HERMIT CRABS:
FORMAL RENEWAL OF MORPHOLOGY
BY PHONOLOGICALLY MEDIATED AFFIX SUBSTITUTION

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A grammatical affix undergoing phonetic erosion is sometimes abruptly replaced by a conveniently available lexical stem with which it shares one or more phonological segments. The new affix has the phonological shape of the old independent stem, but acquires the basic grammatical function of the old affix, though it may also bring in a portion of the stem’s own morphological and semantic idiosyncrasies. Because the old affixal form is eliminated, the historical process can easily be misdiagnosed as reflecting the gradual compression of an original syntactic construction which includes the relevant independent stem. Recognition of the system-renewing element in this particular type of stem-to-affix grammaticalization leads to awareness of the pivotal role of the inherited system in grammaticalizations, and to a general critique of historical models which see grammaticalization as a straightforward syntax-to-morphology compression.*

INTRODUCTION. For some time now the most energetic force in historical linguistics has been a movement that sees morphosyntactic change as driven by the grammaticalization of original syntactic configurations. Using chemical and geological metaphors like ‘bleaching’ and ‘compression’, complemented by a ‘paths of change’ figure, this line of research argues that grammatical systems are produced by slow-acting forces that break down syntactic configurations, whereby lexical stems with concrete senses (‘go’, ‘back’) evolve into more abstract grammatical concepts which come to operate on other, more substantive lexical items. The direction of change from lexical stem to grammatical morpheme is predetermined, by some combination of natural cognitive connections and universal constants of discourse structure, in ways that can be captured by crosslinguistically valid directional sequences (paths of change): ‘the source meaning uniquely determines the grammaticization path that the gram will travel in its semantic development’ (Bybee et al. 1994:12). While the path may contain some steplike discontinuities, the intermediate stages must be traversed to get from the initial to the final point. Therefore a stem must become a clitic en route to affixhood: ‘While there is not always evidence of a clitic pre-stage in the grammaticization of affixes out of autonomous lexical words, the very loss of lexical autonomy involved in the process presupposes a clitic stage’ (Hopper & Traugott 1993:132).

The notion of syntax-to-morphology compression is old, as are systematic comparisons between language and, for example, geological structures (Naumann et al. 1992). Interest in grammaticalization was revived by Indo-Europeanists in the early and mid twentieth century (see the following section). More recently, there has been a surge of sophisticated work in grammaticalization studies (Bybee et al. 1994; Heine et al. 1991; Traugott & Heine 1991; Hopper & Traugott 1993). Though somewhat eclectic, its theoretical grounding is primarily in a functional typology that stresses the interplay between cognition and discourse principles (Givón 1979, 1984/1990).

In the empirical body of this article I show what can go wrong when this model is

* Earlier versions of the Uto-Aztecan material were presented to a conference on syntactic change at the University of Michigan in 1980, in a rather different context, and to a workshop on reconstruction at the University of Pittsburgh in 1990. I would prefer that the present article be the citation of record instead of the hard-to-find working version in the conference proceedings. I thank four Language referees for useful comments; some of the literature discussed here was suggested by them.
applied in detail to the historical morphology of a specific language family. I therefore consider the intensive historical work on Uto-Aztecan by a team based in California in the 1970s, led by Langacker (1975, 1976, 1977a). Abstract higher predicates like BE, DO, and HAVE have played important roles in generative semantics (a precursor of contemporary cognitively and semantically based grammatical models), and one of Langacker’s ideas was to bring out similarities between processes of historical change and synchronic rules that delete semantic/pragmatic structure (1975). Another basic belief was that the primary mechanism of morphosyntactic change was compression of complex structures into smaller ones, and Langacker 1977a has been influential in recent grammaticalization theory (Hopper and Traugott 1993:40) call it ‘a major paper on syntactic change’). He saw this process in revealingly metaphorical terms.

It would not be entirely inappropriate to regard languages in their diachronic aspect as gigantic expression-compacting machines. They require as input a continuous flow of creatively produced expressions formed by lexical innovation, by lexically and grammatically regular periphrasis, and by the figurative use of lexical and periphrastic locutions. The machine does whatever it can to wear down the expressions fed into it. It fades metaphors by standardizing them and using them over and over again. It attacks expressions of all kinds by phonetic erosion. It bleaches lexical items of most of their semantic content and forces them into service as grammatical markers. It chips away at the boundaries between elements and crushes them together into small units. The machine has a voracious appetite. Only the assiduous efforts of speakers—who salvage what they can from its output and recycle it by using their creative energies to fashion a steady flow of new expressions to feed back in—keep the whole thing going. (Langacker 1977a:106–7)

Most of the metaphors are of gradual or incremental physical processes (continuous flow, wear down, fades, erosion, bleaches, chips away). This is consonant with contemporay grammaticalization theory: ‘Grammaticization takes place very slowly and proceeds very gradually’ (Bybee et al. 1994:24). And yet somehow the process is also seen as abrupt and cyclical; the grammar undergoes merciless ‘crushing’ by the ‘machine’, after which the speakers emerge from their bunkers to ‘salvage’ some of the ‘output’ and ‘recycle’ it. There is an ambivalence here about the temporal character of grammaticalization (gradual or abrupt, continuous or cyclical, gentle or destructive) which is diagnostic of deeper conceptual problems in the theory.²

If the processes are in fact slow, or affect only a small portion of the system at any given time, the central system of grammatical categories of the language should remain largely intact across any particular generational divide. The core system should therefore exert considerable influence over any new morphosyntactic material in the process of becoming grammaticalized, both by selective acceptance and by subtly channeling the newly accepted material into particular categories. Langacker, like the current grammaticalization specialists, recognized the need to maintain a viable grammar across the generations, but saw the dynamic process insuring this as a repeated recycling in which the (phonological) rubble left by the machine at the end of one cycle is picked up and pieced together into a new grammar by speakers responsive to universal cognitive and discourse-functional demands. In this ‘junkyard’ model, there is no real sense in which the particular prior system of grammatical categories, with its unique typological fea-

¹ Whether these linguists still hold their earlier views on the relevant historical developments is immaterial to this article, in which I aim to show how a grammaticalization model can lead to erroneous conclusions. As it happens, in the meantime there has been a lull in published studies of Uto-Aztecan historical verbal morphology. The recent published work I know of on UA historical linguistics has dealt with subgrouping, lexicon, phonology, and nominal morphology, none of which bears directly on the issues treated here.

² Another example: ‘the new grammar is constantly being created on top of the willing and yielding ruins of the old’ (Matisoff 1991:447). Note the same mix of metaphors of continuity (‘constantly’) and destruction.
tures, is restored in the process. (I return to the notion of ‘junk’ at the end of the article.) The destructive aspect of grammaticalization would be more plausible if the processes were sudden and massive, forcing a new generation of speakers to construct a grammar anew, as in abrupt-creation models of Caribbean and certain other creoles—models which, not accidentally, were particularly attractive to typologists with strong interests in cyclical grammaticalization (Bickerton & Givón 1976).

In the absence of unusual contact situations, I argue here, the ‘old’ grammatical patterns (categories and forms) are always decisive in shaping the way ‘new’ patterns fit into the system. Grammaticalization is not the work of a mechanical monster or other external force. Nor are lexical items like ‘go’ and ‘have’ propelled by preprogrammed navigational paths into morphology, in the fashion of drone aircraft. Instead, the old grammatical system typically renews itself by acquiring new raw material to express old categories, often additionally preserving the original formal arrangements. In the cases discussed here, the changes are relatively abrupt, but are restorative rather than destructive. My chosen metaphor is from biological behavior rather than the physical sciences.

To argue the case, I review the original scenario for grammaticalization patterns in Uto-Aztecan verbal morphology developed initially by Langacker along with several students and colleagues, and worked out in greatest detail by Jacobs (1975). This body of work represents perhaps the most thorough application of grammaticalization theory in the entire recent literature to a group of closely related languages. Moreover, the linguists in question had strong theoretical linguistic backgrounds, and had good data on the relevant languages from fieldwork by themselves and by contemporaries.

Noting phonological resemblances between verbal suffixes and independent verb stems (synchronic or reconstructed), these linguists argued that the morphological formations resulted from the gradual compression of former syntactic constructions. I argue, to the contrary, that the injection of the former independent stems into affixal morphology was relatively sudden, and was triggered crucially in each case by the fortuitous partial phonological similarity of the old independent stem and an old affix.\(^3\) The latter normally disappeared in the process, so that its former presence can be inferred only from comparative data from related languages (or internal reconstruction from vestigial remnants). The central dynamics of the historical changes were not external forces working at a leisurely pace over several generations, but the relatively abrupt formal renewal of a preexisting category threatened with elimination due to phonetic erosion or other factors. Instead of following universal paths of change, the connections between old independent stems and new affixes were language specific, and on occasion semantically bizarre. The methods necessary to elucidate the relevant historical dynamics are the traditional forensic techniques of (nontypological) historical linguistics. After a brief discussion of the supposed intellectual ancestry of grammaticalization theory (§1), and a description of hermit-crab processes (§2), I return to the Uto-Aztecan case material (§3). This is followed by a shorter review of a similar

\(^{3}\) ‘Abrupt’ here does not mean instantaneous, merely that there was no stage of the language lacking the affixal category in question. (Compare the notion of ‘geologically instantaneous’ speciation in paleontology.) In the grammaticalization literature, one sometimes encounters claims that grammaticalization is ‘abrupt’ (or ‘instantaneous’, ‘sudden’, ‘saccadic’, etc.), but in a different sense referring to the initial extension of a formation from its prior usage to another with a structurally distinct representation. Givón: ‘... cognitively, grammaticalization is not a gradual process, but rather an instantaneous one. It involves the mental act of the mind recognizing a similarity relation and thereby exploiting it, putting an erstwhile lexical item into grammatical use in a novel context’ (1991:122, italics original).
problem in Germanic historical linguistics (§4). I conclude with a general criticism of the logic of grammaticalization theory and further comments on the use of tropes.

1. Grammaticalization theory in classic Indo-European linguistics. Current specialists in grammaticalization theory acknowledge the pivotal role of earlier generations of Indo-Europeanists in initiating modern research in the field. Meillet (1921 [1912]) is cited not only for coining the term GRAMMATICALIZATION but also for making important theoretical distinctions, and hence for being ‘the founder of modern grammaticalization studies’ (Heine et al. 1991:8). Benveniste and Kurylowicz are also regularly cited with approval; see the historical surveys at the beginning of Hopper & Traugott 1993 (18–25) and Heine et al. 1991 (8–11). However, a more careful reading of these sources is needed, with particular attention to the role these Indo-Europeanists ascribed to the prior grammatical system in determining the manner in which lexical material is grammaticalized.

By GRAMMATICALIZATION, Kurylowicz refers mainly to the transition from derivational to inflectional function of already affixed formations, and in some passages this is the only sense. ‘The change of an inflectional category into a derivative is called lexicalization of the respective morpheme. The opposite change (derivative > inflectional) is called grammaticalization’ (1964:36, italics original). True, in other passages, he includes the transition from stem to affix as a subtype of grammaticalization, but morphology-internal shifts seem to be his main concern.

Meillet makes a clear initial distinction between grammaticalization, by which a nongrammatical morpheme comes to function as a grammatical element, and ANALOGICAL INNOVATIONS, by which inherited grammatical material is reconfigured. At first sight, he is squarely in the camp of the paths-of-change grammaticalization theorists.

Whereas analogy may renew the detail of the forms, while most often leaving intact the overall pattern of the preexisting system, the ‘grammaticalisation’ of certain words creates new forms, introduces categories which had lacked linguistic expression, transforms the whole of the system.

As the paper unfolds, however, we see Meillet’s typical appreciation of the role of the synchronic systemic context in channeling grammaticizations (as well as analogical changes). Leading us from Indo-European through Latin to modern Romance languages, he shows us how a basically stable system of negation is regularly renewed with new material. At each stage, the grammar must provide the speaker with both an unmarked negation (I didn’t eat) and a more emphatic or expressive version (I didn’t eat at all). As one stage’s emphatic version becomes routinized and loses its oomph, it becomes the next stage’s unmarked negation; a new emphatic version is then fashioned out of newly grammaticalized lexical material, and the ‘spiral’ continues (1921:140). It is precisely the grammar’s need to provide speakers with expressive morphology that motivates grammaticalization.

Moreover, the pattern of grammaticalization depends on the preexisting morphosyntactic type of the language:

The grammatical categories that are subject to being expressed by means of words converted into grammatical elements are, to elaborate on what has just been said, those which have a certain expressive character; at least this is what happens in languages where there exist grammatical forms characterised by affixes fused to the words. Languages which, like Chinese and perhaps even more Vietnamese, know

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4 ‘Tandis que l’analogie peut renouveler le détail des formes, mais laisse le plus souvent intact le plan d’ensemble du système existant, la “grammaticalisation” de certains mots créé des formes neuves, introduit des catégories qui n’avaient pas d’expression linguistique, transforme l’ensemble du système.’
no affixation, are led to express more categories by the accessory words which are often called empty words.5 (141)

In his ensuing discussion of Latin and Romance periphrastic tense/aspect categories (perfect, future), Meillet continues to argue that the grammaticalizations are selectively driven by grammar-internal functional requirements. The disappearance of the Latin inflected perfect ‘left a gap’ which forced speakers to find a new, periphrastic type. The early Romance languages likewise created a periphrastic future ‘when the [inflected] future of ancient Latin had become too weak, too unexpressive’ (142, 145). Meillet saw the renewal of the future as maintenance of a nonuniversal, language-specific category: ‘The future is not a necessary form; but in the languages where it exists, it is constantly renewed’ (146).6

Benveniste’s most accessible and widely quoted paper on grammaticalization begins with a distinction between ‘innovating mutations’, which add new categories or delete old ones, and ‘conservative mutations’, by which a preexisting morphological category is displaced by ‘a periphrastic category with the same function’ (1968:85–86). He gives only brief mention of examples of the innovating type (loss of the neuter gender, loss of the dual number, reduced number of nominal inflectional classes, creation of definite articles, creation of -/-y adverbs). None of these cases directly involves the grammatically paramount VP or clausal categories (tense, aspect, mood, negation, and so on).

Benveniste quickly turns to the more interesting and important ‘conservative’ mutations, which constitute the bulk of his paper. He begins by showing how the early Romance periphrastic perfect construction was especially suitable for renewing the Latin (inflected) perfect[ive], each component (‘have’ auxiliary, passive participle, and semantic class of verb) bringing out one essential aspect of the perfect category.

Thus the periphrastic form is heir to the original perfectum, not only by virtue of a historical sequence of events, but also because it brings to light its inherent value . . . The structural mutation results in a functional preservation. (1968:89)

In his next section, Benveniste describes the late Latin and early Romance periphrastic future in similar fine-grained detail. He identifies the origin of the construction in certain passive subordinated clauses, denoting foreordained events. Having located the earliest attestations in writings of ‘the Christian theologians starting with Tertullian (early third century A.D.),’ he hints that the new religion with its distinctive linear interpretation of unfolding history was a factor in the grammatical development.

This periphrasis acts as the equivalent of a future passive participle, indicating not obligation . . . but predestination. No nominal form of the Latin verbal paradigm was available for this concept, which was both new in regard to the classical ‘tenses’ and vital in the conceptual frame in which it developed. (1968:89–90)

These citations can be multiplied. The point is that the centrally important Indo-Europeanists Kuryłowicz, Meillet, and Benveniste, who are correctly credited with inaugurating the modern study of grammaticalization, were keenly aware that the latter did not take place in a vacuum. They realized that grammaticalization, above all in the tense-aspect-mood-negation system of verbs, was tightly controlled by system-internal

5 ‘Les catégories grammaticales qui sont sujettes à être exprimées au moyen de mots devenus éléments grammaticaux sont, par suite de ce qui vient d’être dit, celles qui ont un certain caractère expressif; c’est du moins ce qui a lieu dans les langues où il existe des formes grammaticales caractérisées par des affixes soudés aux mots. Les langues, qui, comme le chinois et plus encore peut-être l’amazone, ignorent toute affixation, sont conduites à exprimer plus de catégories par des mots accessoires qu’on appelle souvent mots vides.’

6 ‘Le futur n’est pas une forme nécessaire; mais dans les langues où il existe, il se refait constamment.’
considerations, including both the gross morphosyntactic form of the language (in-
flected, analytic, etc.) and a strong tendency to maintain preexisting categories (whether
universal or language specific) whose prior expression had become unsatisfactory in
one way or another.

This is in stark contrast to recent grammaticalization theory, whose central image is
of phrasal constructions entering the grammar on their own energy. In this view, the
prior grammar becomes involved only belatedly and passively, as the intruding gram-
maticalized formations push out older formations or force reanalysis of synchronic
paradigms. Grammar is basically a junkyard: ‘The processes that lead to grammatical-
ization occur in language use for their own sake: it just happens that their cumulative
effect is the development of grammar’ (Bybee et al. 1994:298). These secondary effects
have nothing to do with the primary grammaticalization itself, and can be safely disre-
garded even in book-length synthesizing treatments of the subject: ‘we will also not
look into the question as to how the rise of new grammatical forms affects the network
of existing grammatical expressions, such as leading to a restructuring of the content
of these expressions or to the emergence of ‘“zero expressions”’ (Heine et al. 1991:26).

This article is close in spirit to the intellectual tradition defined by Kuryłowicz,
Meillet, and Benveniste, a tradition that has no deep affinity with current grammatical-
ization theory. Nevertheless, the specific historical mechanism proposed for Uto-
Aztecans languages in §3 may seem bizarre to their Indo-Europeanist successors, even
though a case for a similar mechanism can be made for a crux of Germanic historical
linguistics (§4).

2. HERMIT-CRAB RESTRUCTURINGS. In biology, hermit crabs (Pagurus and Eupagurus
spp.) are soft-bodied crustaceans which survive only by locating and occupying empty
shells left on the beach by defunct mollusks. Any suitably cozy and solid univalve
shell within certain parameters will do. During its lifetime, a single hermit crab discards
several shells as they wear out, replacing them with more robust ones, often from
distinct mollusk species.

The linguistic analogue is a particular ‘method’ of formal renewal of a grammatical
affix that has undergone phonetic attrition to the point of being inadequately perceptible
or risking complete disappearance. An independent lexical stem with a more robust
shape (i.e., more phonetic material), and sharing one or more conspicuous segments
such as an initial consonant with the ailing affix is seized on. The phonological form
of the old independent stem replaces the old affix. The independent stem continues to
coeexist with its new alter ego as a grammatical morpheme, at least for a time. The next
generation of native speakers is ‘fooled’ into thinking that the stem and homophonous
affix are in some sense the same element. While basically carrying out the grammatical
function of the old affix, the new affix may also bring in some morphological and/or
semantic properties of the old independent stem, which strengthens the synchronic
association, at least temporarily. Unwary linguists note the phonological identity of
stem and affix, and consider their shared morphological and semantic peculiarities to
be telltale evidence: ‘multiple uses and the retention of lexical specificities can be
employed as diagnostics of the earlier history of grammatical material, even in lan-

7 A semantic similarity between this stem and the old affixal category is always a favoring factor. However,
in some cases described below there is little discernible semantic connection, and it would be foolhardy to
attempt a rigorous universal delimitation of possible hermit-crab sources.
guages for which historical attestation is sparse or nonexistent . . . [they] constitute fossil evidence' (Bybee et al. 1994:18). A straightforward grammaticalization process (syntactic phrase frozen into morphology) is diagnosed. The perfect crime has been committed.

The hermit crab is the affixal category itself. The mollusk shells are the successive phonological forms which express the category.

3. THE CUPAN LANGUAGES AND THE KEY DATA. The primary focus of the Uto-Aztecan (UA) work which I hope to revise was the Cupan subgroup of Northern UA, consisting of Cahuilla, Cupeño, and Luiseño along with a few poorly documented and long-extinct neighbors which will not be mentioned here. The first two languages are a subgroup (CaCu) within Cupan. The Cupan group and the next most closely related language, Serrano, make up the Takic subgroup, one of four genetic components of Northern UA. See Figure 1.8

![Figure 1. Takic subgroup of Uto-Aztecan.](image_url)

The major cases of putative direct grammaticalization of independent verb stems to be reviewed here are listed in Table 1. The phonological representations are Proto-Cupan or Proto-CuCa.

<table>
<thead>
<tr>
<th>ORIGINAL STEM</th>
<th>GLOSS OF STEM</th>
<th>CATEGORY OF RELATED AFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>*qal-</td>
<td>be</td>
<td>durative sg</td>
</tr>
<tr>
<td>*win-</td>
<td>be (pl)</td>
<td>durative pl; passive</td>
</tr>
<tr>
<td>*nac-</td>
<td>sit</td>
<td>future durative</td>
</tr>
<tr>
<td>*nim-</td>
<td>go around</td>
<td>future</td>
</tr>
<tr>
<td>*yax-</td>
<td>say</td>
<td>mediopassive</td>
</tr>
<tr>
<td>*tikan-</td>
<td>do, happen</td>
<td>causative</td>
</tr>
</tbody>
</table>

Table 1. Putative cases of direct grammaticalization.

I suggest that in the first five of these six cases the independent stem did play a role in the origin of the related affix, but in a hermit-crab style. This means that there was in each case a preexisting affix of similar phonological form, whose overt expression

8 Not all Uto-Aztecanists accept Northern UA as a genetic unit. The evidence (shared sound changes, shared morphological innovations, and lexicostatistic grouping) has long seemed to me to be overwhelming. In any event, details of subgrouping at this higher level are not central to this article.


Transcriptions are those of the source publications unless otherwise indicated, but where morpheme boundaries were not shown they have been added. Terms for grammatical categories have been slightly normalized to facilitate comparisons.
was renewed by acquiring the phonological form of the independent stem, followed
by a partial injection of this stem’s semantic and/or morphological properties. The
original affixes in question are shown in Table 2 along with the paired independent
stem(s).

<table>
<thead>
<tr>
<th>ORIGINAL STEM</th>
<th>ORIGINAL AFFIX</th>
<th>CATEGORY OF ORIGINAL AFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>*qal-</td>
<td><em>-qa- (</em>-kka-)</td>
<td>agentive</td>
</tr>
<tr>
<td>*win-</td>
<td>*-wa-</td>
<td>passive</td>
</tr>
<tr>
<td>*nac-, *nim-</td>
<td>*-ni-</td>
<td>future</td>
</tr>
<tr>
<td>*yax-</td>
<td>*-ki-</td>
<td>mediopassive</td>
</tr>
</tbody>
</table>

Table 2. Original affixes.

I will first dispose of the last case, where the independent stem seems to have played
no role, then discuss the more interesting hermit-crab cases. Readers with limited appetite for historical minutiae can skim most of §3. The general idea can be gotten painlessly from §3.6.

3.1. CAUSATIVE *i-na-. In Cupan there is a class of thematic verbs which have a
transitive form (basically causative or factitive) reconstructible as Proto-Cupan *-in-
(Luiseno/-i-/, Cahuilla and Cupeno /-i-/ or reduced in Cupeno to /-i-/) in some en-
vironments), and an intransitive (mediopassive) form (discussed in §3.2; see Heath 1978,
cf. Langacker 1977b:132, 145). Thematic suffixes directly follow the relevant verb
roots (typically CVC- or CVVC-), preceding further suffixes marking e.g. tense/aspect.
A Luiseno example is /néc-i-/ ‘pay’ (contrast mediopassive /néc-ax-/ ‘be paid’).
With a recent-past suffix this becomes /néc-i-qat/ ‘paid’ (Kroeber & Grace 1960:161,
stresses added following Bright 1968:27).

Jacobs offers two alternative historical analyses. One is to derive Proto-Cupan *-in-
directly from Proto-UA causative *-ina (1975:139–40), or more accurately *i-na.9 This
is certainly the correct analysis. The loss of word- and stem-final vowels, and the
leftward shifting of affixal morpheme boundaries, are regular in Cupan (Proto-UA
*CVCi-CV → Proto-Cupan *CVC-iC), so no external factors need be invoked to ac-
count for the historical phonology. The grammatical function of the Cupan reflexes is
also similar to that of the Proto-UA (or at least Proto-Northern-UA) etymon.

Jacobs’s alternative possibility is to derive *-in- from a reconstructed Proto-Cupan
verb *i-xan ‘to do, to behave, to happen’ (1975:159–64). He was attracted to this
possibility because such a grammaticalization would be parallel to one he proposed
for the corresponding mediopassive thematic affix for many of the verbs which take
causative *-.in-. Moreover, both causative and mediopassive affixes allow (in Cupeno
only) the insertion of a pronominal prefix between the stem and the affix, which gives
the affix the appearance of acting like a verb stem (see below). The reasoning is intelli-
gent, but relies on the belief that the mediopassive themes represent a similar grammati-
calization, a conclusion that will now be disputed.

3.2. MEDIOPASSIVE *-ki-. The class of thematic verb stems (ranging from very large
in Luiseno to quite small in Cahuilla) is clearly related to similar classes in most other
Northern UA languages (there is a somewhat distinct southern UA version, for example
in Nahuatl). The core of the verb class is simple action verbs like ‘pop’, ‘bend’, and

9 The superscript indicates that i-ablaut applies to the preceding morpheme (usually the verb stem), the
final vowel shifting to /i/. Ablaut and other UA morphophonemic patterns are analyzed historically in Heath
1977.
‘snap’, which occur with high frequency in both intransitive (mediopassive) and transitive (causative) forms. In Proto-Northern UA, the mediopassive suffix was *-ki- (or *-qi-, the velar and uvular stops being distinct in some of the languages): Hopi /-qi/, Serrano /-qi/.10 Note that Serrano, the closest relative of Proto-Cupan, participates in this suffixal cognate set.

The regular output of Proto-Northern UA *-ki- would be Proto-Cupan *-ax-. The intervocalic velar stop undergoes spirantization to the fricative *x. With the leftward shifting of morpheme boundaries, a suffix like this which does not induce i-ablaut normally generalizes to *a, the most common (unablauted) stem-final vowel: *CVCa-ki- > *CVC-ax-. The actual Cupan forms are Luiseno /-ax-l/, Cahuilla /-i-l/, and Cupeno /-ax- ~ -yax-l/. A Luiseno example is /néč-ax-l ‘to be paid’ (Kroeber & Grace 1960:151, Bright 1968:27).

The Luiseno suffix form requires no massaging; it can derive directly from Proto-Northern UA *-ki- by regular sound changes, with no significant change in grammatical function. However, this is not true of the Cahuilla and Cupeno forms.

The Cahuilla form /-i-l/ is problematic. The thematic class in this language is unproductive, limited to a smallish set of stems. Since *x frequently disappears before *q, it is reasonable to think that Cahuilla /-i-l/ is immediately derived from something like *-ix-, the x-less surface variant (before aspectual suffixes beginning in *q, see below) having generalized.11 This in turn might be a slightly irregular reflex of */Vx with some vowel *V, corresponding to the Cupeno variant /-yax-l/. This Cupeno variant could derive from a Proto-Cupan *-yix- or *-yax-; the latter is more reasonable in view of Luiseno /-ax-/. Putting the pieces together, we seem to have reflexes of both *-ax- and *-yax- in various Cupan languages, the latter confined to the CaCu subgroup. While *-ax- can be derived unproblematically from the earlier *-ki-, the *-yax- variant cannot be.

Unaware of the *-ki- connection, Jacobs suggested that all of the Cupan mediopassive variants derive from the Proto-Cupan verb *yax- ‘say’. Reflexes of this verb occur in the recorded languages not only as quotation introducers, but also in ‘auxiliary’ constructions involving another, semantically more concrete verb, which Jacobs assumes was originally in verbal noun (VbN) form. He suggests that *yax- was basically a copula (cf. the productive copula *miyax-). The attested mediopassive forms of type */VERB-(y)ax-l/ would then be compressed reflexes of auxiliary constructions of type */VERB-VbN yax-l/. In summary, *yax- ‘started off as an independent inflected copula verb, gradually became incorporated into the lower verb, and eventually became the ‘theme’ suffix -(y)ax in two of the languages’ (1975:128, cf. 138–40; the two languages are Luiseno and Cupeno).

This scenario is typologically quite plausible. The verb roots in question (‘pop’, etc.) lend themselves to auxiliary constructions (cf. English it went pop!), in the fashion of delocutive verb formations (Benveniste 1966a [1958]). As direct evidence for the reconstructed *yax- auxiliary construction, Jacobs (1975:129) cites a minor Cupeno

10 The Proto-Northern UA transitive (causative-factitive) counterpart involved the *-i-na- suffix (§3.1). In some northern languages, *-na- is added to *-ki-, resulting in reflexes of *VERB-ki-na- (Hopi /VERB-ki-na/, Serrano /VERB-k-inas/). In others, *-na- is added directly to the stem, as with Southern Paiute *-na-, cf. Proto-Cupan *VERB-in- (§3.1).
11 The velar in Luiseno /-ax-/- is likewise deleted before a velar or uvular stop, with some exceptions (Kroeber & Grace 1960:26–27).
auxiliary use of \textit{/yax-} in the sense ‘to be like X’,\textsuperscript{12} and archaic-looking Cahuilla constructions involving \textit{/yax-} in the sense ‘VERB a little’ with a juxtaposed bare verb root. But neither these constructions nor the attested thematic suffixal forms in \textit{*-(y)ax-} show any trace of overt nominalization of the attached substantive verb. Moreover, once we recognize that the mediopassive in \textit{*-(y)ax-} is identical in function to cognates like \textit{/qi-} in the closely related Serrano which go back to a Proto-Northern UA affix of similar shape, having no discernible relation to an independent verb stem, the straight-line grammaticalization model for \textit{*-(y)ax-} becomes untenable.

Instead, the Cupan facts strongly suggest a partial fusion between an inherited suffixal type of Proto-Northern UA lineage and an innovated construction involving \textit{*yax-} plus a concrete verb. The following scenario accounts for the Proto-Cupan developments satisfactorily: (1) Proto-Cupan inherits an older intransitive (mediopassive) type \textit{*CVCV-qi-} for verbs of the thematic class, in the form \textit{*CVC-ax-}, reduced to \textit{*CVC-a-} before the important series of suffixes beginning in \textit{*q} by a rule deleting \textit{*x} before velar/uvular stops; (2) Proto-Cupan separately develops an auxiliary construction of the type \textit{*-(PRONOUN) yax-SUFFIXES + VERB}, where \textit{*yax-} is a semantically ‘light’ intransitive verb which carries tense/aspect/number suffixes, and VERB is the substantive verb stem; \textit{*yax-} is also subject to the \textit{x}-deletion rule before \textit{*q}; (3) the \textit{*yax-} construction becomes secondarily associated with the thematic \textit{*-ax-} type due in part to phonological similarity; and (4) the \textit{*yax-} construction is incorporated into the morphology of thematic verbs, expressing the past tense. This is basically the Proto-Cupan situation.

In Luiseno, the past punctual form of \textit{/ax-/} thematic verbs is \textit{/a/} or \textit{/ya/} according to Kroeber and Grace (1960:152); Jacobs (1975:131–32) reports a wider range of allomorphs. The past punctual variants containing the sequence \textit{/ya/} may reflect an older construction of some type involving \textit{*yax-} and the bare verb root. Note, however, that in all other tense/aspect forms the mediopassive thematic suffix is \textit{/ax-/} without \textit{/y/}. There is no reasonable way to derive both \textit{/ax-/} and past punctual variants like \textit{/ya/} from a single proto-form \textit{*yax-} without positing an ad hoc secondary allomorphic split.

In Cupeno, there is a very interesting past formation for thematic verbs involving \textit{/yax-/} added to the substantive verb with a subject pronoun intervening between them, as in 1.

\begin{enumerate}
\item \textit{na’-ap cung-na-yax-\textgamma\textsuperscript{13}}
\end{enumerate}

1SG-REALIZED kiss-1SG-THEME-PUNCTUAL

‘I was got kissed’ (Jacobs 1975:141)

Here unmarked (zero) aspect is interpreted as punctual. The first person singular subject is expressed both by a clause-initial pronoun and by an affix sandwiched between the substantive verb ‘kiss’ and the \textit{/yax-/} morpheme, interpreted as an allomorph of the mediopassive thematic suffix \textit{/ax-/} (\textit{<*ax-}). In nonthematic verb classes, sub-\textsuperscript{12} Jacobs apparently tried but failed to elicit a copula reading for \textit{/yax-} in the Cupeno auxiliary construction meaning ‘to be like X’. ‘When native speakers were asked to use the Spanish-derived \textit{kuma} “like” in the Cupeno sentence, they used \textit{yaz} even though they seemed to be unaware of \textit{yaz} as a be verb, i.e. they always recognized \textit{yaz} as if it were a (homophonous) verb which means “say, speak”’ (1975:129). To the extent that a \textit{*yax-} auxiliary construction is involved in the current historical complex, it is more likely to have been an active ‘do VERB’ construction (cf. English \textit{it went pop}) with a bare substantive verb root, rather than a copula-plus-nominalization construction.

\textsuperscript{13} The morpheme transcribed \textit{/yax-/} by Jacobs is rendered as \textit{\textgamma yax-} in later specialist literature on Cupeno (J. Hill 1966; J. Hill & Nolasquez 1973); ‘\textgamma’ is a digraph for \textit{hy}.\textsuperscript{737}
ject pronominals are prefixed to verbs in the Past tense. This makes it reasonable to interpret the verb form in 1 as resulting from the gradual compression of a syntactic type *VERB(-VblN) + PRONOUN-yax-SUFFIX in which *yax- played the role of an auxiliary carrying the inflectional affixes.

Some type of auxiliary construction involving the verb *yax- must have been involved in the development of these Cupeno past forms (as well as the Luiseño past punctual). Since there are no vestiges of nominalizing suffixes on the substantive verb, the construction in question is most likely to have been a delocutive construction *VERB . . . yax-SUFFIX (with *SUFFIX often zero), evolving into *VERB + PRONOUN-yax-SUFFIX in the immediate ancestor of Cupeno when subject pronouns became fixed prefixes on verbs.

In Luiseño, the *yax- element in this past punctual formation remained distinct from the basic thematic affix /-ax/. The y-initial allomorphs (/-'ya-/ etc.) can replace causative /-i-/ as well as mediopassive /-ax-/ in the past punctual, and there is no spreading of the initial /y/ into the other tense forms of /-ax-/ . But in Cupeno, /-yox-/ in the past tense is clearly a synchronic allomorph of the mediopassive thematic suffix. While /-yox-/ in the past tense is postvocalic (the preceding pronominal affixes end in vowels), in other tenses the thematic suffix is normally postconsonantal, so an allomorphic interpretation is indicated. Moreover, the y-initial has spread into the nonpast forms of *-ax-. The current situation is that /-ax-/ occurs after stem-final coronal consonants, /-yox-/ after noncoronals. Native speakers presumably think of /-ax-/ and /-yax-/ as allomorphic variants, perhaps with a single base form /-yax/ and a y-deletion rule after coronals at least in this combination.

It remains only to note briefly that *-in-, the causative counterpart of *-ax- discussed in the previous section, has developed similar past (punctual) formations. In Luiseño, the past punctual of both /-ax-/ and /-i-/ (<*-in-) thematic verbs is one variant or another from the set /-a(x)/, /-'ya(x)/, etc., perhaps all of them reflecting *-yax-. In Cupeno, causative thematic verbs of type CVC-in- have followed the mediopassive thematic verbs in secondarily developing a past tense with subject pronominal intervening between stem and /-in-/ giving outputs of the type 1sg/CVC-na-n-/3sg/CVC-pa-n-/ etc.

3.3. Summary of CUPAN TENSE/ASPECT/NUMBER SUFFIXES. The three Cupan languages share a distinctive system of verbal inflectional suffixes which follow the suffixes *-ax- and *-in- in thematic verbs, and directly follow nonthematic verb stems. Fairly detailed inventories of categories and affixal forms are given in Tables 3-5. For Cupeno (Table 3) I give the paradigm of an actual stem in order to show how pronominal prefixes (PRONOUN) and internal stem-reduplication (habilitative form) operate; for Cahuilla and Luiseño it suffices to present the suffixal forms. The numerals in the left-

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>SG SUBJECT</th>
<th>PL SUBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. present</td>
<td>čal-qa</td>
<td>čal-wa</td>
</tr>
<tr>
<td>2. past durative</td>
<td>PRONOUN-čal-qal</td>
<td>PRONOUN-čal-wan</td>
</tr>
<tr>
<td>3. future durative</td>
<td>čal-na</td>
<td>čal-wana (&lt; *-win-ni(m))</td>
</tr>
<tr>
<td>4. habitual ('generally')</td>
<td>čal-na</td>
<td>&quot;</td>
</tr>
<tr>
<td>5. past punctual</td>
<td>PRONOUN-čal-θ</td>
<td>PRONOUN-čal-θ</td>
</tr>
<tr>
<td>6. future punctual</td>
<td>čal-θ</td>
<td>čal-θ</td>
</tr>
<tr>
<td>7. habilitative</td>
<td>ča’al</td>
<td>ča’al</td>
</tr>
<tr>
<td>8. imperative</td>
<td>ča’la (&lt; /čal-’la/)</td>
<td>čal-Šm</td>
</tr>
</tbody>
</table>

Table 3. Cupeno inflectional paradigm for čal- "to husk".
hand column are designed to bring out etymological equivalences between Cupeno (the reference language) and the other two. For the same reason, some normalization of categorial terminology has been carried out vis-à-vis the primary sources.

Before I proceed to discuss individual suffixes in detail, a few general points can be made. In all three languages there is a key set of marked forms of basically durative or imperfective aspect with labels like past durative and present, contrasting with an often unmarked punctual series (past punctual). In Cahuilla and Cupeno but not Luiseño, this system extends to the future tense. Suffixes of the durative series, and to a much lesser extent those of other categories, are bisected by a subject-number feature (singular versus plural). The plural forms point to Proto-Cupan *win- or reductions thereof, while the past durative and present point to *qal- or a reduction thereof. Reflexes of *win-sometimes have passive function independent of subject number. Future durative forms in Cahuilla and Cupeno point to *nim- or *nač-.

All of these forms strongly resemble independent verb stems in the same languages, some with Proto-UA pedigrees. There is accordingly a prima facie case that the morphology in question is the result of gradual compression of former syntactic configurations in which these independent verbs played an auxiliary-like function. I now argue, however, that in each case the independent stem appears to have been exploited in hermit-crab fashion by an ancient suffix with which it shared at least the initial consonant.

3.4. AGENTIVE *-qa-. The full suffixal form */qal/ including the lateral occurs in the Cupeno past durative */qal/, and in the Cahuilla present */qal/ and past durative */qal*/ (and variants). In Cupeno, the juxtaposition of past durative */qal/ with present */qal/ is synchronically suggestive of apocope (i.e. loss of final /l/ in the present). A reasonable historical explanation is that the Proto-CaCu past durative was really bimorphemic *-qal-’i, in contrast to present *-qal, essentially as in Cahuilla, and that word-final phonetic erosion (apocope) reduced these to */qal/ and */qal/, respectively, in Cupeno. The */-i/ (Cahuilla */-e ~ */-i/) is a past tense marker also used in the (aspectually unmarked) past punctual (Cahuilla */-i/, Cupeno */i/). It is less certain but possible that Luiseño present allomorphs */q ~ */q/ also derive from Proto-Cupan *-qal after phonetic erosion.
Proto-Cupan *qal- is the expected output of Proto-UA *kati- 'sit', which has a similar singular-subject constraint in some other UA languages such as Southern Paiute (Miller 1967:55 *kate, using the symbol *e for a PUA vowel that was most likely *i). In the modern Cupan languages, *qal- occurs, sometimes vestigially and irregularly, as an existential or locative 'be' verb, not necessarily with a singular-subject restriction: Luiseño /qal-/ 'to live, be (especially on top of something); to mount a horse' (Bright 1968:35); Cupeno presentative interjection /qa/ 'there it is!' and certain forms (present /qa/, past durative /qal/) of the suppletive verb 'to be' involving plural (not singular!) subject (J. Hill & Nolasquez 1973:129, 169, 178). A semantically low-content 'light' verb like this is a good candidate for grammaticalization. It is perfectly reasonable to suspect that the durative suffixes pointing to *-qal derive from syntactic combinations involving Proto-Cupan *qal- 'to be', which was presumably still associated with singular subject, along with some appropriate form of a juxtaposed substantive verb stem. Following Bybee et al. (1994:128–30), the likely construction would be of the locative type 'be at VERB-ing', with a verbal noun and a locative adposition. Compare English be coming < (archaic) be a coming < *be on coming.

However, there is no trace in the attested Cupan data of either a nominalizing suffix or a locative adposition in the durative-aspect forms displayed in the tables. I claim that this is because the durative suffix forms do not result from gradual compression, rather from abrupt formal renewal of a preexisting form involving an unrelated suffix that happened to begin with a uvular (or velar) stop.

There are actually a number of candidate suffixes, since other Northern UA languages are chock full of verbal suffixes beginning with velar or uvular stops. The categories expressed include various kinds of past tense, agentives, and subordinators. 14 We have un embarras du choix.

This section will focus on an agentic nominal whose Proto-Cupan form was *-qa-. It normally appeared with nominal absolute (unpossessed) suffix: *-qa-t, PL *-qa-t-im. There are cognates in Hopi (agentive /-qa/-) and various other northern and southern UA languages, pointing to Proto-UA *-kka- (or *-qa-), with absolute forms *-kka-t (SG), *-kka-t-mi (PL).

To judge by Luiseño agentive /-qa-tl/, *-q-t still had agentive functions in Proto-Cupan, but it lost this function in Cahuilla and Cupeno as part of a general rearrangement of participial suffixes. Even in Luiseño the agentive plural is /-vu-k-t-um/, an amalgam of the inherited agentive plural *qa-t-im and another participial ending *-vi- (Proto-Northern UA *-pi-).

In Cupan languages *qa-t survives more broadly as an imperative for verbs (not shown in Tables 3-5), though to various degrees it retains its telltale nominal endings. In this function it is frequently preceded by an i vowel, which favors a velar rather than uvular stop articulation, making *i-ka-t the probable Proto-Cupan form. The *-i- and the velar stop suggest contamination with a nominal postposition (usually allative) that shows up as Luiseño /-ik ~ -yuk/ and Cahuilla /-ka ~ -ika/. The i- ablaut

14 Many of the languages have a 'switch reference' system in which verbal subordinating suffixes specify 'same subject' or 'different subject' vis-à-vis a matrix clause in addition to temporal and/or logical relationships.
15 Langacker took the original absolute (absolutive) suffix to be *ti, and derived it from a verb 'be' (1977b: 61). He likewise described *-qa- (older *-ka) as 'a pervasive UA verb suffix with generally stative or durative value related ultimately to *ka "be"' (1977b:61, 180). But PUA clearly had absolute *-t- and agentive *-kka- (or *-qa-) as core grammatical suffixes, and any derivations of them from independent stems are speculative internal reconstructions going back from Proto-UA.
triggered by another important participial ending, Proto-Cupan *-vi- («*i-pi-), may have supported the development of a similar i-effect in *-i-ka-t. In Luiseño, the inceptive singular is now expressed by the innovative /-lowut ~ -lul/, but the corresponding plural is still /-ku-t-um/, probably resyllabified from *-i-k-t-im. In CaCu, the inceptive singular is Cupeno /-qa-t/, Cahuiilla /-ka-(t) ~ -ik/; the plurals are Cupeno /-qa-t-im/ and Cahuiilla /-ka-t-em ~ -ik-t-em/.

It seems that in Proto-Cupan, *-qa-t had begun to split into the two functions agentive (truly nominal) and inceptive (functionally verbal but with vestigial nominal morphology). Although the inceptive developed an initial *-i-, at least in some environments, none of the languages now uses the same forms in both agentive and inceptive functions. Cahuiilla and Cupeno dropped the inceptive function of *-qa-t, redeploying other participials to fill the gap. On the other hand, Luiseño kept singular *-qa-t in agentive function, specialized plural /-ku-t-um/ < *-i-k-t-im as inceptive plural, and dredged up new suffixes or suffixal combinations for agentive plural and inceptive singular to flesh out the system.

Luiseño also uses /-qa-t/ as a recent past imperfect, this time with PL /-qa-t-um/, showing the same nominal endings (absolute and plural) that betray its derivation from the old agentive. Whether or not Proto-Cupan *-qa-t already had recent past imperfect function, this Luiseño development shows that the agentive suffix (without preceding *i) was capable of acquiring a tense/aspect value including a durative ( = imperfective) feature.16

This suffices to show that there was a preexisting suffixal formation sharing its initial two segments with the phonologically fuller verb stem *qal- ‘be’, satisfying the phonological requirements for a hermit-crab restructuring. There are, to be sure, some problems with the case presented so far. Readers may wonder whether the preexisting suffixes derived from agentive *-qa-t had a sufficiently clear association with durativity that a hermit-crab replacement would acquire this function. The hermit-crab hypothesis might also be challenged on the grounds that the phonetic erosion to which *-qa-t was exposed was insufficient to justify formal renewal. These objections are reasonable, but can perhaps be countered by adducing additional material about other suffixes with initial *k or *q in Cupan verbal morphology, some of which have clear durative or imperfective value. (In order not to interrupt the flow of the article, this material is presented in an appendix.)

The *-qal- suffixes are in most cases limited to singular subject. The corresponding plural forms (see next section) are expressed by affixes derived from another originally independent verb stem. One way to account for the synchronic subject-number opposition is as a carryover of original subject-number features on the independent verbs in question, a typical Uto-Aztec typological feature. But the (morphologically nominal) agentives, which I suggest were replaced by the attested durative suffixes, already distinguished singular (*-qa-t) from plural (*-qa-t-im). So even the number-sensitivity of the existing durative suffixes is consistent with a hermit-crab model. The original suffixal formation defined the system of categories that persist (with new phonological shapes) to the present.

3.5. Passive *-la-wa-. As an independent verb stem, Proto-Cupan *win- is reflected in simple or derived form in all three daughter languages in senses like ‘stand’ and ‘be

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16 Typologically, agentives may be aspectually protean; killer can denote a professional hit man or a one-time murderer. In many languages, though, agentives are explicitly or predominantly habitual.
(in a place)’, as well as in the transitive sense ‘put (in a place)’. A plural (perhaps really inanimate collective) feature is present in some reflexes: Luiseño /won- ‘be at a place’ of inanimate plurals (Bright 1968:51); Cahuilla /hiwen- ‘be’ of plants, Cahuilla transitive /-wen- ‘put in place’ of plural or mass object (Seiler & Hioki 1979:236); Cupeño inanimate plural presentative interjection /wa’/ ‘there they are!’ versus singular /qa’/ and human plural /hi-we/ (J. Hill & Nolasquez 1973:169, 178). The Proto-Cupan stem derives in turn from Proto-Northern UA *wini- ‘to stand’ (Miller 1967:58).

The suffix *qal- entered the verbal morphology (§3.4) as a tense/aspect suffix (basically durative) with a singular subject restriction, replacing a singular agentive *-qa-t that had come to be used aspectually. Once this happened, the cumbersome inherited plural counterpart *-qa-t-im became incomprehensible morphologically. At a time when the connection between independent *qal- and the new singular-subject durative affix *-qal- was clear to speakers, it was appropriate to develop a new plural-subject durative that likewise used the form of an independent verb stem. It appears that *win- as a verb stem already functioned as a suppletive form of *qal- with some kind of animacy and/or number restriction, so a suffix *-win- was created as a plural-subject counterpart of durative *-qal- in the verbal morphology.

If this were the whole story, suffixal *-win- would be best described not as a canonical hermit-crab morpheme but as a secondary adjustment triggered by the primary hermit-crab renewal involving *-qal-. However, in addition to functioning as a plural-subject counterpart of *-qal-, the suffix *-win- is attested in passive or resultative function regardless of subject number. This is most productive with Cupeño /-wen-/, but there are some attestations (apparently vestigial) in Luiseño and Cahuilla (J. Hill 1966:78–79; Jacobs 1975:186–87).

In passive function, *-win- must have directly replaced the widely distributed Proto-UA passive suffix *i-wa-, whose Northern UA reflexes include Tubatulabal /-i-wa/ and the first element in Hopi /-w-ta/ (Heath 1977). The replacement had most likely occurred by Proto-Takic times, since Serrano (which combines with the Cupan languages to constitute Takic) lacks *i-wa- but uses a suffix /-win/ in a few combinations with a kind of passive or resultative value (K. Hill 1967:213).

One could counter that the Takic (including Cupan) *-win- passive might have resulted from gradual compression of a syntactic structure, with *-win- functioning as a copula-like ‘light’ verb accompanying a passive participle or the like (cf. English I stand corrected). But there is no trace of such a participle: *-win- is added directly to verb stems. One might also argue that the passive reading is a development from the plural-subject reading (‘they eat corn’ > ‘corn is eaten’). But the *-win- passive shows no trace of a former transitive structure (no frozen third plural subject, no accusative marking on the patient NP).

The current usage of *-win- suffixes therefore suggests a two-stage introduction: (a) replacing passive *i-wa-, and (b) fleshing out the tense/aspect suffixal system by provid-

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17 Yaqui and Nahuatl in southern UA also have reflexes of *i-wa-. Langacker reconstructed a composite passive suffix as *ti-wa (note the back unrounded vowel *i), beginning with a ‘be’ verb which figured in many of his suffixal reconstructions, but acknowledged that this element was ‘apparently optional by P-UA times’ (1977b:47, cf. 1976:150–51). He took the *-wa as originally a nominalizing suffix (1976:162). If passive *i-wa- is a reduction of *-ti-wa, it is difficult to explain the ablaut patterning of the modern languages, and the wide distribution of reflexes of simple passive *i-wa- in both northern and southern languages makes a composite reconstruction unnecessary.
ing a plural-subject counterpart to *-qal-. The chronology was probably (a) before (b), since Serrano attests only the former.

3.6. FUTURE *-ni-. Inspection of Tables 3–5 shows several future forms beginning with n. They are not all cognate. There are at least two sets of forms, related to different independent verbs. One set includes Cupeno /-nâṣ/ and Cahuilla /-niš/. This is clearly related to the Proto-CaCu stem *nâṣ- ‘sit down’ (*nâṣ- before consonant or word-finally, by a regular deaffrication rule) reflected in Cahuilla /-hâṣ-/ (dialectally also /-nâṣ-/) ‘to sit down; to settle down’, (Seiler & Hioki 1979:130) and Cupeno ‘nache’, i.e., /nâc̲̲̲̲̲̲̲̲/ ~ /nâʃ/- (J. Hill & Nolasquez 1973:164, cf. 143–44, 146). Perhaps the Cahuilla hortative suffix /-na/ (Table 4) is a reduced form of *-nâṣ.

The second set includes Cahuilla /-nem/ (dialectally also /-ne/) and Cupeno /-na/ (habitual), which is also a frozen component of /-wana/ < *-wan-na(m). This is related to the Cahuilla verb /-nêm/- ‘to walk around’ (Seiler & Hioki 1979:126), which we can probably attribute to Proto-CaCu (*nim-). For more distant relatives see Miller 1967:44 (entry 263a misleadingly labeled ‘live’).

In Cahuilla, the suffix *nim is a pure future, used regardless of subject number and aspect (forms 3 and 7, Table 4), but *nâc- is restricted to singular subject and durative (future or potential) aspect. The two therefore combine in form for future durative with singular subject /-nîš-nem/. Cupeno shows a somewhat similar system, except that /-na/ < *-ni(m) does not occur in the future punctual; instead, simple /-na/ has habitual or gnomic value (see forms 3, 4, and 6 in Table 3).

The phonological similarity between independent stem and suffix is sufficiently striking in these CaCu forms to exclude the possibility of coincidence. This would seem to call for a grammaticalization model involving a prior syntactic configuration, slowly compressed into morphology. But here the semantic affinities are particularly weak, as Jacobs noted with concern (1975:196). Certainly many languages have futures derived from *[go to VERB-NOM] with an infinitive or other nominalization, but why ‘walk around’ of all the motion verbs available? Above all, what connection is there between ‘sit down’, and future durative? These cases should warn against any suggestion that hermit-crab processes are tightly constrained by semantic connections.

Here again a critical role was played by a preexisting verbal suffix, this time a future *-ni attested widely in northern and southern UA languages, e.g. Hopi /-ni/. By Proto-Cupan this would have been *-an by the familiar processes of apocope, leftward shifting of morpheme boundaries, and generalization of original stem-final *a before a non-i-

18 Sauvel and Munro take pains to point out that Cahuilla /naʃ-/, without a suffix ‘refers to the action of “sitting down”, not to the state of “sitting”’ (1982:19). The verb has no intrinsic durative aktionsart which would motivate the aspecual value of the future durative suffix.

19 Reflexes of this suffix in northern languages are nonablauting, but reflexes in the southern languages (Yaqui, Papago = O’odham) show i-ablaut (Heath 1977:32). Langacker (1977b:154) noted the suffixal reconstruction *-ni- in the manuscript version of Heath 1997 (1997:31); without rejecting it, he suggested a ‘conceivable alternative that some or all of the forms in question descend at some level from *-nak ‘want’. The most suggestive datum in this respect is Mayo future /-naké/, identical with the verb ‘want’. I regard this as a recent Mayo development, cf. future /-ne/ < PUA *-ni in the very closely related Yaqui. I am tempted to take the Mayo form as a hermit-crab case, but a more probable scenario is a conflation of Proto-Yaqui Mayo suffixal (*-ne) and compounded (*-nak) constructions. There is another reconstructible future suffix, perhaps originally desiderative, beginning *-pa . . . (Heath 1977; Langacker 1977b:148). Serrano has Future /-ib/, probably from an intermediate proto-form *-pa(.-), and lacks reflexes of *-ni. Because of apocope, any Proto-Cupan reflex of *-pa(-) would have risked confusion with reflexes of an important participial suffix *-pi (Heath 1977; Langacker 1977b:62, 181), which may account for the loss of the former in Cupan languages.
ablaut suffix, all of which we have seen before (e.g., thematic *-ax- < *-ki*). We must presume that *-an survived into Proto-Takic, and eventually attracted both *nač- and *nim- into the suffixal system. The fact that *nim- was a motion verb, and the fact that *nač- was, like *qal- and *win-, a high-frequency stance verb, were enabling factors. However, the shared *n was the catalyst, so these are valid hermit-crab restructurings.

To maintain the singular/plural subject distinction, by now firmly established as the result of the earlier developments involving *-qal- and *-win-, the latter morpheme was combined with *-nim- to give Cahuilla /-we-nem/ and Cupeno /-wana/. There is no indication that the independent verb stems *-nim- or *nač- were sensitive to subject number.

Whether these hermit-crab restructurings took place before Proto-Cupan, or between Proto-Cupan and Proto-CaCu, depends on whether we take the (aspectually unspecified) Luiseño future /-(a)n/ (Table 5) as a direct reflex of *-ni or as an eroded reflex of *-nim. The direct-reflex hypothesis is preferable since it involves no change in form or function other than regular sound changes; *-an is precisely the expected Proto-Cupan reflex of *-ni. If this reasoning is correct, both *nač- and *nim- entered the suffixal system between Proto-Cupan and Proto-CaCu.

I have now identified five instances of hermit-crab processes in Cupan languages. All of them have clear reflexes in Cupeno, and if we were to excise them from this language it would have little voice or tense-aspect machinery left. Cahuilla too probably has reflexes of all five. Luiseño has reflexes of four, and we cannot rule out the possibility that its future /-(a)n/ is a reflection of the fifth. In each case, we have an attested suffix related to an independent verb form, but which expresses a category formerly conveyed by a clearly reconstructible short suffix that shared a consonant with the independent stem. In each case, a direct syntax-to-morphology compression is unlikely.

4. THE GERMANIC DENTAL PRETERITE. I hope that this article will encourage specialists in a range of language families to dig into the sand for similar examples of hermit-crab (and related) processes. One is wary of personally venturing into other families in search of further examples, since the detective work needed to uncover and explicate them requires an expertise in those families that can only come from years of immersion. At the same time, readers deserve some reason to believe that hermit-crab processes are not merely quirks of the southern California sun, and I will therefore step (gingerly) into a long-standing crux of Germanic historical linguistics: the development of the DENTAL PRETERITE from Proto-Indo-European (PIE) through Common Germanic (CG) and on to the attested ancient Germanic languages.

This preterite (i.e. simple indicative past tense) involves a suffix (or rather suffix complex) beginning in a dental consonant, cf. English called and kept. In the ancient languages, though not in modern English, it had a full pronominal conjugation (1sg, 2sg, and so on). This was the preterite of the four classes (I–IV) of ‘weak’ verbs, most of which were secondary (denominatives and causatives, the root and inflectional ending being separated by a vowel-final derivational suffix). It was also the preterite of certain otherwise ‘strong’ primary (underived) stems, primarily the PERFECTO-PRESENTS, verbs like ‘know’ whose PIE perfect had come to be used in Germanic in present-tense

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20 *nač can probably be excluded since the Luiseño suffix has no durative aspectual feature and since, to my knowledge, the stem *nač- is not securely reconstructible beyond Proto-CaCu.
function.21 In these verbs, the dental formative directly follows the (consonant-final) root. The remaining nonweak (strong) verbs, in several classes, had a distinct CG preterite involving stem-ablaut rather than a dental suffix-initial formative. The strong preterite of CG continues the PIE perfect and does not constitute a major difficulty for historical analysis.

Historical explanations of the dental preterite have been classified into two basic types, plus intermediate ones combining elements of both. First, there is the composition theory, by which the dental preterite represents compression of an older syntactic combination of a form of the substantive lexical stem plus a form of the verb ‘do’. This is similar to the syntax-to-morphology historical analyses characteristic of modern grammaticalization theory. What I will call the analogical theory (cf. Meillet’s more general use of this term, §1) derives the weak preterite by positing various restructurings from inside the verbal morphology itself. Both theories were articulated by Indo-Europeans of the early nineteenth century, and the matter continues to be debated. Helpful surveys in English are Ball 1968 and Tops 1974. The early literature is discussed in Collitz 1912, which also presents a version of the analogical theory and contains a devastating critique of the then-fashionable composition theory. The following discussion will focus on two works: Lühr 1984, which leans toward the compositional approach and contains an exhaustive bibliography, and Bammesberger 1986, a comprehensive work on Germanic verbal morphology whose treatment of the dental preterite leans toward the analogical theory. I will, however, end by favoring a hermit-crab approach suggested by Watkins (1962a).

The composition theory is supported by (a) the lack of a comparable paradigm of dental-initial suffixes in reconstructible PIE paradigms with past time reference (perfect, aorist, or imperfect), and (b) the similarity between the Germanic dental preterite pro-nominal endings and those of the verb ‘do’ (which survives in West Germanic). The Gothic inflected forms of the dental preterite, showing the initial d typical of the weak classes, are shown in Table 6. While Gothic (East Germanic) has identical 1sg and 3sg forms, as does West Germanic (Old English, Old High German), the two are distinct in North Germanic (Old Norse).22

<table>
<thead>
<tr>
<th>1sg-da</th>
<th>1pl.-dedum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2sg-des</td>
<td>2pl.-deduθ</td>
</tr>
<tr>
<td>3sg-da</td>
<td>3pl.-dedun</td>
</tr>
</tbody>
</table>

**Table 6. Gothic dental (weak) preterite endings.**

These and other Germanic dental preterite forms closely resemble West Germanic forms of ‘do’. This verb in turn is derivable from the PIE root *dʰeh₁- (*dhē-), whose reflexes in Greek and Vedic show an additional *Ce- reduplication in certain tenses. In attested West Germanic, ‘do’ dropped the reduplication in the present stem (Old High German 1sg tuon, 2sg tuos, etc.). The corresponding preterite stem is, however, a (frozen) reduplication (OHG 1sg teta, 2sg tāti, etc.), reflecting a reduplicated PIE paradigm (most likely the perfect). Note that the plural forms of the Gothic dental

21 The term preterito-present is also in use. Perfecto-present brings out the actual historical change (perfect > present), while preterito-present brings out the synchronic morphological similarity in CG and the later languages between the functional present of this class and the functional preterites of other classes.

22 For the benefit of non-Germanists I use the IPA symbol /θ/ instead of the Germanic ‘thorn’ symbol for the voiceless interdental fricative.
preterite in Table 6 are reduplicated (1PL -dedum, etc.), though other Germanic languages have short endings (cf. the Gothic singular endings in the table).

There are many difficult issues that have been grappled with by specialists making at least some use of the composition theory. Did the forms of ‘do’ that evolved into the Germanic preterite paradigm derive from the PIE perfect, aorist, or imperfect? What were the precise forms of the relevant PIE paradigm, including stem-grade (*d\^\text{\textit{e}}h_1\text{-}, *d\^\text{\textit{oh}}_1\text{-}, etc.)? How does one account for differences in vowel quality and length between corresponding (pan-Germanic) dental preterite and (West Germanic) independent ‘do’ endings? Nevertheless, a strong case can be made for a ‘do’ component in the dental preterite, even if many details remain obscure.

On the other hand, there are serious objections to deriving the dental preterite from a straight syntax-to-morphology compression. If the dental preterite reflects an old construction of the general type *[\text{VERB} + ‘\text{did}’], we should expect the original \text{VERB} to appear in the accusative case form of a verbal noun derivation [\text{VERB-VblN-Acc} + ‘\text{did}’]. In fact, for the majority of dental preterite forms there is no plausible PIE prototype of this type. This is the same kind of problem seen in some of the UA examples.

Secondly, while in the weak classes the dental preterite suffixes begin with a consonant compatible with PIE *d\^\text{\textit{h}} (and hence with *d\^\text{\textit{h}}e_1\text{-}), in the nonweak stems such as the perfecto-presents the various dental suffix-initial formatives (CG *s, *t, *\text{\textit{th}}, *d) unequivocally point to *t rather than *d\^\text{\textit{h}}, given well-established PIE-CG consonantal correspondences (including Grimm’s and Verner’s Laws and various consonant-cluster assimilations).

Because of these problems, critics of the (pure) composition theory seek the origin of the dental preterite within the inherited morphology. There is no PIE paradigm that matches the dental preterite in all of the following key respects: (1) suffix-initial *t, (2) the correct stem-grades, (3) personal endings compatible with the Germanic reflexes, and (4) some connection with past time reference. So one looks for a source formation containing a *t that also satisfies some of the other criteria and that could have gotten a foothold in at least one relevant verb class and then spread from there.

There are two basic possibilities for this source formation. In what is here called the participial version, the dental formative in the preterite is seen as a reflex of a deverbal nominal or adjectival suffix, most obviously the PIE verbal adjective (later, past or passive participle) in *-\text{\textit{to}}-. The Indo-Europeanist pioneer Franz Bopp already saw this participle as a key constitutive element of the dental preterite: ‘I do not regard this method of forming the preterite as the original invention of the Teutonic language, nor must d or t be considered as characteristics of past time, but it originates from a participle’ (1974 [1820]:40).

This version must overcome two major conceptual obstacles. First, it must explain how an originally unconjugated nounlike derivative secondarily acquired a conjugation (i.e. a set of pronominal endings). Secondly, if the dental preterite was based on *-\text{\textit{to}}-, how do we explain the fact that, with a typical transitive stem, the actual participle in *-\text{\textit{to}}- is passive in sense while the preterite is active? In spite of these hurdles, there are several attractive aspects of *-\text{\textit{to}}- as a source for the dental preterite. It forms the Germanic participle (CG *-\text{\textit{da}}-) of precisely the same set of verb classes that also have the dental preterite (weak verbs, perfecto-presents), whereas the remaining Germanic strong verb classes have a different participle with a nasal suffix (cf. -\text{\textit{en}} in English \text{\textit{broken}}). Moreover, the stem-ablaut patterns of the dental preterite nicely match those of *-\text{\textit{to}}-. 
The second variant of the analogical theory, here dubbed the **Conjunctional** version, seeks the origin of the dental formative in an already conjugated PIE paradigm. A paradigm in which at least one of the personal endings (e.g. 2sg) began with a dental consonant is selected. The dental onset is then argued to have spread into other personal endings in the paradigm, eventually being reanalyzed as a past tense formative preceding the actual endings. Such an analysis would constitute the purest ‘analogical’ theory since it would recognize a number of individually small operations entirely within the system of conjugated verbs.\(^{23}\)

While pure composition theories and pure analogical theories have been proposed, the objections to them are insurmountable, and any satisfactory contemporary model will have to include components of both. In fact, Bammesberger (1986) favors the conjunctional version of the analogical theory, while Lühr (1984) favors the composition theory, but there is one crucial historical event that both (along with many other scholars) presuppose; I will call it the **Ointment Maneuver**. The basic idea here (long central to the composition theory) is that a set of weak class II denominative verbs continued to coexist with the original nouns, and that a new preterite for some of these verbs was produced by combining the verb ‘do’ with the instrumental form of the noun.\(^{24}\) This works in the case of PIE long *-ɑ- noun stems, whose instrumental singular PIE *N-ɑ combined with the ‘do’ verb to give PIE *[N-ɑ *d'e]h1-], fused into CG *[N-ɑ-d . . . ]. The example regularly given is CG *salbōdó ‘I anointed’ ( < ‘I did [ = provided] with ointment’), which became the preterite of the denominative verb whose already existing present stem was CG *salbōjā-.

For Lühr this is the unique source of the dental preterite. Once it had gained a foothold with ‘anoint’ and perhaps a few other weak class II verbs, the new preterite spread rapidly into other weak classes and beyond. For Bammesberger the CG dental preterite is an amalgamation of this weak class II formation and an originally independent development in the perfecto-present class and in a small set of ‘reverse-ablaut’ verbs in weak class I.\(^{25}\) The dental preterite is then a historical hybrid reflecting two quite distinct sources, one morphology-internal (analogical theory) and the other a syntax-to-morphology compression (composition theory).

As a self-described advocate of the composition theory, Lühr is closer to the wavelength of grammaticalization theory than is Bammesberger. Lühr’s detailed scenario of how the dental preterite developed, however, is anything but a simple bleaching and compression model. While the unique origin was an instrumental-plus-‘do’ construction, it was initially limited to a subset of one class of weak verbs, and so had to spread from there via morphological (not syntactic) routes into the other weak classes and eventually into the perfecto-presents and certain other strong verbs. Not only did the inherited morphological system channel the middle and latter stages of this trajectory, even the initial syntax-to-morphology compression is motivated as a renewal of preexisting grammatical categories. The instrumental-plus-‘do’ combination did not follow...

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\(^{23}\) Collitz (1912) identified the key original ending as *-tai, which he reconstructed as the 3sg and 1sg endings of the middle (mediopassive) mood (cf. Greek 3sg middle -tai).

\(^{24}\) Bammesberger and Lühr differ as to what the precise ‘do’ construction was. Bammesberger takes the relevant forms of *d'e, (in the original combination with instrumental *ɑ nouns) to be reflexes of the PIE aorist. Lühr takes the relevant forms to have been reflexes of the present injunctive of an athematic reduplicated present stem. This matter need not concern us here.

\(^{25}\) In Bammesberger’s model, the perfecto-presents formed their CG preterite from the PIE aorist conjugation, while the reverse-ablaut verbs formed theirs from a PIE (strong) perfect.
its own evolutionary logic. Rather, Lühr views it as raw material, opportunistically appropriated by a system in need of (re-)establishing for the weak verbs a preterite category (still clearly expressed in the strong verbs) in the absence of a well-established prior morphological expression. The weak verbs had lacked an IE perfect, and the only forms they had for past time reference in pre-CG were morphologically related to—and barely distinguishable phonetically from—corresponding present forms. ‘The resulting gap in the verbal system of those verbs which could form no perfect was filled by the periphrasis *solpa’ dʰéḍōm’ (1984:42).26 This functional pressure explains why the new preterite form spread so rapidly to other classes. Along the way, the many additional formal developments (in suffixal forms and stem shapes) posited by Lühr are driven by system-internal structural and functional pressures.

I do not detail all these developments here, but it is important to consider the role that she assigns to the *-to- participle. Although *-to- was not involved in the inception of the dental preterite, it was decisive in channeling its spread. In the weak classes, the initial consonants of PIE *-to- and of the ‘do’ verb (PIE *dʰeh₂-) had secondarily converged as CG *d, as the result of Verner’s Law. The resulting secondary association of the dental preterite with the participle (CG *-ta- < PIE *-to-), established the route by which the dental preterite spread to the other weak classes, some of which contain no denominatives and therefore could not have participated in the ‘I provided with ointment’ > ‘I anointed’ compression, but all of which had *-da- participles. (Bammesberger too recognizes a similar traffic-cop role for the *-to- (CG *-ta-) participle in helping the dental preterite to spread across weak verb classes.)

In Lühr’s model, the expanding dental preterite then turned its sights on the perfecto-presents. Recall that the PIE perfect, which in the other strong verb classes became the CG preterite, for this class had shifted to present-tense function. To generate a new preterite, these verbs had recourse to the pronominal endings of the expanding dental preterite from the weak classes. For the various perfecto-present verbs, the *-to- participles by this time had a miscellany of forms (*-da-, *-ta-, *-sa-, and *-ta-) depending chiefly on the root-final consonant, and in each case the new dental preterite endings were grafted onto the preexisting dental consonant of the participle. For example, the perfecto-present verb ‘know’ had a participle *uiss-sa- (< PIE *uid-tó-) which served as the basis for the new dental preterite 1sg *uissṓm, etc. The upshot is that the dental preterite ended up closely matching the old *-to- participle in both choice of initial consonant and verb-class distribution.

So Lühr no more than Bammesberger can be invoked to support the type of syntax-to-morphology compression model of current grammaticalization theory. Even if, as with Lühr, the initial compression of a ‘do’ construction is taken as the sole origin of the dental preterite, every step including this formative one is seen as controlled by the prior system of grammatical categories, and the ultimate effect of the developments is to preserve or fill out this system by insuring that the weak and perfecto-presents could clearly express the preterite category already solidly established in the (remaining) strong verbs.27

This is favorable terrain for a hermit-crab restructuring, but whether the case merits

26 ‘Die dadurch entstehende Leerstelle im Verbalsystem derjenigen Verben, die kein Perf. bilden konnten, füllte die Periphrase *solpa’ dʰéḍōm aus.’

27 It is difficult to believe that the perfecto-presents and the weak verbs ever lacked some way of expressing a past tense (‘knew’ versus ‘knows’, ‘anointed’ versus ‘anoints’), but it is very possible that the available mechanisms were problematic in some way, either cumbersome periphrases, irregular and formally isolated remnants of the PIE aorist, or (as Lühr suggests) reflexes of unreduplicated PIE imperfects that were only weakly differentiated phonetically from corresponding present-tense forms.
this term depends on our precise modeling of it. Certainly there is a formal renewal of a morphologically expressed category. There is also clearly at least one bolt of Thorian lightning whereby two etymologically unrelated morphemes that happen to begin with the same dental consonant become secondarily associated. Both Lühr and Bammesberger recognize that the (weak) dental preterite became associated with the participle; for Bammesberger, there was also a fusion between this weak dental preterite (the ointment maneuver) and the originally unrelated preterite of perfecto-present and reverse-ablaut verbs. But for both authors, the lightning bolt occurred after the ointment examples had already been morphologized; they were morphology-internal associations or fusions, not the stem-to-morpheme fusions of canonical hermit-crab processes. So far, close but no cigar.

But there is something fishy about the ointment-maneuver compression of ‘do’ into a preterite, as in ‘I did [ = provided] with ointment’ becoming ‘I anointed’. While scattered analogues with *d₁eh₁- plus instrumental noun can be adduced from Vedic Sanskrit and other ancient IE languages, they have no special association with past tense. Moreover, in Germanic, both *d₁eh₁- (a rather abstract ‘do’ in its West Germanic survivals) and the PIE instrumental case of the *a declension (merged with dative in attested ancient Germanic languages) were undergoing shifts that make an already shaky periphrasis for ‘anointed’ even less convincing semantically.20 The Bammesberger and Lühr scenarios, both of which accept the ointment maneuver, posit a suspiciously intricate sequence of individually minor developments following the initial small-scale intrusion of syntax into morphology. Moreover, these steps are often typologically dubious. Bammesberger, for example, relies on analogical generalization of forms from the 2ₚ₋ (for the perfecto-presents) or from the 2₃₋ and 2ₚ₋ (for the reverse-umlaut verbs) to the other pronominal categories of the relevant paradigms. This is odd, given the standard generalization that the 3₃₋ form is the basis for paradigmatic restructuring in Indo-European conjugations (Watkins 1962b:90ff., building on the pronominal asymmetries identified by Benveniste 1966b [1946]). Markedness reversals in favor of the second person might be justified in nonindicative modal contexts, but hardly in a simple indicative preterite.

So there is a fly in the ointment maneuver. By taking this to have been the primordial event, Bammesberger and Lühr allow the *-to- participle to get involved only belatedly. But it is hard to imagine forms like CG *salbōdo⁰ ‘I anointed’ emerging from a cumbersome ‘do’ periphrasis, with no reference to the preexisting *-to- participle *salbōda- ‘anointed’. The point-by-point correspondences between participle and dental preterite in verb-class distribution and in choice among four dental consonants, as well as their close semantic association, support giving the *-to- participle a prominent role in Act 1 of our scenario rather than a minor supporting role near the conclusion. Instead of a pointillist sequence of many minute steps, we need a simpler and more dramatic scenario based on a frontal encounter between ‘do’ and *-to-, accounting in one fell swoop for at least a central core of the attested dental preterites.

One possibility is that the *-to- participle could (at some time between PIE and CG)

20 Arguing that the relevant ‘do’ periphrasis was directly inherited from PIE would solve this problem by rendering such Germanic developments irrelevant, but this would raise chronological difficulties by implying that the dental preterite (at least in the weak verbs) was a very early Germanic formation. The perfecto-presents could not have been influenced by the preterite of weak verbs until considerably later (following the stabilization of their PIE perfect as present tense forms, and after a number of consonantal shifts and assimilations affecting their *-to- participles).
be used predicatively, with a zero copula at least for 3SG subject: /*X VERB-Participle/ meaning ‘X is VERB-ed’ (cf. English X is gone).29 Indeed, if there was no other functioning preterite in Pre-CG for the weak and perfecto-present classes (parallel to the inherited preterite of strong verbs), a formation based on the participle may have been the only readily available possibility. To go from this stage to an inflected dental preterite, it would simply be necessary for the *-to- (CG *-da) to be replaced, in hermit-crab fashion, by inflected forms of the phonologically similar ‘do’ verb.

Watkins (1962a) is concerned with the Celtic t-preterite, but he attaches a lengthy stop-press addendum commenting on a just-received paper by another author who had connected this Celtic formation with the Germanic dental preterite and a Slavic analogue. Watkins analyzes the Celtic type as the reflex of an old aorist formation, unrelated to the superficially similar Germanic dental preterite. He sees the Germanic and Slavic paradigms, however, as independent cases where the *-to- verbal adjective ( = participle) has acquired a conjugation. In Germanic, the original locus was the small set of mostly ancient primary consonant-final stems, including the perfecto-presents. This set was dominated by intransitive or low-transitivity verbs (‘know’, ‘own’, ‘need’, ‘be able’, ‘should’) whose *-to- verbal adjective denoted a resultative state of the grammatical subject. He argues that the *-to- form was used predicatively with (formally unexpressed) 3SG subject, the syntax being e.g. *[X KNOW-Participle] = ‘X knew’.30 If we interpret the participle here as active (subject-oriented) rather than passive, the formation can be extended to transitive verbs, e.g., *[X HIT-Participle Y] = ‘X hit Y’.31 At some point, a full conjugation was created by replacing participial *-to- by forms of the ‘do’ verb. Watkins acknowledges that a necessary condition for this ‘fusion’ was the shared *d following the operation of pre-CG consonantal shifts.

If correct, this is a straightforward hermit-crab restructuring since the lightning bolt directly connected an independent stem with a grammatical affix. Ditto for a variation on this scenario in which the predicatively used *-to- participle acquired its first conjugation in some other way, and this conjugation of dental-initial suffix complexes was then displaced by (phonologically longer) forms of the ‘do’ verb.32

5. Grammaticalization theory and its critics. To be sure, this is not the first work expressing reservations about the current vogue for syntax-to-morphology grammaticalization theory, but I have seen no hard-hitting, broad critiques. In the two volumes of Traugott & Heine 1991, I thought at first I had detected a lone dissenting voice in Mithun (1991). She does indeed caution that certain potential grammaticalizations may be disfavored for language-specific reasons, citing the failure of certain American Indian languages to develop a morphological (or syntactic) subject category.

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29 *-to- would originally have had further endings for gender, number, and case, but phonetic erosion and perhaps categorial neutralizations (to masculine singular?) could have reduced this variation and disguised the nouniness of the participial stem.
30 The schemata used in this paragraph are interpolated and are not from Watkins’s sketch.
31 The role of low-transitivity verbs in the redefinition of the participle as subject-oriented, i.e. ‘active’, was anticipated by Bopp (1974 [1820]:40).
32 Ball (1968) is inclined to believe that the weak preterite originated as a reshaping of a preexisting conjugation based on the PIE derivational suffix *-ā- (and perhaps another suffix, PIE *-ē-), consisting of the secondary insertion of *-t- (modeled on the *-t of the participle *-to-) between root and suffix. The ‘do’ verb was only later associated with this conjugation, leading to partial reshaping of certain of its forms, especially in Gothic. This departs significantly from Watkins’s model but is still a hermit-crab restructuring insofar as forms of an independent ‘do’ directly displaced shorter endings in the same grammatical function.
But her criticism of grammaticalization theory is gentle, and elsewhere she expresses basic allegiance to it (Mithun 1996:156).

There have been some more forceful critics, but instead of dealing broadly with the logic of grammaticalization theory they have tended to concentrate on the discovery of counterexamples. First, there are cases where a grammaticalized element has been (re-)lexicalized as a verb or noun stem, as with English up in He upped the ante. Second, there are some well-documented cases where a reanalysis or paradigmatic restructuring has resulted in a shift from affixal to clitic or particle status (Campbell 1991, Janda 1981, 1995, Greenberg 1991).

Grammaticalization specialists have taken note of these findings without breaking stride. For example, Hopper and Traugott (1993) point out that Greenberg’s examples do not really involve reversals on the stem-clitic-affix journey (166), that the up-the-ante examples merely illustrate the ecumenical opportunism by which new lexical items are coined (127), and that the affix-to-clitic/particle cases are few and far between: ‘the rare counterexamples should not be allowed to deprive us of a useful descriptive method and an important source of data’ (128–29). Heine et al. (1991:5) write in the same vein, ‘Although both degrammaticalization and regrammaticalization have been observed to occur, they are statistically insignificant and will be ignored in the remainder of this work.’ Likewise Bybee et al. (1994:13): ‘The few examples adduced in support of the reverse process are either reconstructed and thus hypothetical cases . . . or cases where an element cliticizing to material on one side of it seems to be reanalyzed as belonging with the material on the other side of it.’ The critics have been simply dismissed, not even recognized as sparring partners of the sort that most research movements rely on to clarify issues and keep themselves sharp.

The reason the critics have made such little impact is that most have concentrated on digging up instances of morphosyntactic change of the same type as their opponents, merely inverted in direction (e.g. affix becoming clitic). These are bound to be infrequent, especially when false alarms are discounted, and probably always reflect the operation of unique combinations of structural and functional factors within the particular linguistic systems involved. In two impressively well-researched papers, Janda argues that the original affixal genitive -(e)s was, in Early Modern English, ‘liberated’ into the pronoun his (1981); and that, in dialectal Spanish, the 1PL agreement suffix -mos was upgraded to a clitic -nos (1995). But a true reversal of the syntax-to-morphology compression would be a simple ‘decompression’ unpacking fused elements into more independent forms. In fact, Janda’s close analyses show that the relevant historical events are, respectively, a conflation of two morphosyntactic patterns triggered by the phonological merger of two original morphemes (English -(e)s and his), and the essentially analogical spread of one allomorph into the territory of another under the catalyzing influence of stress patterns (Spanish -nos and -mos). So neither is a simple decompression (compression in reverse). Both have affinities to hermit-crab processes, substituting clitic for stem as the source element, since phonological similarities have a catalyzing role, but they are not motivated by phonetic attrition (and in fact result in no increase in phonetic material).

A more broadly based critique of grammaticalization theory should go beyond the tabulation of scattered counterexamples, and challenge the assumption that even the unassailable cases of compression work in the linear fashion alleged by the theory. In this skeptical perspective, it would be argued that even the canonical cases of compression were controlled by the inherited grammatical system, which have selected only a
handful of potential grammaticalizations and have steered them into particular categorial slots and/or formal patterns.

The most dramatic cases of this type are those where an independent stem is seized upon by an affixal category in distress, as in the hermit-crab cases described above for Uto-Aztecan and Germanic. Because this process entails an evidentiary ‘coverup’ and may therefore result in a perfect crime, it requires considerable philological detective work to identify it. This makes me suspect that it is actually rather common in languages with medium to high degrees of morphological complexity, and I hope that readers will take a fresh look at other language families in this light.

Hermit-crab restructuring are only the tip of the iceberg, however. If we accept that they represent a mechanism for repairing important inherited grammatical categories, there must be other kinds of morphosyntactic developments that are driven, at least in part, by the same basic motivation. Specifically, this includes the final acceptance into the inner sanctum of core grammar of a select subset of the numerous incipiently grammaticalized phrasal constructions that were lying around in the previous state of the language. While the body of this article makes an addition to the inventory of ‘types’ of morphosyntactic change, the larger debate should go beyond typology (and the relative frequency of the types) and squarely address the fundamental mechanisms that motivate the changes. Is grammaticalization to be described and interpreted from the viewpoint of the trajectory of the initial syntactic phrase as it insinuates itself into the morphology, along the lines of the unidirectional and cyclical models that dominate grammaticalization theory? Or are the initial syntactic phrases, especially in the crucial latter stages of their grammaticalization, essentially pawns whose progress and direction are controlled by the core grammatical system?

In this light it is useful to analyze the fine print in the grammaticalization literature on four key points. I begin with the ‘bottleneck’ problem.

If we compare, for example, the number of tense and aspect distinctions which are expressed grammatically in a given language with the number of ways of modifying actions and events available through lexical adverbs, we can see immediately that the process of grammaticalization is a selective one in which only a few lexical forms end up as grammatical morphemes. (Hopper & Traugott 1993:114)

But the nature of the selection process is unexplored. The quotation implies that selectivity is a mere logistical consequence of the small number of categorial slots in the core grammar. It isn’t clear whether the actual selection is seen as a random lottery, or a Darwinian endurance test in which the differential fitness of the contestants takes its toll. But there is a third possibility: the selection process is like a buffet where consumers (here, speakers of the language) select ingredients and combine them into an arrangement of their own design.

Second, there is the issue of coexistence of old and new constructions.

Rather than replace a lost or almost lost distinction, newly innovated forms compete with older ones because they are felt to be more expressive than what was available before. This competition allows, even encourages, the recession or loss of older forms. (Hopper & Traugott 1993:123)

This point, made already in Meillet’s analysis of the history of Romance negation (see §1), is adduced to counter a crude functionalist model by which all grammaticalizations are vacuum-filling devices. I have argued that true hermit-crab processes are very close to being just such vacuum-filling devices, and probably involve no sustained coexistence. However, in the more gradual cases with which the authors of this passage are concerned, the point is unobjectionable. But the significance of coexistence can be looked at in two very different ways. The grammaticalization theorists see it as
demonstrating that the relevant process is a push-chain rather than a pull-chain. That is, the initial syntactic phrase moves into the grammar on its own initiative, guided by universal semantic and discourse principles directly affecting it which have little or nothing to do with the prior core grammatical system of the particular language. Since the original system is not in distress, systemic pressures cannot be invoked to account for the grammaticalization. It is only much later that the old formation is eased into oblivion, and the new one gently takes over its functions.

But we can also look at coexistence in an entirely different light, viz., as the establishment of a linkage between old and new formations which express the same basic, inherited denotative category and differ chiefly in expressive power. The old and new formations may also be similar in formal structure. Then, as the old formation recedes and eventually vanishes, it pulls the new formation behind it. Although the process is slow, it can have the same coercive, system-driven, goal-oriented motivation as in the hermit-crab cases. Moreover, during the period of peaceful coexistence the new formation can undergo further subtle formal and functional 'socialization' into the core grammar, adjusting not only to the outgoing, less expressive variant paired with it but also to other categories which constitute the larger paradigmatic context.

In a slightly different context, Hopper and Traugott introduce another interesting figure: 'A metaphor for linguistic forms in these clusters might be chips in a magnetic field; over time fewer or more of the chips in the clusters may be pulled magnetically to another field' (1993:105). They are talking here about small local clustering discontinuities on the syntax-to-morphology cline, rather than about coexistence with old formations, but a magnetism metaphor for the symbiosis between expressive (new) and nonexpressive (old) formations would be apt. Given that languages can make good synchronic use of paired expressive and nonexpressive versions of certain grammatical categories (e.g., negation, imperfective/perfective aspect, obligation, plurality), there is no reason why a functional analysis cannot motivate on system-internal grounds both the initial partial grammaticalization of the formerly free syntactic phrases, and their subsequent full grammaticalization as the old formation vanishes.

Thirdly, there is the issue of (language-specific) cycles and resultant synchronic layering, whereby the 'same' grammaticalization recurs in rapid succession in the development of a single language. Among the book-length treatments of grammaticalization, Heine et al. 1991 has most clearly described this phenomenon. 'In the literature on grammaticalization, there are indeed many examples suggesting that, once a given grammatical form declines and/or disappears, a new form tends to be recruited on the same conceptual pattern as the old one, with the result that a kind of morphological cycle emerges' (1991:246). As examples, they mention that three different 'say' verbs have evolved successively into quotative 'that' complementizers in Yoruba, and that three 'finish' verbs have become perfective markers in Swahili. While the authors appear to have a brief glimmer of insight here into the pull-chain role of the prior language-specific system, the phenomenon does not fit neatly into their universal-cognitive model of syntax-to-morphology evolution, and is therefore left hanging as a loose thread: 'Morphological cycles of this type are . . . not an obligatory feature of grammaticalization processes; the cognitive and linguistic conditions under which they do or do not occur are still largely unclear' (247). Following the familiar logic of hard-core grammaticalization theory, Bybee et al. (1994:22) claim that layering is prima facie evidence against the role of the prior grammar in triggering grammaticalizations: 'The existence of multiple grammaticizations along the same path and the retention of lexical substance from earlier stages are two of the reasons we regard "system" or "structure"
to be epiphenomenal rather than basic to the nature of grammatical substance and exponence’ (22).

But the very same data can be used to argue for a diametrically opposed pull-chain model in which the older formation at each stage serves as a formal and categorial model for the next parallel grammaticalization. This is akin to Meillet’s already quoted observation that languages that have a future renew it in successive cycles, while other languages manage without it over long periods. If the old formations did not serve as models for the new grammaticalizations, we would expect each specific type of grammaticalization (such as ‘finish’ becoming perfective) to have a completely random distribution across languages. Any nonrandom correlation between features of core grammar and the occurrence of new grammaticalizations, including suspicious rapid-fire successions of the ‘same’ syntax-to-morphology compression in the same language, is evidence for the influence of the prior system on grammaticalizations.

Finally, the role of overarching gross typological distinctions has occasionally been noted.

It would seem that the point at which grammaticalization stops may be determined by the typological characteristics of the language concerned. There is, for example, a well established channel of grammaticalization leading from postpositions to nominal case inflections. To our knowledge, however, such a development has not been documented for languages of the analytic-isolating type, where grammaticalization is unlikely to lead to the development of inflectional morphology. Observations like this suggest that there may be typological language-internal constraints that block grammaticalization from proceeding beyond a certain point. (Traugott & Heine 1991:9)

So an incipient grammaticalization is generated and begins its journey as in other languages, but eventually runs into a foreign brick wall which interrupts its trajectory. But this negative formulation is logically equivalent to a positive one, viz., that grammaticalization (in this instance, to a case affix) occurs only in languages whose prior structure provides exemplars of similar morphosyntactic patterns (if not in nominal, then at least in verbal morphology). Much of the history of recent linguistics has consisted of a dismantling of previously formulated external constraints on grammatical rules, revising representations and rules to make such constraints unnecessary. A similar reformulation of grammaticalization theory is needed to account directly for typological barriers to otherwise possible compressions. As long as grammaticalizations are seen as preprogrammed trajectories driven by universal semantic and discourse principles applying to individual syntactic constructions, external barriers will have to be recognized as separate entities. This flies in the face of the frequent claim that grammar is an epiphenomenal byproduct of grammaticalizations. But if the prior system, in its formal patterning as well as its unique categorial system, is seen as providing the models for would-be grammaticalizations, these typological patterns fall out naturally.

On one key issue after another, grammaticalization theory has either ventured no explanatory account, or has falsely claimed empirical vindication from data that can in fact be turned against it. Its survey methodology disfavors close study of actual historical dynamics, and its interpretive framework is defective and occasionally illogical. It is clear that the model is badly in need of a wide-ranging and searching cross-examination that goes beyond the tabulation of isolated reverse-direction counterexamples.

6. Metaphor and theory. Some readers may be uncomfortable with my emphasis on tropes, but theoretical debates in linguistics always have a strong underlying figurative element (verbal or visual). In historical linguistics, the figures are abstract and verbal since they involve processes rather than structures. Among the terms culled from
the literature treated in this article are: journey, path, channel, cline, slippery slope, barrier, bottleneck, gap, erosion, fading, chipping, bleaching, salvaging, redeployment, rebuilding, magnetism, drift, chaining, suspension, sedimentation, ossification, fossilization, death. In any theoretical discussion of historical processes, the metaphorical content of the relevant models, both proposed and argued against, should be explicitly foregrounded and dissected. Works like Langacker 1977a that unashamedly expose their figurative metaphysics are particularly valuable in this respect.

In the case of grammaticalization, the more useful metaphors are those that commit us to causal interpretations. The hermit-crab figure is hopefully suggestive, since it distinguishes the active crustacean (the old category) from the passive bivalve shells (the successive phonological shapes). In contrast, some fashionable metaphors of grammaticalization are ambiguous or otherwise unedifying. Path of change, for example, is often useful as a descriptive summary, but gives no insight into the underlying mechanics. Is the moving object self-propelled and self-navigating, hacking its own way through the jungle? Is it following a route trodden by previous moving entities of the same type? Or is it being swept along by external forces?

I use hermit crab as a metaphor of functional preservation, focusing on categories more than forms. In a related article (Heath 1997), I discuss a series of cases of more purely formal paradigm rebuilding involving the replacement of key relational morphemes (that serve as the ‘glue’ holding more substantive morphemic material together, such as ‘inverse’ morphemes in direct/inverse case systems). In the cases discussed there, when the key relational morpheme is threatened by phonetic erosion, a vaguely similar but minor morpheme, such as an intermorphemic linker (partly conditioned by phonology), is appropriated; it replaces the old morpheme throughout the latter’s paradigm, resulting in near-perfect restoration of the original morphological structure in all its intricacy. In the Australian case studies used in Heath 1997, a single original linker morpheme is appropriated by different daughter languages to replace completely different key relational morphemes. This process, characteristic of polysynthetic languages, is captured by a ‘lost wax’ metaphor, alluding to a method for casting bronze used since antiquity, by which molten metal displaces (and adopts the shape of) the wax which had separated the inner and outer earthen molds.

While the sources (independent stems) for hermit-crab processes are already fully functional, a typical lost-wax process upgrades a minor, perhaps phonologically motivated linker to a more crucial relational status. Lost-wax processes might therefore be considered to be examples of the creative redeployment of inherited low-function raw material, unlike hermit-crab processes, which may involve fully functional independent stems. Speaking of low-function material, Roger Lass’s stimulating paper entitled ‘How to do things with junk: exaptation in language evolution’ (1990) argues that morphemes can pass through an inert phase before reacquiring functionality. More generally, he compares the evolution of a language to that of a species (seen as a genetic assemblage). In evolutionary biology (Konrad Lorenz and Stephen Jay Gould are cited), one can distinguish simple genetic adaptations (transformations directly motivated by function) from exaptations, whereby genes pass through three stages: original functionality, latent survival, and reemergence with new functions. The latent stage in exaptations is logistically unproblematic in genetics, since at any given time a substantial minority of genes are overtly (phenetically) unexpressed. Such recessive genes can later achieve overt expression in the wake of mutations in other genes.

But applying the notion of exaptation to language is questionable, since long-term retention of morphemes which have lost their original function (the ‘junk’ phase) exacts
a cost. Moreover, once reduced to zero expression, a morpheme cannot reemerge generations later in its original phonological form. We are back to Langacker’s three-stage model (old system, rubble, new system), which fails to bring out long-term structural continuities. For our purposes, perhaps a more useful borrowing from evolutionary biology is the theory of punctuated equilibrium (Gould & Eldredge 1977), which argues that a biological species changes very little, except for an occasional burst of rapid genetic change as a new species is created. This model tries to account for both stability and change. A rough linguistic analogue might be rapid change in a short period of intense language contact, followed by a long era of continuity under monolingual conditions.

At one point Lass suggests that languages, like other changeable systems, ‘may in their structure show a certain amount of bricolage . . . the remnants of old structures can be recobbled into new ones’ (1990:80, italics original). This is an interesting collage of metaphors and allusions, with somewhat different spins as to whether historical change is restorative or destructive. The phrase REMNANTS OF OLD STRUCTURES suggests that an original system collapses before a successor system is built from the ground up. BUT RECOBBLE can be taken in two ways, either as ‘repair (shoes)’, an essentially restorative operation, or as ‘put (several components) together clumsily’, which suggests creation of a new structure. The unmistakable allusion to Claude Lévi-Strauss’ famous passage (1966[1962]:16ff.) on the bricoleur (a kind of handyman who does many jobs with a limited inventory of implements, each partially shaped by prior functions), adds further complexity to the metaphorical structure. Lévi-Strauss equates mythmaking with the handyman’s work: ‘Mythical thought, that “bricoleur”, builds up structures by fitting together events, or rather the remains of events’ (1966:22). He cites a phrase from Franz Boas strikingly similar to Langacker’s machine passage: ‘It would seem that mythological worlds have been built up, only to be shattered again, and that new worlds were built from the fragments’ (Boas 1898:18). But Lévi-Strauss distances himself from the impression of historical discontinuity given by this passage, and much of his own structuralist anthropology was about the essential continuity of relational configurations, whether universal or culture specific, in spite of regular turnover in the concrete component elements. So Lass’s metaphorical assemblage (like the paths of change figure discussed earlier) is ambivalent on the crucial matter of whether (non-contact-induced) grammatical evolution is basically continuous (the inherited formal and categorial system is regularly patched up with new material), or basically discontinuous (old structures periodically collapse, and entirely new ones are created out of the rubble). This must be the central issue of historical grammar, and of all historical scholarship, and our terminology and tropes should force us to confront it.

Models of historical dynamics from other fields have, admittedly, at best a heuristic value for historical grammarians. This is not only because we linguists may fail to grasp the intricacies of exotic subject matter, or may mistake a well-publicized controversial position for a scholarly consensus. Historical dynamics are only partially extractable from the concrete substance dealt with by each field. A major problem with the transmission of grammars is (phonetic) attrition, which has no counterpart in the transmission of gene complexes. There is likewise no close analogy in historical grammar to the incorporation of real-world events into legend and myth. Still, we should agree with Lass that confrontations of our basic working assumptions with those articulated by scholars in other fields can sharpen our thinking. An engagement with evolutionary biology, historical anthropology, and similar fields should alert us that conservatism is as much of a theoretical problem as revolution, and that structural continuity takes
many forms and may be harder to discern than change. Whether we prefer respectable technical expressions like punctuated equilibrium, or colorful metaphors like bricolage, hermit crabs, and lost-wax casting, we need frameworks that give due weight to the restorative and conservative nature of much grammatical change.

APPENDIX: FURTHER CUPAN SUFFIXAL SOURCES ASSOCIATED WITH *-qal-

In §3.4, I gave details about one verbal suffix that may have played a role in attracting the phonological shell of the independent verb *qal- ‘be’ into the verbal morphology in hermit-crab fashion. This was agentive *-qa-t and its offspring (inceptive in all three languages, also recent past durative in Luiseno). In this appendix I introduce other relevant cognate sets and present a more specific hypothesis about the sequence of events. Luiseno has a past habitual /-uk / -/k/ (Table 5), not found in CaCu. This form has no nominal attributes (absolute or plural suffixes) and so has no apparent affinity to agentive *-qa-t, though we cannot totally rule out such a derivation (via apocope). The Luiseno past habitual is more likely a direct cognate of certain non-Cupan tense/aspect markers such as Tuhbatulabal past habitualative /-wkan/ (Voegelin 1935:107). As a category, past habitual is within striking distance of (present/past) durative, the category expressed by the suffix *-qal-. Moreover, Luiseno /-uk /-k/ is down to one reliable segment after phonetic erosion, and the suffix does not occur in CaCu. A Proto-Cupan *k with allomorph *Vk (Luiseno unstressed /a/ could reflect Proto-Cupan *u or *i) is a potential target for a hermit-crab restructuring.

Luiseno has a past durative in /-qus/ (Table 5) of unknown origin.

A final set of relevant forms is a series of gerundials (temporal subordinators) which seem to point to Proto-Cupan *-qal and *-qal-it. The latter is probably a secondary combination of the former with nominal absolute suffix *-t with epenthetic *i to break up the word-final *it cluster. These forms correspond functionally to nonagentive subordinating uses of *-kka- (*-qka-) in other Northern UA languages, associated with the switch-reference system. It is therefore quite possible that the original hermit-crab restructuring involved *-qal replacing a subordinator *qa (eroded to *q or *Vq) with something like ‘same-subject simultaneous action’ value (hence intrinsically durative/imperfective). Later, this subordinated verb could have acquired main-clause functions as a present or past durative.

The form *-qal-it become Cahuilla /-qal-et/ and Cupeno /-qal-at/ (Jacobs 1975:44–45; Seiler 1977: 248–49). Luiseno has no direct reflex but may have indirect ones. The Luiseno gerundial /-wun-ut/ (so), /-wun-tum/ (PL) is based on *win-, elsewhere the plural-subject counterpart of so *qal- (§3.4). The nominal plural suffix /-um is used here to distinguish singular from plural subject. It is likely that this replaced an earlier opposition of singular-subject *-qal-it and plural-subject *-win-it, as speakers took advantage of the presence of a nominal plural suffix to neutralize the (redundant) number distinction expressed by the stems. I also suspect that the Luiseno contemporaneous gerundial /-qa-nuk/ might be a reshaped form of an older *-qal-ut (< *-qal-it), contaminated with a subordinator /-nuk/ which is attested (without preceding /-qa/) in Cupeno, Cahuilla, and Serrano.

Luiseno has a durative subordinator /-qal/ which expands to /-qal-a/ when a pronominal prefix is present; the /-a/ is obscure but is typologically parallel to various ‘possessed state’ (non-absolute) suffixes in Luiseno and more generally in Northern UA; see Jacobs 1975:93–94 and Kroeber & Glaze 1960:146–47.

In summary, there are at least four possible suffixes that could have served as entry points for the independent stem *-qal- into the system of verbal suffixes: (a) agentive *-qa-t and its offspring (inceptive, recent past durative), (b) the past habitual represented in Cupan by Luiseno /-u/ (c) the Luiseno past durative /-qus/ (of dubious antiquity), and (d) gerundials with generally imperfective (durative or contemporaneous) aspectual value derived from Proto Northern UA *-kka- (without absolute ending). It is quite possible that more than one of these sets had some involvement in the introduction and spreading of *-qal- suffixes, the agentive supplying the nounlike morphology while other forms determined or at least reinforced the imperfective aspectual value.

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