ד]: jarad, horid, hurad; horada, jerida, morad; jarud | J-r-J [י-ר-י]: jara, nora; jéri, jerija | J-r-k [י-ר-ק]: horik; horaka, jérek; jarok | J-r-š [י-ר-ש]: jaraš, horiš, huraš; horaša, moraša, moréšet; noraš | J-š-v [י-ש-ב]: nošav, jišev, jušav; hitjašvut, jišuv, mošav, mošava, tošav

‚

B-J-š [ב-ו-ש]: boš, biješ, bujaš, hitbaješ, heviš, hoviš | d-J-g [ד-ו-ג]: dag; dájig; dajag | d-J-n [ד-ו-ן]: dan, nadon, nidon, hitdajen, hidajen; din, dajan | d-J-n [ד-ו-ן]: dan, nadon, nidon; dijun | d-J-r [ד-ו-ר]: dar; dijur, dajar, dija | x-J-š [ח-ו-ש]: xaš; xuš, xiša, xajšan, maxoš, txuša | t-J-s [ט-ו-ס]: tas, hetis, hutas; hatasa, tájis, tajas, tisa, matos, matas

Ø

‚

'-c [א-ו-ץ]: 'ac, he'ic, hu'ac; 'acan, he'aca, ma'oc, te'uca | B-' [ב-ו-א]: ba', hevi, huva; bo, bi'a, hava'a, mavo, mevo'a, mavoj | g-v [ג-ו-ב]: hegiv; hegev, hagava, tguva | g-r [ג-ו-ר]: gar, hitgorer; megurim | z-z [ז-ו-ז]: zaz, heziz, huzaz; hazaza, tzuza | K-n [כ-ו-ן]: naxon, hitkonen, hexin, huxan; haxana, hitkonenut, konan, konenut, txuna; naxon | m-r [מ-ו-ר]: hemir, humar; hamara, tmura | n-A [נ-ו-ע]: naa, hitno'ea, hinia, hunaa; henea, hana'a, hitno'a'ut, manoa, noa, nia, ni'a, tnu'a | n-f [נ-ו-ף]: nofef, hitnofef, henif, hunaf; henef, hanafa, hitnofefut, manof, menifa, tnufa | c-m [צ-ו-ם]: cam; com | k-m [ק-ו-ם]: kam, komem, hekim, hukam; hakama, komemut, kima, tkuma | r-m [ר-ו-ם]: ram,

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[13] Examles of **J** in the last radicals are so numerous that they are not listed here.

romem, romam, hitrorem, herim, huram; harama, hitromemut, marom, rum, rom, romemut, rama | r-c [ץ-ו-ר]: rac, hitrocec, heric, hurac; haraca, hitrorecut, meruc, rica | š-v [ב-ו-ש]: šav, hešiv, hušav; hašava, mašov, švut, šiva

י

f-A [ע-פ-י]: hofia; hofa'a, mofaa | c-A [ע-צ-י]: hicia, hucaa; hecea, haca'a, macaa | c-t [ת-צ-י]: nicat, hicit, hucat; hacata, macet || B-n [ן-י-ב]: hevin, huvan; bina, havana, tvuna, tovana; navon | s-m [ם-י-ש]: sam, hesim, husam; hasama, sima, tsuma | š-r [ר-י-ש]: šar, šorer, hušar; šir

ג

b-A [ע-ב-ג]: hibia, hubaa; haba'a, mabaa | k-J [י-כ-ג]: hika, huka; haka'a, maka | k-š [ש-ק-ג]: hikiš, hukaš; hakaša | k-f [ף-ק-ג]: hikif, hukaf; hekef, hakafa, makof | s-g [ג-ש-ג]: hisig, husag; heseg, hasaga

N (= n~Ø)

ג

N-s-A [ע-ס-ג]: nasaa, hisia, husaa; hasa'a, masoa, masaa, nesi'a | N-s-' [א-ש-ג]: nasaa' hisia, husaa, hasa'a, masoa, masaa, nesi'a | N-P-l [ל-פ-ג]: nafal, hipil, hupal; hapala, mapal, mapala, mapólet, nefila, néfel, nefólet | N-c-l [ל-צ-ג]: nacal, hicil, hucal; hinaclut, hacala, nicol | N-š-v [ב-ש-ג]: našav, nišev, hišiv; hašava, mašav, nešiva | N-š-r [ר-ש-ג]: našar, hišir; hašara, nešira, nešóret; našur, našir

n[14]

ג

n-'-l [ל-ע-ג]: na'al, nin'al; hina'alut, man'ul, ne'ila; na'ul | n-P-š [ש-פ-ג]: nafaš (jinpoš); hinafšut, nefiša, nófeš | n-c-l [ל-צ-ג]: nicel, nical; nicul, naclan, nicólet, necólet | n-k-J [י-ק-ג]: nika, nuka, hitnaka; hinakut, hitnakut, nikuj, nikajon; naki | n-k-m [ם-ק-ג]: nakam, hitnakem; hinakmut, hitnakmut, nakam, nekama, nakman; nokmani | n-š-m [ם-ש-ג]: našam, hitnašem, hinšim, hunšam; hanšama, hitnašmut, nišum, nešima | n-š-f [ף-ש-ג]: našaf, hitnašef; hitnašfut, nišuf, nešifa, našfan | n-š-k [ק-ש-ג]: našak, nišek, nušak, hitnašek; hitnaškut, nišuk, nešika | n-t-x [ח-ת-ג]: niteax, nutax; nituax, natax, natxan, netixa; natiax

č

צ׳

č-km-k [ק-קמ׳-צ]: čikmem, hičtakmek; mečukmak || P-nč-r [ר-נצ׳-פ]: pinčer, hitpančer || g-l-č [צ׳-ל-ג]: hitgaleč

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[14] Examles of n in the second and third radicals are so numerous that they are not listed here.

ğ

ג׳

n-ğ-s [ס-ג׳-נ]: niğes; niğus

k

כ

k-j-f [ף-י-כ]: kijef (jekajef); kijuf | k-x-v [ב-כ-כ]: kixev (jekaxev); kixuv ‖ d-k-' [א-כ-ד]: dika, duka; dika'on, dikuj; dak'ani, nidka | k-r [ר-כ-נ]: nikar, hikir, hukar; heker, hakara, hekerut, makar | k-š [ש-ק-נ]: hikiš, hukaš; hakaša | s-k-m [ם-כ-ס]: hiskim, huskam; heskem, haskama | s-k-n [ן-כ-ס]: siken, sukan, histaken; histaknut, sikun, sakana | r-k-z [ז-כ-ר]: rikez, rukaz, hitrakez; hitrakzut, rikuz, rakaz, tarkiz ‖ '-zk-r [ר-כז-א]: 'izker, 'uzkar; 'izkur | K-lk-l [ל-לכ-כ]: kilkel (jexalkel), kilkul, kalkala | m-lk-d [ד-לכ-מ]: milked, mulkad; milkud | '-dk-n [ן-דכ-ע]: 'idken, 'udkan, hit'adken; hit'adkenut, 'idkun; 'adkani | t-sk-l [ל-סכ-ת]: tiskul, tuskal, tiskul

K (= k~x)[15]

כ

'-r-K [ך-ר-א]: 'arax, hit'arex, he'erix, ho'orax; 'arixut, 'órex, 'arka, 'arxan, ha'araxa, he'arxut, hit'arxut; 'arox ('aruka) | d-r-K [ך-ר-ד]: darax, nidrax; drixa, midrax, midraxa, midréxet

x

כ

x-l [ל-ו-כ]: hexil; haxala, mexula, mexal ‖ '-x-f [ף-כ-א]: 'axaf, ne'exaf; 'axifa; 'axif | k-x-v [ב-כ-כ]: kixev; kixuv | r-x-l [ל-כ-ר]: rixel; raxil, raxlan ‖ '-xz-v [ב-כז-א]: 'ixzev, 'uxzav, hit'axzev; hit'axzevut | '-xl-s [ס-כל-א]: 'ixles, 'uxlas, hit'axles; 'ixlus, hit'axlesut | d-xd-x [ך-כד-ד]: dixdex, duxdax; dixdux | l-xl-x [ך-כל-ל]: lixlex, luxlax, hitlaxlex; hitlax;exut, lixlux, laxlexan | s-xs-x [ך-כס-ס]: sixsex, histaxsex; histaxsexut, sixsux; saxsexan | š-xp-l [ל-כפ-ש]: šixple, šuxpal, hištaxpel; šixpul | š-xt-v [ב-כת-ש]: šixtev, šuxtav; šixtuv | t-xn-n [ן-כנ-ת]: tixnen, tuxnan; tixnun | t-xn-t [ת-כנ-ת]: tixnet, tuxnat; tixnut | t-xt-v [ב-כת-ת]: tixtev; tixtuv ‖ B-r-x [ך-ר-ב]: berex (jevarex), borax, hitbarex; braxa, hitbarxut; barux | h-l-x [ך-ל-ה]: halax, hile, hithalex, holix, hulax; hlaxa, hilux, halixa, hélex, halax, hithalxut, mahalax, tahaluxa | x-j-x [ך-י-ח]: xijex, hitxajex; xijux, xajxan; mexujax | x-n-x [ך-נ-ח]: xanax, xinex, xunax, hitxanex; hitxanxut, xanix, xanix | x-s-x [ך-ס-ח]: xasax, nexsax; xisaxon, xasxan | x-t-x [ך-ת-ח]: xatax, nextax; hexatxut, xitux, xatixa; xotxani, xatux, mexutax | n-m-x [ך-מ-נ]: hitnamex, hinmix, hunmax;

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[15] Examles of **K** in the first and second radicals are so numerous that they are not listed here.

hanmaxa, hitnamxut, nemixut, nómex; namux | t-x [נ-ת-ך]: nitax, hitix, hutax; hitux, hataxa, mitux, matax, matéxet, nétex | s-B-x [ס-ב-ך]: sibex, subax, histabex; histabxut, sibux, savix, svax, sabxan, tisbóxet | s-m-x [ס-מ-ך]: samax, nismax, histamex, hismix, husmax; hasmaxa, hisamxut, histamxut, somxa, smixa, smixut, sémex, samxut | '-r-x [ע-ר-ך]: 'arax, ne'erax, he'arxut, ma'arax, ma'aréxet, 'arixa, ta'aruxa; 'arux | c-r-x [צ-ר-ך]: carax, nicrax, hictarex, hicrix, hucrax,; hictarxut, hacraxa, crixa, córex, ticróxet, carxan, micrax; carix | š-P-x [ש-פ-ך]: šafax, nišpax, hištapex; hišafxut, hištapxut, mašpex, špix, šfixa, šéfex, šofxa, tišpóxet | t-'r-x [ת-אר-ך]: ti'arax, tu'arax; ti'arux | t-v-x [ת-ו-ך]: tivex; tivux | t-m-x [ת-מ-ך]: tamax, nitmax, tomxa, tmixa; tamux

An alternative approach would be to assign the archiphonemes P, B, and K where the orthographical פ, ב and כ appear, and then to explain the morphophonological alternations positionally according to the phonological rules as shown in the following table, except when either a plosive or fricative member of the pair manifests itself exclusively even where expected according to the following table; e.g., š-xp-l vs. š-KP-l, t-xt-v vs. t-Kt-B, etc. In the table [■] and [□] stand for the appearances of plosive and fricative pairs of the archiphonemes, i.e., p / b / k and f / v / x respectively.

	Past	Present	Future
1-1-1			
Pa'al	[■]a[□]a[□]	[■]o[□]e[□]	ji[□][■]o[□]
Nif'al	ni[□][■]a[□]	ni[□][■]a[□]	ji[■]a[□]e[□]
Pi'el	[■]i[■]e[□]	me[□]a[■]e[□]	je[□]a[■]e[□]
Pu'al	[■]u[■]a[□]	me[□]u[■]a[□]	je[□]u[■]a[□]
Hitpa'el	hit[■]a[■]e[□]	mit[■]a[■]e[□]	jit[■]a[■]e[□]
Hif'il	hi[□][■]i[□]	ma[□][■]i[□]	ja[□][■]i[□]
Huf'al	hu[□][■]a[□]	mu[□][■]a[□]	ju[□][■]a[□]
1-2-1			
Pi'el	[■]i[□■]e[□]	me[□]a[□■]e[□]	je[□]a[□■]e[□]
Pu'al	[■]u[□■]a[□]	me[□]u[□■]a[□]	je[□]u[□■]a[□]
Hitpa'el	hit[■]a[□■]e[□]	mit[■]a[□■]e[□]	jit[■]a[□■]e[□]
Hif'il	hi[□][■■]i[□]	ma[□][■■]i[□]	ja[□][■■]i[□]
2-2-1			
Pi'el	[■□]i[□■]e[□]	me[□■]a[□■]e[□]	je[□■]a[□■]e[□]

At first sight, this alternative seems superior to the first approach, but etymological knowledge is presupposed here in assigning the above archiphonemes since the morphophonological alternations are not always observable in actual forms synchronically.

In terms of the number of radical components the slot of each radical can contain, roots can be classified into the following five types:

1) **Biradical roots**

    1.1) **Biconsonantal roots**: 1-1

2) **Triradical roots**

    2.1) **Triconsonantal roots**: 1-1-1

    2.2) **Quadriconsonantal roots**: 1-2-1

    2.3) **Quinteconsonantal roots**: 1-3-1, 2-2-1

The second type 1-1-1 constitutes the majority of the roots; the rest of the four types, i.e., 1-1, 1-2-1, 1-3-1, and 2-2-1, are exemplified below:

1-1

'-c: 'ac, he'ic, hu'ac; 'acan, he'aca, ma'oc, te'uca | B-': ba', hevi, huva; bo, bi'a, hava'a, mavo, mevo'a, mavoj | g-v: hegiv; hegev, hagava, tguva | g-r: gar, hitgorer; megurim | z-z: zaz, heziz, huzaz; hazaza, tzuza | K-n: naxon, hitkonen, hexin, huxan; haxana, hitkonenut, konan, konenut, txuna; naxon | m-r: hemir, humar; hamara, tmura | n-A: naa, hitno'ea, hinia, hunaa; henea, hana'a, hitno'a'ut, manoa, noa, nia, ni'a, tnu'a | n-f: nofef, hitnofef, henif, hunaf; henef, hanafa, hitnofefut, manof, menifa, tnufa | c-m: cam; com | k-m: kam, komem, hekim, hukam; hakama, komemut, kima, tkuma | r-m: ram, romem, romam, hitrorem, herim, huram; harama, hitromemut, marom, rum, rom, romemut, rama | r-c: rac, hitrocec, heric, hurac; haraca, hitrorecut, meruc, rica | š-v: šav, hešiv, hušav; hašava, mašov, švut, šiva || f-A: hofia; hofa'a, mofaa | c-A: hicia, hucaa; hecea, haca'a, macaa | c-t: nicat, hicit, hucat; hacata, macet || B-n: hevin, huvan; bina, havana, tvuna, tovana; navon | s-m: sam, hesim, husam; hasama, sima, tsuma | š-r: šar, šorer, hušar; šir || b-A: hibia, hubaa; haba'a, mabaa | k-J: hika, huka; haka'a, maka | k-š: hikiš, hukaš; hakaša | k-f: hikif, hukaf; hekef, hakafa, makof | s-g: hisig, husag; heseg, hasaga

1-2-1

'-gr-f: 'igref, hit'agref; 'igruf, hit'agrefut | '-vr-r: 'ivrer, 'uvrar, hit'avrer; 'ivrur, hit'avrerut | '-zr-x: 'izreax, hit'azreax; 'izruax, hit'azrexut | '-xl-s: 'ixles, 'uxlas, hit'axles; 'ixlus, hit'axlesut | '-lm-n: 'ilmen, hit'almen; hit'almenut | '-sl-m: 'islem, hit'aslem; hit'aslemut | '-kl-m: hit'aklem; 'iklum, hit'aklemut | '-tg-r: 'itger | B-lg-n: bilgen, bulgan, hitbalgen | b-lf-f: bilfef (jebalfef) | g-l'-n: gil'en, gul'an | g-r'-n: gir'en, gur'an; gir'un | d-gm-n: digmen, dugman | d-mj-n: dimjen, dumjan | d-fd-f: difdef; difduf, dafdaf, dafdéfet, dafdefan | d-pr-s: dipres; medupras | x-lt-r: xilter; xiltur | x-mc-n: ximcen, xumcan, hitxamcen; ximcun | x-cc-r: xiccer; xiccur | x-šb-n: xišben, xušban, hitxašben;

hitxašbenut | <u>t-rp-d</u>: tirped, turpad; tirpud | <u>K-ft-r</u>: kifter, kuftar, hitkafter; kiftur | <u>K-rt-s</u>: kirtes; kirtus, kartéset | <u>m-gn-t</u>: mignet; mignut | <u>m-xz-r</u>: mixzer, muxzar; mixzur | <u>m-xš-v</u>: mixšev, muxšav, hitmaxšev; mixšuv | <u>m-lk-d</u>: milked, mulkad; milkud | <u>m-lc-r</u>: milcer | <u>m-sg-r</u>: misger, musgar; misgur | <u>m-sx-r</u>: misxer, musxar, hitmasxer; hitmasxarut, misxur | <u>m-sm-r</u>: mismer, musmar; mismur | <u>m-sp-r</u>: misper, muspar; mispur | <u>m-'r-v</u>: hitma'arev; hitma'arvut | <u>m-kc-A</u>: hitmakcea | <u>m-rk-z</u>: mirkez, murkaz; mirkuz | <u>n-jl-n</u>: nijlen; menujlan | <u>s-bs-d</u>: sibsed, subsad; sibsud | <u>s-gn-n</u>: signen, sugnan; signun | <u>s-nd-l</u>: sindel, sundal | <u>'-nj-n</u>: 'injen, hit'anjen; hit'anjenut | <u>f-br-k</u>: fibrek, fubrak; fibruk | <u>P-tr-l</u>: pitrel; pitrul | <u>p-lm-s</u>: hitpalmes | <u>P-lp-l</u>: pilpel; pilpul | <u>f-nt-z</u>: fintez; fintuz | <u>P-nč-r</u>: pinčer, hitpančer | <u>f-ks-s</u>: fikses | <u>f-rm-t</u>: firmet; firmut | <u>P-rš-n</u>: piršen | <u>c-vr-x</u>: civreax, hictavreax; mecuvrax | <u>c-nz-r</u>: cinzer, cunzar; cinzur | <u>c-nr-r</u>: cinrer; cinrur | <u>k-vk-v</u>: kivkev; kivkuv | <u>k-tl-g</u>: kitleg, kutlag; kitlug | <u>k-rj-n</u>: kirjen | <u>k-rk-A</u>: kirkea, kurkaa; kirkua | <u>r-mz-r</u>: rimzer, rumzar; rimzur | <u>š-pr-c</u>: hišpric; hašpraca | <u>š-rj-n</u>: širjen, šurjan; širjun | <u>t-'r-x</u>: ti'arex, tu'arax; ti'arux | <u>t-xk-r</u>: tixker, tuxkar; tixkur | <u>t-xš-v</u>: tixšev; tixšuv | <u>t-mc-t</u>: timcet, tumcat; timcut | <u>t-mr-c</u>: timrec, tumrac; timruc | <u>t-sr-t</u>: tisret; tisrut | <u>t-fk-d</u>: tifked; tifkud | <u>t-kc-v</u>: tikcev, tukcav; tikcuv | <u>t-kš-r</u>: tikšer | <u>t-rb-t</u>: tirbet, turbat; tirbut | <u>t-rg-l</u>: tirgel, turgal; tirgul, tirgólet

1-3-1

<u>x-ntr-š</u>: xintreš | <u>t-lgr-f</u>: tilgref

2-2-1

<u>fl-rt-t</u>: flirtet; flirtut

4 Types of Secondary Roots

There are two main types of the formation of secondary roots which are different from each other in nature. The first type involves the expansion of biconsonantal or triconsonantal primary roots in that a part of the root is reduplicated or an additional consonant is added, and the total number of the radical components constituting these secondary roots increases by one. In the second type, consonantal skeletons of nonverbal stems – mostly nouns and less often adjectives, be they primitive bases, simplexes (formed through root-pattern formation), complexes$_2$ (formed through affixation), blends, compounds, or acronyms – are extracted in their entirety or in part so that these secondary roots may fit into either one of the following compositions, i.e., 1-1-1, 1-2-1, 1-3-1, and 2-2-1. No secondary root exists whose composition is 1-1 with only

two radicals. No empirical data have been found where the total number of the radical components constituting a single root exceeds five. This can be summarized as follows:

	Primary roots	Secondary roots
1-1	+	–
1-1-1	+	+
1-2-1	+	+
1-3-1	–	+
2-2-1	–	+

Of the two major types of secondary roots formed through the expansion of triconsonantal primary roots, i.e., the reduplication of primary roots and addition of consonants, the first type is divided into two subtypes. The first subtype involves the reduplication of the first radical where the second and third radicals of triconsonantal primary roots are identical, i.e., C_1-C_2-C_2 forms C_1-C_2C_1-C_2 where C stands for a consonant. In the second subtype of the first main type, the last radical of primary roots is reduplicated, i.e., C_1-C_2-C_3 forms C_1-C_2C_3-C_3. The following are some examples.

Reduplication of the first radical

B-l-l: b-l-l, nivlal; blil, blila, mavlel, tavlil; balul > B-lb-l: bilbel, bulbal, hitbalbel; bilbul, hitbalbelut | g-l-l: galal, niglal, golel, hitgolel; hitgolelut, maglul, maglel; galul > g-lg-l: gilgel, gulgal, hitgalgel; gilgul, galgal, hitgalgelut | d-l-l: dilel, dulal; dilul, hidalelut, tadlil; dalil > d-ld-l: dildel, duldal, hidaldel/hitdaldel; dildul, hidaldelut | l-x-x: lixeax; leax; lax > l-xl-x: lixleax, hitlaxleax; hitlaxlexut, lixluax | l-k-k: likek, lukak, hitlakek; hitlakekut, likuk, lekika, lakekan > l-kl-k: liklek, hitlaklek; likluk | m-s-s: namas, moses, hitmoses, hemis/hemes, humas; hamasa, hitmosesut, tmisa; masis > m-sm-s: mismes, hitmasmes; hitmasmesut, mismus | m-r-r: merer; mara, maror, merur, meri; mar, marir > m-rm-r: hitmarmer; hitmarmerut; memurmar | m-š-š: namoš, mišeš, mamoš, mišuš; mašiš > m-šm-š: mišmeš; mišmuš | n-c-c: nacac, hitnocec; hitnocecut, nicoc, necic > n-cn-c: nicnec, hitnacnec; hitnacnecut, nacnac

Reduplication of the third radical

'-š-r: 'išer, 'ušar, hit'ašer; 'išur, 'ašra > '-šr-r: 'išrer, 'ušrar; 'išrur | d-B-r: nidbar, diber, dubar, hidaber; dibur, dabar, divra, dabran, dabéret, dover, hidabrut > d-vr-r: divrer; divrur | K-v-n: kiven, kuvan, hixvin, huxvan; hexven, haxvana, kivun, kavan, kavénet, maxven, mixvan > K-vn-n: kivnen, kuvnan, hitkavnen | l-x-š: laxaš, nilxaš, lixeš, hitlaxeš; hitlaxašut, lixuš, lexiša, láxaš, laxšan > l-xš-š: lixšeš, hitlaxšeš; laxšuš | s-P-r: safar, nispar; mispar, sfira, sifra; safur, safir > s-fr-r: sifrer, sufrar; sifrur | c-x-k: caxak,

hictaxek, hicxik, hucxak; hacxaka, hictaxakut, micxak, cxok; coxakani, caxkan >
c-xk-k: cixkek, hictaxkek; cixkuk | š-r-k: šarak; mašrokit, šrika; šorkani, šarkani >
š-rk-k: širkek | t-K-n: tiken, tukan; tikun, téxen, toxnit > t-xn-n: tixnen, tuxnan; tixnun

The second type of the expansion of primary roots involves the addition of either ', š, or t to
biconsonantal or triconsonantal primary roots, i.e., '-C_1C_2-C_3, š-C_1C_2-C_3 / š-C_1-C_2, and
t-C_1C_2-C_3 are formed from C_1-C_2-C_3 / C_1-C_2; no examples of '-C_1-C_2 and t-C_1-C_2 formed from
C_1-C_2 have been found. Examples of each subtype follow.

Addition of '

B-x-n: baxan, nivxan; 'avxana, baxon, bexina, bóxan, hibaxanut, mivxan, mavxena;
baxun > '-vx-n: 'ivxen, 'uvxan; 'ivxun | B-t-x: batax, hivtiax, huvtax; 'avtaxa, bitxa,
bitaxon, betixut, havtaxa > '-vt-x: 'ivteax, 'uvtax | z-K-r: zakar, nizkar, hizkir, huzkar;
'azkara, hazkara, hizaxrut, zxira, zéxer, zikaron, mizkar, tizkur, tizkóret > '-zk-r: 'izker,
'uzkar; 'izkur | x-z-r: xazar, hexzir, huxzar; hexzer, haxzara, xazira, xazara, maxzer >
'-xz-r: 'ixzer; 'ixzur | K-z-B: > '-xz-v: | š-P-r > '-šp-r | t-x-l > '-tx-l

Addition of š

x-z-r: xazar, hexzir, huxzar; hexzer, haxzara, xazira, xazara, maxzer > š-xz-r: šixzer,
šuxzar; šixzur | K-n-A: nixnaa, hixnia, huxnaa; haxna'a, hikan'ut, kni'a, kni'ut; kanua >
š-xn-A: šixnea, šuxnaa, hištaxnea; hištaxne'ut, šixnua | K-P-l: kafal, nixpal, hixpil,
huxpal; haxpala, hikaflut, kafil, kéfel, kfal; kaful > š-xp-l: šixpel, šuxpal, hištaxpel;
šixpul | K-t-v: katav, nixtav, hitkatev, hixtiv, huxtav; haxtava, hitkatvut, ktav, katvan,
któvet, kituv, ktiv, ktiva, mixtav, mixtava, tixtóvet, taxtiv, katav, katava; katuv >
š-xt-v: šixtev, šuxtav; šixtuv | '-v-d: 'avad, he'evid, ho'ovad; ha'avada, 'avoda, 'éved >
š-'b-d: ši'abed, šu'abad, hišta'abed; hišta'abedut, ši'abud | '-r-x: 'arax, ne'erax; he'arxut,
ma'arax, ma'aréxet, 'arixa, ta'aruxa; 'arux > š-'r-x: ši'arex, šu'arax; ši'arux | '-t-k: he'etik,
ho'otak; he'etek, ha'ataka, 'ótek > š-'t-k: ši'atek; ša'atuk | š-k-l: šakal, niškal; hišaklut,
miškal, miškólet, šikul, škila, škilut; šakul > š-kl-l: šiklel, šuklal, hištaklel; šiklul | k-m:
kam, komem, hekim, hukam; hakama, komemut, kima, kimum, tkuma > š-k-m: šikem,
šukam, hištakem; hištakmut, šikum

Additon of t

g-m-l: gamal; gmul > t-gm-l: tigmel, tugmal; tagmul | d-l-k: dalak, nidlak, hidlik,
hudlak; dlikut, dleka, hadlaka, hidalkut; daluk, dalik > t-dl-k: tidlek, tudlak; tidluk |
K-t-v: katav, nixtav, hitkatev, hixtiv, huxtav; haxtava, hitkatvut, ktav, katvan, któvet,
kituv, ktiv, ktiva, mixtav, mixtava, tixtóvet, taxtiv, katav, katava; katuv > t-xt-v: tixtev;
tixtuv | s-k-l: sikel, sukal; sikul > t-sk-l: tiskel, tuskal; tiskul | P-'-l: pa'al, hif'il, huf'al;
haf'ala, mif'al, pó'al; nif'al, pa'ul, pa'il > t-f'-l: tif'el, tuf'al; tif'ul

Secondary roots extracted from nonverbal stems, mostly from nouns and less often from adjectives, are divided into what will be designated here as whole extraction, aphaeretic extraction, apocopic extraction, extraction with partial reduplication, extraction with whole reduplication, and extended extraction, according to the nature of the extraction. These variations exist in order to accomodate the total number of the radical components of secondary roots to the range of three to five where the nonverbal stems from which roots are extracted contain less than three or more than five consonants.

Furthermore, each type is subdivided according to types of nonverbal stems from which consonants are extracted, i.e., nominal primitive bases, adjectival primitive bases, nominal simplexes, nominal complexes$_2$, nominal blends, nominal compounds, and nominal acronyms.

The first type of extraction, whole extraction, is the extraction of all the consonants of nonverbal stems when they number between three and five. This is the only type where roots are extracted from adjectives as well as from nouns. These nouns include primitive bases, simplexes, complexes$_2$, and blends. The following are some of the many possible examples.

From nominal primitive bases

'éven 'stone' > '-b-n: 'iben, hit'aben; 'ibun, hit'abnut | 'avak 'dust' > '-b-k: 'ibek, 'ubak, hit'abek; 'ibuk, hit'abkut | 'óhel 'tent' > '-h-l: he'ehil; ha'ahala, ma'ahal | 'atar 'site' > '-t-r: 'iter, 'utar; 'itur | behema 'beast' > b-h-m: hitbahem; hitbahamut | beton 'concrete' > B-t-n: biten; mevutan | bájit 'house' > B-j-t: bijet, bujat, hitbajet; bijut, hitbajetut | blof 'bluff' > b-l-f: bilef (jebalef), bulaf, hitbalef; biluf, balfan | basis 'basis' > B-s-s: bises, busas, hitbases; bisus, hitbasesut | bóreg 'screw' > B-r-g: hitbareg, hivrig, huvrag; havraga, hitbargut, mavreg, mavrega, tivróget, tivrug, tavrig | bósem 'perfume' > B-s-m: bisem, busam, hitbasem; basam, bsómet, hitbasmut | gvina 'cheese' > g-B-n: giben, hitgaben; gibun, géven | géves 'gypsum' > g-b-s: gibes, gubas; gibus | gáven 'hue, shade' > g-v-n: given, guvan, hitgaven; givun, migvan | gamad 'dwarf' > g-m-d: gimed, gumad, hitgamed; gimud, hagmada, hitgamdut; gamud | darom 'south' > d-r-m: hidrim; hadrama | xóref 'winter' > x-r-f: xaraf | xrop 'deep sleep, snore' > x-r-p: 'to sleep deeply, snore' | jamin 'right' > j-m-n: hejmin | já'ar 'forest' > j-'-r: ji'er, ju'ar; ji'ur | kadur 'ball' > k-d-r: hitkader; hitkadrut | kis 'pocket' > K-j-s: kijes, kujas, kijus, kajas | koxav 'star' > k-x-v: kixev (jekaxev); kixuv | sabon 'soap' > s-b-n: siben, suban, histaben; histabnut, sibun | séret 'film' > s-r-t: hisrit, husrat; hasrata, masreta, tasrit | pexam 'coal' > P-x-m: pixem, hitpaxem; hafxama, hitpaxmut, pixum | fášla 'mistake' > f-š-l: fišel, hitfašel; fišul, fašlan | citáta 'citation' > c-t-t: citet, cutat; citut | cafon 'north' > c-p-n: hicpin; hacpana, macpen | smol 'left' > s-m-l: hismil; hasmala | šóreš 'root' > š-r-š: šereš, šoraš, hištareš, hišriš, hušraš; hašraša, hištaršut, šeruš | ta'arix 'date' > t-'-r-x: ti'arex,

tu'arax; ti'arux | *távex* 'middle' > t-v-x: tivex; tivux || *'avzar, 'avizar* 'accessory' > '-vz-r:
'ivzer; 'ivzur | *'egrof* 'fist' > '-gr-f: 'igref, hit'agref; 'igruf, hit'agrefut | *'ezrax* 'citizen' >
'-zr-x: 'izreax, hit'azreax; 'izruax, hit'azrexut | *'almana* 'widow' > '-lm-n: 'ilmen,
hit'almen; hit'almenut | *'islam* 'Islam' > '-sl-m: 'islem, hit'aslem; hit'aslemut | *'aklim*
'climate' > '-kl-m: hit'aklem; 'iklum, hit'aklemut | *'etgar* 'challenge' > '-tg-r: 'itger |
baxjan 'crybaby' > b-xj-n: hitbaxjen | *balagan* 'confusion' > B-lg-n: bilgen, bulgan,
hitbalgen | *gal'in* 'stone (of fruit)' > g-l'-n: gil'en, gul'an | *gar'in* 'stone (of fruit)' > g-r'-n:
gir'en, gur'an; gir'un | *xaltúra* 'shoddy work' > x-lt-r: xilter; xiltur | *xacocra* 'trumpet' >
x-cc-r: xiccer; xiccur | *xašmal* ' ' > x-šm-l | *torpédo* 'torpedo' > t-rp-d: tirped, turpad;
tirpud | *kaftor* 'button' > K-ft-r: kifter, kuftar, hitkafter; kiftur | *kartis* 'ticket' > K-rt-s:
kirtes; kirtus, kartéset | *magnet* 'magnet' > m-gn-t: mignet; mignut | *melcar* 'waiter' >
m-lc-r: milcer | *merkaz* 'center' > m-rk-z: mirkez, murkaz; mirkuz | *nájlon* 'nylon' >
n-jl-n: nijlen; menujlan | *subsídja* 'subsidy' > s-bs-d: sibsed, subsad; sibsud | *signon*
'style' > s-gn-n: signen, sugnan; signun | *sandal* 'sandal' > s-nd-l: sindel, sundal | *'arafel*
'fog' > '-rp-l: 'irpel, 'urpal, hit'arpel; hit'arpelut, 'irpul | *patrol* 'patrol' > P-tr-l: pitrel;
pitrul | *pulmus* 'polemic' > p-lm-s: hitpalmes | *pílpel* 'pepper' > P-lp-l: pilpel; pilpul |
páncer 'puncture' > P-nč-r: pincer, hitpancer | *format* 'format' > f-rm-t: firmet; firmut |
cenzúra 'censor' > c-nz-r: cinzer, cunzar; cinzur | *katalog* 'catalog' > k-tl-g: kitleg,
kutlag; kitlug | *karkaa* 'land' > k-rk-A: kirkea, kurkaa; kirkua | *širjon* 'armor' > š-rj-n:
širjen, šurjan; širjun || *xantariš* 'worthless person, word, thing' > x-ntr-š: xintreš |
telegraf 'telegraph' > t-lgr-f: tilgref

From adjectival primitive bases

muxaš(i) 'concrete' > m-x-š: himxiš, humxaš; hamxša || *offani* 'characteristic' > '-fj-n:
'ifjen, 'ufjan, hit'afjen; 'ifjun | *'efšari* 'possible' > '-fš-r: 'ifšer, 'ufšar, hit'afšer | *xevrati*
'social' > x-vr-t: xivret; xivrut | *netráli* 'neutral' > n-tr-l: nitrel, nutral; nitrul | *sakran*
'curious' > s-kr-n: sikren, sukran, histakren; histakrenut | *'acbani* 'nervous' > '-cb-n:
'icben, 'ucban, hit'acben | *kamcan* 'stingy' > k-mc-n: kimcen, hitkamcen; hitkamcenut

From nominal simplexes

'emet 'truth' > '-m-t: 'imet, 'umat, hit'amet; 'imut, hit'amtut | *magen* 'shield' > m-g-n:
migen, mugan; migun | *maxaze* 'play, drama' > m-x-z: himxiz, humxaz; hamxaza |
masax 'screen' > m-s-x: misex; misux; memusax | *mosad* 'institution' > m-s-d: mised,
musad, hitmased; hitmasdut, mimsad, misud | *moked* 'focus' > m-k-d: miked, mukad,
hitmaked; hitmakdut, mikud | *makaf* 'hyphen' > m-k-f: mikef; mikuf; memukaf | *tnu'a*
'movement' > t-n-A: hitnia, hutnaa, hatna'a, matnea | *te'uda* 'document' > t-'-d: ti'ed,
to'ad; ti'ud || *dimjon* 'imagination' > d-mj-n: dimjen, dumjan | *xamcan* 'oxygen' >

<u>x-mc-n</u>: ximcen, xumcan, hitxamcen; ximcun | *xešbon* 'account' > <u>x-šb-n</u>: xišben, xušban, hitxašben; hitxašbenut | *maxzor* 'cycle' > <u>m-xz-r</u>: mixzer, muxzar; mixzur | *maxšev* 'computer' > <u>m-xš-v</u>: mixšev, muxšav, hitmaxšev; mixšuv | *misxar* 'commerce' > <u>m-sx-r</u>: misxer, musxar, hitmasxer; hitmasxarut, misxur | *masmer* 'nail' > <u>m-sm-r</u>: mismer, musmar; mismur | *mispar* 'number' > <u>m-sp-r</u>: misper, muspar; mispur | *ma'arav* 'west' > <u>m-'r-v</u>: hitma'arev; hitma'arvut | *mikcoa* 'profession' > <u>m-kc-A</u>: hitmakcea | *mokeš* 'mine' > <u>m-k-š</u>: mikeš, mukaš; mikuš | *'injan* 'matter, interest' > <u>'-nj-n</u>: 'injen, hit'anjen; hit'anjenut | *paršan* 'commentator' > <u>P-rš-n</u>: piršen | *karjan* 'announcer' > <u>k-rj-n</u>: kirjen | *taxkir* 'investigation' > <u>t-xk-r</u>: tixker, tuxkar; tixkur | *taxšiv* 'calculation' > <u>t-xš-v</u>: tixšev; tixšuv | *tamcit* 'summary' > <u>t-mc-t</u>: timcet, tumcat; timcut | *tamric* 'incentive' > <u>t-mr-c</u>: timrec, tumrac; timruc | *tasrit* 'script' > <u>t-sr-t</u>: tisret; tisrut | *tafkid* 'function' > <u>t-fk-d</u>: tifked; tifkud | *takciv* 'budget' > <u>t-kc-v</u>: tikcev, tukcav; tikcuv | *takcir* 'summary' > <u>t-kc-r</u>: tikcer, tukcar; tikcur | *tarbut* 'culture' > <u>t-rb-t</u>: tirbet, turbat; tirbut | *targil* 'exercise' > <u>t-rg-l</u>: tirgel, turgal; tirgul, tirgólet

From nominal complexes₂

kamut 'quantity' > <u>K-m-t</u>: kimet, kumat; kimut, kamat ‖ *dugman* 'model' > <u>d-gm-n</u>: digmen, dugman

From nominal blends

ramzor 'traffic light' > <u>r-mz-r</u>: rimzer, rumzar; rimzur

In the second type of extraction, aphaeretic extraction, all consonants but the first comprising nonverbal stems are extracted. There are too few examples to make any meaningful generalization as to the morphological characteristics of the first radical not extracted.

From nominal primitive bases

merkaz 'center' > <u>r-k-z</u>: rikez, rukaz, hitrakez; hitrakzut, rikuz, rakaz, tarkiz

From nominal compounds

macav ruax 'mood' > <u>c-vr-x</u>: civreax, hictavreax; mecuvrax

In the third type of extraction, apocopic extraction, one or more of the last consonants are excluded from extraction. The consonants excluded are those constituting suffixes in the source language(s) such as *-ja* and *-cja* in the case of borrowed nouns, or part of postformatives in the case of nominal simplexes such as *-et*. The consonant *j* seems to be prone to exclusion from extraction where it is supposed to be the last radical even if the total number of consonants including *j* is five or less.

From nominal primitive bases

'uxlusija 'population' > <u>'-xl-s</u>: 'ixles, 'uxlas, hit'axles; 'ixlus, hit'axlesut | *deprésja* 'depression' > <u>d-pr-s</u>: dipres; medupras | *fabrikácja* 'fabrication' > <u>f-br-k</u>: fibrek,

fubrak; fibruk | *fantázja* 'fantasy' > <u>f-nt-z</u>: fintez; fintuz | *kompilácja* 'compilation' > <u>k-mp-l</u>: kimpel, kumpal, hitkampel

From nominal simplexes

ta'asija 'industry' > <u>t-'-s</u>: ti'es, to'as; ti'us || *malkódet* 'trap' > <u>m-lk-d</u>: milked, mulkad; milkud | *misgéret* 'frame' > <u>m-sg-r</u>: misger, musgar; misgur | *tigbóret* 'reinforcement' > <u>t-gb-r</u>: tigber, tugbar; tigbur | *tikšóret* 'communication' > <u>t-kš-r</u>: tikšer

The fourth type of extraction, extraction with partial reduplication, involves the reduplucation of the last consonant of stems involved. The reason for this reduplication is easily explicable when the stem in question contains only two consonants, i.e., the structural regulation to make the minimal total number of radical components three. In other cases, however, the reasons are not as clearcut, especially in view of the fact that in some cases secondary roots formed through whole extraction, i.e., with no reduplication, coexist.

From nominal primitive bases

kod 'code' > <u>k-d-d</u>: koded/kided; kidud || *'avir* 'air' > <u>'-vr-r</u>: 'ivrer, 'uvrar, hit'avrer; 'ivrur, hit'avrerut | *blof* 'bluff' > <u>b-lf-f</u>: bilfef (jebalfef) | *gáven* 'hue, shade (of color)' > <u>g-vn-n</u>: givnen, hitgavnen; givnun, hitgavnenut | *faks* 'fax' > <u>f-ks-s</u>: fikses | *cinor* 'pipe' > <u>c-nr-r</u>: cinrer; cinrur || *flirt* 'flirt' > <u>fl-rt-t</u>: flirtet; flirtut

The fifth type of extraction, extraction with whole reduplication, involves the reduplication of all the consonants constituting stems which are biconsonantal.

From nominal primitive bases

daf 'page' > <u>d-fd-f</u>: difdef; difduf, dafdaf, dafdéfet, dafdefan | *kav* 'line' > <u>k-vk-v</u>: kivkev; kivkuv

In the sixth type of extraction, extended extraction, either *v* or *j* is added as the second or third radical in the extraction from biconsonantal stems, thus making the total number of radical components three.

From nominal primitive bases

hon 'capital' > <u>h-v-n</u>: hiven, huvan; hivun | *luax* 'table' > <u>l-v-x</u>: liveax; livuax | *sug* 'sort' > <u>s-v-g</u>: siveg, suvag; sivug | *šuk* 'market' > <u>š-v-k</u>: šivek, šuvak; šivuk || *'iš* 'man' > <u>'-j-š</u>: 'iješ, 'ujaš; 'ijuš | *'ot* 'letter' > <u>'-j-t</u>: 'ijet, 'ujat, 'ijut | *bul* 'stamp' > <u>B-j-l</u>: bilel, bujal; bijul | *min* 'type' > <u>m-j-n</u>: mijen, mujan, hitmajen; hitmajenut, mijun | *tag* 'tag' > <u>t-j-g</u>: tijeg, tujag; tijug | *tik* 'file' > <u>t-j-k</u>: tijek, tujak; tijuk || *gav* 'back' > <u>g-b-J</u>: giba, guba; gibuj | *jad* 'hand' > <u>j-d-J</u>: jida; jiduj | *mapa* 'map' > <u>m-p-J</u>: mipa, mupa; mipuj

5 Summary

Roots as one of the two discontinuous morphemes comprising root-pattern formation – a hallmark of the word-formation of Modern Hebrew and other semitic languages – are conceived as a purely synchronic unit. They are analyzed as composing two or three radicals, each of which contains up to three radical components, on the basis of their synchronic behaviors. They are biconsonantal, triconsonantal, quadriconsonantal or quinteconsonantal, and in terms of the number of radical components in each slot of a radical the following types of roots are found: 1-1, 1-1-1, 1-2-1, 1-3-1, and 2-2-1. The inventory of radical components is as follows: m, P, p, f, B, b, v, V, j, J, n, N, t, d, s, z, c, š, ž, č, ǧ, k, K, x, g, r, l, ', A, and h, where P, B, V, J, N, K, and A stand for the archiphonemes demonstrating the morphophonological alternations of p~f, b~v, v~Ø, j~Ø, n~Ø, k~x, and '~a respectively. This is in opposition with the traditional view which interprets the inventory of what are called radical components here as the letters of the alphabet.

Roots are divided into primary and secondary roots. The types of formation of the latter are summarized as follows: 1) expansion of primary roots: 1.1) reduplication of the first radical, 1.2) reduplication of the third radical, 1.3) addition of '; 1.4) addition of š, 1.5) addition of t; 2) extraction from nonverbal stems: 2.1) whole extraction: 2.1.1) from nominal primitive bases, 2.1.2) from adjectival primitive bases, 2.1.3) from nominal simplexes, 2.1.4) from nominal complexes$_2$, 2.1.5) from nominal blends; 2.2) aphaeretic extraction: 2.2.1) from nominal primitive bases, 2.2.2) from nominal compounds; 2.3) apocopic extraction: 2.3.1) from nominal primitive bases, 2.3.2) from nominal simplexes; 2.4) extraction with partial reduplication: 2.4.1) from nominal primitive bases; 2.5) extraction with whole reduplication: 2.5.1) from nominal primitive bases.

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Abstract

Roots as one of the two discontinuous morphemes comprising root-pattern formation – a hallmark of the word-formation of Modern Hebrew and other semitic languages – are conceived as a purely synchronic unit. They are analyzed as composing two or three radicals, each of which contains up to three radical components, on the basis of their synchronic behaviors. They are biconsonantal, triconsonantal, quadriconsonantal or quinteconsonantal, and in terms of the number of radical components in each slot of a radical the following types of roots are found: 1-1, 1-1-1, 1-2-1, 1-3-1, and 2-2-1. The inventory of radical components is as follows: m, P, p, f, B, b, v, V, j, J, n, N, t, d, s, z, c, š, ž, č, ğ, k, K, x, g, r, l, ', A, and h, where P, B, V, J, N, K, and A stand for the archiphonemes demonstrating the morphophonological alternations of p~f, b~v, v~Ø, j~Ø, n~Ø, k~x, and '~a respectively. This is in opposition with the traditional view which interprets the inventory of what are called radical components here as the letters of the alphabet.

Roots are divided into primary and secondary roots. The types of formation of the latter are summarized as follows: 1) expansion of primary roots: 1.1) reduplication of the first radical, 1.2) reduplication of the third radical, 1.3) addition of ', 1.4) addition of š, 1.5) addition of t; 2) extraction from nonverbal stems: 2.1) whole extraction: 2.1.1) from nominal primitive bases, 2.1.2) from adjectival primitive bases, 2.1.3) from nominal simplexes, 2.1.4) from nominal complexes$_2$, 2.1.5) from nominal blends; 2.2) aphaeretic extraction: 2.2.1) from nominal primitive bases, 2.2.2) from nominal compounds; 2.3) apocopic extraction: 2.3.1) from nominal primitive bases, 2.3.2) from nominal simplexes; 2.4) extraction with partial reduplication: 2.4.1) from nominal primitive bases; 2.5) extraction with whole reduplication: 2.5.1) from nominal primitive bases.