Roots, Bases and Stems

1 Root and Stem

Words are made up of roots, bases, stems, derivational endings, inflectional endings, and occasionally clitics. Not everyone agrees on these forms or on the names of them. This includes Katamba.

If we include base-extenders (stem-extenders as some kind of near-morph or sub-morph, then a root is that part of a word from which all affixes and stem-extenders have been removed. A root differs partially from a stem in that a stem must have lexical meaning. A root has no lexical meaning and the semantic range of the root is vague if there is any at all. A stem may contain derivational affixes.

Consider the following nouns, adjectives and verbs in English:

(1) car, book, buy, sell, eat, type, run, play, dog, cat, mouse, … .

None of these wordforms contains an affix. They are, therefore, roots. Each wordform in the same set is also a stem. Each form has lexical meaning. Here, they are coterminously a root and a stem.

Roots are also bases. A base may contain affixes, a root cannot:

(2) a. car, book, buy, etc. are roots and stems.

b. pre-fer, in-sip, in-sip-id, chick+en, re-bel, de-lay are bases only.

Consider the verb defer. There is no verb stem *fer. Fer is a verbal root. It is found in refer, inter, prefer, differ, prefer, offer. The forms to the left of -fer are prefixes which cannot occur in isolation. Even these prefixes do not have a fixed lexical meaning. In a tree structured form, these verbs are composed of a prefix and a root. Together this forms a stem; the category is inherent in the stem:
Sometimes a root occurs with one or more suffix to form as stem:

(4)  
   a. stup-id, stup-our, stup-end-ous, stup-if-y  
   b. rig-id, rig-our  
   c. frig-id, re-frig-er-ate  
   d. splend-our, splend-id  
   e. cand-our, cand-id  
   f. val-id, val+our  
   g. putr-id, putr-ify  
   h. com-ic, com-edy (cf: rem-edy)

The structure for (4a), for example, is the following:

(5)  

A-stem

stup-id

Root

stup

Suffix

-id

We have named the new structure an ‘A-stem’ for adjective stem. In the more common practice of creating new structures from the bottom up, the category of the head is usually copied upward. If that were the case here, we would have to call the root an A-root. It is not clear that the root has any features that imply a category. The root easily feeds the seven adjectives in (4) with the common suffix ‘-id’ forming an adjective. It is the suffix that
has the adjective forming property. Note that '-our' forms nouns, and '-ify' and '-ate' form verbs. It is simpler and less messy to assume that the root has no categorical property, though this assumption could be wrong.

The suffix bears the categorical feature of the derived item; consequently (5) is replaced with (6):

(6)
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  ____________
   \     /   \
   /     \
------------------
      A-stem
         \   /  \
          \ /   \
            Root
            stup

            /   \
           /     \
          A-suffix
             \
               -id
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Although suffixes need a host (the form that they are adjoined to) they control the category of the derived stem.

2 Bases

Bases are similar to stems but they have no lexical meaning. This definition differs somewhat from Katamba whose definition is confusing.

(7) Base

A base is a form to which an affix may be adjoined. As such, it has no lexical meaning.

All roots are bases, but not all bases are roots. Roots are monomorphemic. For many words in English, root = base = stem:

(8) cat, dog, see, happy, run, gray, hope, up, over, if, under, that.

Figure (6) should now be replaced with (9):
(9) base, A-stem
    \[\text{stup-id}\]
  Root, base
    \[\text{stup}\]
A-suffix
    \[\text{-id}\]

An example of a base occurs in \textit{refrigerator}. It can be broken down into the following morphs:

(10) \text{re-frig-er+at+or.}

We look for bases from bottom up. Start with the root; to do so removed what you think are the affixes. If you ripped off \text{re-}, \text{-er-}, \text{+at}, and \text{+or}, you did well. The root is ‘frig’. We find this root in \textit{frigid}, But \text{*frig-er} is not a word. It has no lexical meaning; therefore, it cannot be a stem. It must be a base. Note that whereas ‘frig’ is a root and a base, ‘frig-er’ is a base, but it is not a root. It is not a stem since it has no lexical meaning.

(11) a. frig. [root, base].
    b. -er [suffix].
    c. frig-er. [base].

Now add ‘re-‘. ‘refriger’ is not a word nor does it have lexical meaning. It must be a base:

(12) a. re- [prefix]
    b. re-frig-er [base].

Now add ‘+ate’. refrigerate’ is a word. It is a verb stem with the meaning of keeping cool or cold. But, it is also a base, because we added an affix to a base. The base is also a stem if it has lexical meaning, which it does:

(13) a. +ate [suffix].
    b. re-frig-er+ate [base, stem].
Add an inflecting suffix to make it a word form:

(14)  a.  +ed [inflectional suffix].
      b.  re-frig-er+at+ed [word form].

Add another derivational suffix to the lexical stem to form a new base; if it is lexical it is then a stem:

(15)  a.  +or [derivational suffix]
      b.  re-frig-er+at+or [base, stem].

Add an inflectional suffix to make it a word form:

(16)  a.  +s [inflectional suffix].
      b.  re-frig-er+at+or+s. [word form]

There are two kinds of affixes: derivational and inflectional. Inflectional affixes occur on the outside of derivations affixes; that is, the derivational affix is always closer to the stem than the inflectional one:

(17)  a.  burners, *burnser
      b.  burn+er+s, *burn+s+er.

Inflectional affixes carry grammatical meaning. Grammatical meaning is meaning that is required by the grammar. It can’t be deleted:

(18)  a.  two dogs
      b.  *two dog

(18b) could be wrong for two reasons. The first is dog is not marked for number (singular vs. plural). The second is that dog is interpreted as singular, in which case grammatical agreement does not apply.
(19)  
a. John plays everyday.

b. *John play today.

c. *John played now.

(19b) needs a suffix—either ‘s’ to mark the present tense or ‘ed’ to mark the past tense. (19c) has a suffix but it is the wrong one. The time adverbial ‘now’ requires the present, not the past tense. It is the grammar of English that required this. Sometime a particular form is phonetically missing. This could mark a construction where the form is not required. However, we don’t find this in simple verbs. An example would be the following:

(20)  
a. John worked here yesterday.

b. John has worked here for six months.

In (20a) the sentence is marked as imperfect by the lack of some form of the verb to have. In (20b) has marks the present perfect.

Derivational affixes are not required by the grammar. They are used optionally, but they must conform the grammatical requirement. For example:

(21)  
a. The lioness challenged her mate.

b. The female lion challenged her mate.

c. The lion challenged her mate.

All three sentences are nearly synonymous. The lion in (21c) can only be interpreted as female when the pronominal ‘her’ refers to the lion. Otherwise, it does not. The adjective female in (21b) ensures that the lion must be female, as is the case n (21a). The grammar does not require the use of a female form in (21). It is inserted if the speaker wants to include this information that is to be transmitted to the hearer.

There is some reason to believe that agreement might mark the end of a word, but this is far too speculative to discuss here. Clitics are adjoined to the end of a word, and they appear to be adjoined to words whose final morpheme is agreement.
3 One problem

The way we have defined base and stem here raises a problem with nouns formed with base-extenders formed from Latin nouns. Consider the following nouns:

(22) radius, radii, radial, radiant.

If we consider ‘-us’ to be a base-extender, then there are two bases, radi- and radi-us. ‘radi-us’ becomes a stem when we pass through the lexicon and find out that ‘radi-us’ is a lexical stem, a lexeme. The singular is not overtly marked with a suffix. Now let us consider the plural. Since the plural is marked with an inflectional suffix except for a few Germanic based nouns, we should analyze ‘i’ as the plural suffix: radi+i. This means that ‘radi’ here is a root, a base, and a stem, but not a word form. This leads to a bit of confusion which is unfortunate: ‘radi’ is a base, OK, but it is a stem when overt suffixes are added to it. It is a base only when the base extender is adjoined to the base forming the new base ‘radi-us.’

Most of us are trained to compare the spelled out form less any suffixes as a stem. So what is the lexeme? This is the now familiar (I hope) case of having ‘eme’ words and ‘allo-’ words: lexeme and allolex, based on phoneme and allophone, morpheme and allomorph. The two allolexes are ‘radi’ and ‘radius.’ If we don’t buy the underlying representational theory, then we list the distribution of the two allolexes:

(23) a. radi+us / _____ (null ending).
    b. radi / _____ elsewhere (the default).

Note that we can’t use the term ‘allomorph’ since two morphemes (one a base extender) are used. Of course, if we don’t recognize base-extenders as a viable notion, then we are forced to analyze the singular as ‘radius’ = root = base = lexeme (stem). Some people won’t like considering ‘radius’ as a root. So, what do we do?

4 Summary

The following represent the pattern of word building:
(24) a. root = base: stup-
   b. root = base = stem: hand, see, radio, window, finger, house.
   c. base + derivational affix or stem extender = base: sip-id
   d. base + derivational affix or stem extender = base = lexeme (stem):
      stup-id, frig-id, lion+ess, duck+ling, room+ette.
   e. stem + inflectional affix = wordform: hand+s, see+s, radio+s,
      finger+s, house+s, lion+ess+es, town+ship+s, wash+er+s.

Because of forms such as “sip-id”, we see that derivational affixes are added to bases. Derivational affixes may change the lexical meaning associated with the lexical stem = base which underlies derived base=stem: hand → hand+y. The latter means useful now, it doesn’t refer directly to a hand, but it is derived from ‘hand.’ Derivational affixes often change the category of the base=stem to which they are adjoined: move = verb, move+ment = noun. Sometimes they can do both: heal = verb, heal+th = noun. Here, ‘health’ no longer refers to ‘healing (something)’ but to one’s physical or mental well-being. Sometimes it appears that a derivational suffix is added directly to a stem (lexeme): warm, warm+ly. We find it desirable to keep the pattern of derivation simple, that is, derivational affixes are added to bases, The lexical meaning is obtained from the lexicon, the vocabulary of the speaker. In words such as adverbs derived adjectives, it is best to say the warm+ly is derived from the stem “warm,” The adverb is then said to inherit the lexical meaning of the stem equivalent to the base:

(25) a. swift: root = base = stem “quick”
   b. swiftly+ly: [root = base = stem “quick”] + base = stem = “adverb: in
      “the manner of ‘stem = “quick”.””

Unfortunately, there is no way to predict when the underlying meaning is inherited. It occurs more often for some derivational suffixes than it does for others.

In (25b) the brackets enclose the underlying root = base = stem “quick”; then ‘ly’ is adjoined to the underlying base, which makes a new stem, inheriting its meaning from the underlying stem. I will now put (25b) into a tree structure:
The meaning “quick” and “in the manner of” are each inherited when the suffix ‘ly’ is adjoined to its host.

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