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Author(s): William M. Norman

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Advancement Rules and Syntactic Change:
The Loss of Instrumental Voice in Mayan ¹

William M. Norman

University of Pittsburgh

0. Introduction The verbal suffix -b'e occurs in a number of Mayan languages in sentences where an instrumental noun phrase has been focused, questioned, or relativized.² In some languages (e.g. Quiche), -b'e marks the advancement of instrument to direct object. This advancement is subject to the restriction that any instrument which advances to direct object must subsequently be focused, questioned, or relativized. Other languages (e.g. Ixil, Cakchiquel) have no rule of instrument to direct object advancement but do have -b'e as a marker of instrument extraction.³ It is argued here that -b'e was originally a marker of advancements and that the loss of instrument advancement in languages like Ixil and Cakchiquel is motivated by the interaction between instrument advancement and extraction rules. In certain types of sentences, the evidence that the extracted instrument has advanced to direct object is ambiguous; ambiguity of this type leads to 'telescoping' of instrument advancement with extraction rules. Once telescoping has taken place, -b'e is reanalyzed as a marker of instrument extraction.

After first reviewing some typological characteristics of Mayan languages, we investigate the synchronic behavior of -b'e in Quiche, Ixil, and Cakchiquel. Subsequently, data on -b'e in other Mayan languages is introduced to show that *-b'e can be reconstructed as an advancement marker for proto-Central Mayan. Lastly, a diachronic analysis is proposed to account for the loss in some languages of instrument advancement.

1. Typological characteristics Before proceeding further, some typological characteristics of Mayan languages are reviewed. Word Order: Quiche, Ixil, and Cakchiquel all have verb-initial basic word order (as do most Mayan languages). Application of the rules of Topicalization and Focus may produce the alternate surface word order patterns shown in Figure 1.

Figure 1. Word Order

	<u>basic</u>	<u>derived</u>
Quiche	VOS	SVO, SOV, OVS
Ixil	VSO	SVO, OVS
Cakchiquel	VOS	SVO, SOV, OVS

Constituents are topicalized by placing them in sentence-initial position. Focused constituents are placed immediately before the verb (Norman, forthcoming).

Verbal Agreement: Verbs in Mayan languages are inflected for aspect and person. Intransitive verbs agree with their subjects, while transitive verbs are marked for agreement with both subject and object. There are two sets of person markers: the ergative set (abbreviated as E) cross-references transitive subjects and

noun possessors; the absolutive set (abbreviated A) cross-references direct objects and intransitive subjects. The relative order of aspect, ergative, and absolutive affixes is shown in Figure 2.

Figure 2. Order of Verbal Affixes

Quiche	Aspect-A-E-Stem (-phrase final suffix)
Ixil	Aspect E-Stem-A
Cakchiquel	Aspect-A-E-Stem

Nominal Inflection and Case-Marking: Nouns in Mayan languages are not inflected for case. Subjects and direct objects are unmarked noun phrases. Nouns may be inflected for possession by prefixing to the possessed noun an ergative person marker agreeing in person and number with the possessor. The syntactic function of a noun phrase which is neither subject nor direct object may be marked by a preposition or 'relational noun'. Relational nouns are abstract or locational nouns syntactically possessed by the noun whose case role they mark. For example, in Quiche the relational noun -uuk' may mark NPs in an instrumental or comitative function, e.g. r-uk' lee achih 3sE-WITH THE MAN 'with the man' (literally 'his witness the man').

2. Instrument Advancement in Quiche It is argued here that in Quiche -b'e marks the advancement of instrument to direct object. A number of syntactic characteristics distinguish direct objects from other NPs, including instruments which have not been advanced. In sentences with -b'e, it is the NP understood as instrument which displays the characteristics of direct objects, while the NP understood to be patient or goal of the action has the syntactic characteristics of an oblique NP. This is accounted for by assuming that instruments may advance to direct object; as a result of this advancement, the underlying direct object is put en chômeage and the verb is marked with the suffix -b'e.

2.1 Direct objects are syntactically distinct from instruments with respect to the following: 1) case marking, 2) control of verbal agreement, 3) advancement to subject via Passive, and 4) extraction strategies.

Direct objects are unmarked for case; this is seen in (1), which is a normal transitive sentence with VOS word order.

- (1) 'x- \emptyset -u-rami-j lee chee7 lee achih.
 asp-3sA-3sE-CUT-suffix THE TREE THE MAN
 'the man cut the tree'

x- \emptyset -u-rami-j is a transitive verb with a third-person singular absolutive prefix (\emptyset -) agreeing with the direct object and a third-person singular ergative prefix (u-) which agrees with the subject. Both subject and object are unmarked NPs. In (2), the absolutive marker at- agrees with the second-person singular object.

- (2) x-at-in-sok-oh.
 asp-2sA-1sE-WOUND-phrase final suffix
 'I wounded you'

Note that no independent pronouns appear in (2); independent pronouns in Quiche are always emphatic.

Direct objects may advance to subject by the rule of Passive as illustrated in (3).

- (3) x- \emptyset -rami-x lee chee7 r-umal lee achih.
 asp-3sA-CUT-passive THE TREE 3sE-BY THE MAN
 'the tree was 'but by the man'

The verb is intransitivized through the addition of the passive suffix -x and is marked for absolutive agreement with the derived subject. The old subject appears as an oblique constituent introduced by the relational noun -umal.

The extraction of direct objects does not require any special markers in the clause from which the extraction takes place, as shown in sentences (4)-(6). Direct objects are focused by preposing them to the verb, as in (4).

- (4) chee7 x- \emptyset -u-rami-j lee achih
 TREE asp-3sA-3sE-CUT-suffix THE MAN
 'the man cut a tree'

Direct objects are questioned by preposing to the verb the appropriate interrogative word (jas for non-humans, jachin for humans), as illustrated in (5).

- (5) jas x- \emptyset -u-rami-j lee achih?
 WHAT asp-3sA-3sE-CUT-suffix THE MAN
 'What did the man cut?'

Relative clauses on direct objects are formed by deleting the coreferential noun in the relative clause. If the relativized noun is definite, then the relative clause is optionally introduced by the definite article. This is exemplified in (6).

- (6) x- \emptyset -w-il lee chee7 [(lee) x- \emptyset -u-rami-j
 asp-3sA-1sE-SEE THE TREE [(THE)asp-3sA-3sE-CUT-suffix
 lee achih] 'I saw the tree that the man cut'
 THE MAN]

2.2 Having reviewed some of the characteristics of direct objects in Quiche, we will now consider the properties which distinguish instrumental NPs from objects. While direct objects are unmarked, instrumental NPs are marked by prepositions or relational nouns, as in (7).

- (7) x- \emptyset -u-rami-j lee chee7 lee achih
 asp-3sA-3sE-CUT-suffix THE TREE THE MAN
 ch-ee jun ch'iich'.
 preposition-(3sE-) GENITIVE A MACHETE
 'the man cut the tree with a machete'

In (7), the instrumental NP is marked by ch-ee, which is composed of the preposition chi plus the relational noun -ee. Instruments do not control verb agreement, nor do they advance to subject by Passive. Instruments also differ from direct objects with respect to extraction strategies: extraction of instrumental NPs requires that the particle wih ~ wi appear following the verb of the clause from which the instrumental NP is extracted.⁴ For example, focusing an instrumental NP requires that the instrumental phrase be preposed to the verb and wih inserted following the verb, as shown in (8).

- (8) ch-ee jun ch'iich' x- \emptyset -u-rami-j
 prep-(3sE-) GENITIVE A MACHETE asp-3sA-3sE-CUT-suffix
 wi lee chee7 lee achih.
 particle THE TREE THE MAN
 'the man cut the tree with a machete'

Thus instruments and direct objects differ with regard to the four parameters listed in figure 3.

Figure 3. Differences between Direct Objects and Instruments

	<u>direct object</u>	<u>instrument</u>
case marking	unmarked	preposition or relational noun
verbal agreement	controls absolutive agreement on verb	_____
advancement to subject	advances via Passive	_____
extraction strategies	no special marking	requires <u>wih</u>

2.3 In sentences where -b'e is suffixed to the verb, the underlying instrument has all those properties which characterize the direct object while the underlying direct object has none.⁵ In such sentences, the underlying direct object is an oblique NP and functions syntactically as possessor of the relational noun -ee. This is explained by positing a rule in Quiche which advances the underlying instrument to direct object, marking the verb with the suffix -b'e and putting the direct object en chômeage. This chômeur is marked by the relational noun -ee.

Several different types of evidence support the claim that in sentences like (9) where -b'e is suffixed to the verb, the NP which denotes the instrument is syntactically a direct object.

- (9) ch'iich' x- \emptyset -in-sok-b'e-j aw-eech.
 MACHETE asp-3sA-1sE-WOUND-instr-suffix 2sE-GENITIVE
 'I used a machete to wound you'

First of all, in (9) it is the underlying instrument and not the underlying direct object which controls absolutive agreement on the verb. xinsokb'ej agrees with a third person object, not second person. Sentences like (10), where the verb xatinsokb'ej agrees with its underlying direct object, are ungrammatical.

- (10) *ch'iich' x-at-in-sok-b'e-j (aw-eech.)
 MACHETE asp-2sA-1sE-WOUND-instr-suffix (2sE-GENITIVE)
 ('I used a machete to wound you')

The assumption that in (9) ch'iich' is syntactic direct object and that the underlying direct object is en ch \emptyset mage would account for the facts of verbal agreement and predict the ungrammaticality of (10).

Second, in (9) the underlying instrument is an unmarked NP, while the underlying object is marked as an oblique NP. Thus, the case-marking of the NPs also supports the claim that ch'iich' is syntactic direct object (hence an unmarked NP) while the oblique NP aw-eech is a direct object ch \emptyset meur.

Third, if sentences like (9) are passivized, the underlying instrument advances to subject in place of the underlying direct object. In (11), ch'iich' is the derived subject and controls absolutive agreement on the passivized stem sok-b'e-x.

- (11) ch'iich' x- \emptyset -sok-b'e-x aw-eech.
 MACHETE asp-3sA-WOUND-instr-passive 2sE-GENITIVE
 'a machete was used to wound you'

Finally, in sentences with -b'e the underlying instrument is focused like a direct object and not like an oblique instrumental NP, that is, without leaving wih in the clause from which the extraction takes place. This may be seen by comparing (12) with (4) and (8).

- (12) ch'iich' x- \emptyset -u-rami-b'e-j lee achih
 MACHETE asp-3sA-3sE-CUT-instr-suffix THE MAN
 r-ee lee chee7.
 3sE-GENITIVE THE TREE
 'the man used a machete to cut the tree'

The above facts show that in Quiche, the NP understood as instrument is the derived direct object of verbs suffixed with -b'e, while the underlying direct object is a ch \emptyset meur, appearing as an oblique NP. A rule of Instrument to Direct Object Advancement accounts for this realignment of grammatical relations. The effect of this advancement rule is represented schematically in figure 4.

In sentences where a non-third person instrument is allowed, it is apparent that the verb with -b'e does not agree with the instrument, cf. (20).

- (20) axh la7 in-paxi-b'e-∅ u ispeeja.
 YOU asp 1sE-BREAK-instr-3sA THE WINDOW
 'I'm going to use you to break the window'

These facts indicate that in (18)-(20), the underlying direct object retains its grammatical relation. Despite the fact that the instrumental NP loses its relational noun when it_i is preposed to the verb, its grammatical relation appears unchanged. According to Ayres (1977), the instrumental NP must be preposed to the verb when the -b'e suffix is used. Thus -b'e in Ixil simply marks the extraction of an instrumental NP; there is no evidence that instruments must pass through the direct object state in order to be extracted. In Ixil, a single rule of Instrument Extraction corresponds to two distinct rules (an advancement rule and an extraction rule) in Quiche.

3.2 In Cakchiquel, -b'e also occurs as a transitive stem formative. Its function, however, is simply that of registering the presence of an instrumental NP in the clause without marking a change in grammatical relations.

There are a number of different strategies for focusing an instrument in Cakchiquel. One of these involves preposing the instrument and suffixing -b'e to the verb, as in example (21).

- (21) r-ik'in jun machät x-∅-u-choy-b'e-j
 3sE-WITH A MACHETE asp-3sA-3sE-CUT-instr-suffix
 ri che7 ri achin.
 THE TREE THE MAN
 'the man cut the tree with a machete'

Despite the occurrence of -b'e, several facts show that in this construction the instrument does not advance to direct object, this relation being retained by the underlying direct object. First, in Cakchiquel, the instrument is always introduced by a relational noun or preposition, even when preposed to the verb. Second, absolutive agreement on the verb is with the underlying direct object and not with the instrument, as shown in (22).

- (22) r-ik'in jun machät x-i-ru-sok-b'e-j
 3sE-WITH A MACHETE asp-1sA-3sE-WOUND-instr-suffix
 ri achin.
 THE MAN
 'the man wounded me with a machete'

Third, if (22) is passivized, it is the underlying direct object and not the instrument which advances to subject; in (23), the underlying first-person direct object serves as derived subject of the passivized verb and therefore controls absolutive agreement.

- (23) r-ik'in jun machät x-i-sok-b'e-x
 3sE-WITH A MACHETE asp-1sA-WOUND-instr-passive
 r-oma ri achin.
 3sE-BY THE MAN
 'I was wounded with a machete by the man'

Cakchiquel is thus similar to Ixil in that in sentences with b'e, the instrument does not advance to direct object.

Cakchiquel differs from both Ixil and Quiche in that -b'e may appear in Cakchiquel in clauses where the instrument has not been extracted. That is, in clauses which contain instruments, -b'e may occur even when the instrument is not focused, questioned, or relativized, cf. (24).

- (24) ri achin x-∅-u-choy-b'e-j ri che7
 THE MAN asp-3sA-3sE-CUT-instr-suffix THE TREE
 r-ik'in jun machät.
 3sE-WITH A MACHETE
 'the man cut the tree with a machete'

Thus, in Cakchiquel, -b'e appears not to be uniquely associated with the extraction of an instrument NP; it may simply register the presence of an instrument. The significance of this fact will be discussed below.

A second fact of relevance for our eventual diachronic analysis is the existence in Cakchiquel of a second strategy for extraction of instruments which involves the particle wi, cognate with Quiche wih and similar to it in function. An instrument may be focused, questioned, or relativized in Cakchiquel by preposing the instrument together with its relational noun and inserting wi after the verb.

- (25) r-ik'in jun machät x-∅-u-choy wi ri che7 ri achin.
 3sE-WITH A MACHETE asp-3sA-3sE-CUT prt. THE TREE THE MAN
 'the man cut the tree with a machete'
- (26) achoq-k'in x-∅-a-choy wi ri che7?
 oblique-interrog.-WITH asp-3sA-2sE-CUT prt. THE TREE
 'with what did you cut the tree?'

Instrument extraction thus may be marked by the particle wi, which also may be used to mark the extraction of locatives. It consequently appears that -b'e is entirely superfluous in Cakchiquel since the instrumental relation is always marked by a preposition or relational noun, and since wi may be used to mark instrument extraction.

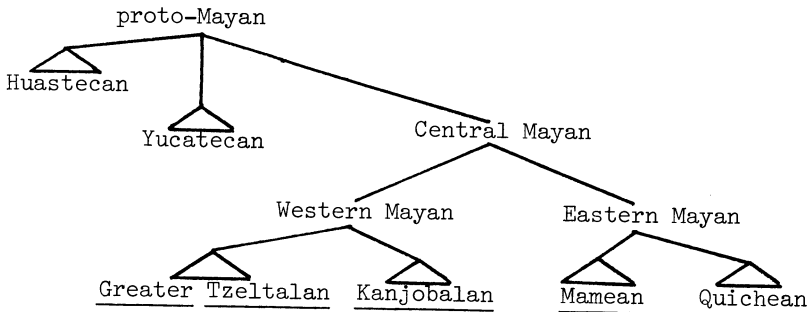
3.3 To summarize the arguments presented so far, we have seen that -b'e in Quiche is associated with a relation-changing rule which advances instruments to direct objects. The direct objects created by this rule must be extracted. In Ixil, -b'e marks instrument extraction but is not associated with any relation-changing rule.

In Cakchiquel, -b'e registers the presence of an instrument in the clause and may function to mark instrument extraction; in both cases, it merely replicates the functions of other morphemes.

4. The Direction of Change The fact that -b'e has different functions in Quiche, Ixil, and Cakchiquel clearly indicates that one or more of these languages has undergone some syntactic change which has affected the advancement and extraction of instruments. From the evidence presented so far, however, it is not obvious what the direction of the change has been: has -b'e changed from an advancement marker to an extraction marker, or vice versa? In this section, it is argued that -b'e was originally an advancement marker and not an extraction marker. This is based on the fact that -b'e is distributed among the Mayan languages more widely as a marker of advancement than as a marker of extraction. The use of -b'e to mark extraction of instruments is an innovation confined to Eastern Mayan.

The Mayan family comprises thirty distinct languages distributed among six different subgroups. The interrelations among these subgroups are depicted in the family tree in Figure 6. (The triangles in Figure 6 serve as a reminder that the label at the end of each branch designates a subgroup, not an individual language.)

Figure 6. Subgroups of Mayan



Reconstructing the precise function of -b'e involves a number of complex problems which will not be dealt with here. For our present purposes it is sufficient to show that a transitivizing suffix *-b'e can be reconstructed for proto-Central Mayan and that this suffix originally functioned as a marker of advancements to direct object.

Although definite cognates of -b'e have not so far been attested for Huastecan and Yucatecan, cognates have been found in all four remaining subgroups of Mayan. (The subgroups where -b'e is attested are indicated by underlining in Figure 6.) In the Greater Tzeltalan subgroup, -b'e occurs as a transitive stem formative in Chol (Warkentin and Whittaker 1970:86-87), Chontal (Smailus 1975:194), Tzotzil (Aissen, to appear), and Tzeltal (Kaufman 1971:67). In the Kanjobalan subgroup, -b'e apparently occurs only in Mocho (Kaufman 1967:ix). In the Mamean subgroup, -b'e has been attested in Teco (Kaufman 1969:165) as well as in Ixil, and -b'e apparently occurs as a frozen

suffix on several transitive stems in Mam and Aguacatec. In the Quichean subgroup, the languages besides Quiche and Cakchiquel where -b'e is productive include Pocomam (Smith-Stark 1976), Tzutujil (Dayley 1977), and Uspantec (Kaufman 1970). A few transitive stems with frozen -b'e exist in Kekchi.

The widespread occurrence of -b'e in the Central Mayan branch could be explained either by assuming that it is an innovation which originated in one subgroup and spread into others or by assuming that -b'e is inherited from proto-Central Mayan. It is unlikely that the distribution of -b'e is due to diffusion, since the geographical area where it occurs does not form a continuum, being interrupted by those Kanjobalan languages (Jacalteco, Kanjobal, Acatec, Chuj) which do not have cognates of -b'e. Therefore we conclude that *-b'e is to be reconstructed for proto-Central Mayan.

The suffix -b'e may mark two distinct types of advancements to direct object. In some languages, e.g. Mocho (Western Mayan), Teco, Quiche, Pocomam (all Eastern Mayan), -b'e marks advancement of instruments to direct object, while in other languages, e.g. Tzotzil, Tzeltal, Chol, Chontal (all Western Mayan), -b'e marks the advancement of indirect object to direct object (cf. Aissen, to appear, for a detailed treatment of -b'e in Tzotzil).

In the languages where -b'e marks the advancement of indirect objects, this advancement has no special connection to extraction processes. For example, an indirect object which has advanced to direct object does not have to be extracted. The occurrence of -b'e as an extraction marker thus appears to be confined to the Eastern Mayan branch, whereas its use as a marker of advancement to direct object is common to both Western Mayan and Eastern Mayan. On the basis of the widespread distribution of -b'e as an advancement marker versus its limited distribution as an extraction marker, we conclude that *-b'e marked an advancement to direct object in proto-Central Mayan (though it is not clear whether originally the advanced NP was an instrument or an indirect object.) This implies that Quiche represents a more conservative usage of -b'e than does Ixil or Cakchiquel.

5. Telescoping and the Loss of Instrumental Voice We have shown that Quiche has an instrumental voice, i. e. a rule which converts underlying instrumental NPs into direct objects of instrumentive verbs in -b'e. Presumably proto-Eastern Mayan was like Quiche in this respect; Ixil and Cakchiquel have undergone innovations whereby instrumental voice was lost and -b'e reanalyzed as an extraction or registration marker. In this section we show that the innovations in Ixil and Cakchiquel are an instance of a type of reanalysis encountered in diachronic phonology: the 'telescoping' of two rules into a single rule through the loss of the intermediate stage of the derivation. The factors which led to the reanalysis are shown to be 1) the limited nature of the evidence that instruments actually passed through the direct object stage, and 2) the functional cohesion of the advancement rule and the extraction rules. Finally, we discuss aspects of this case study which may prove relevant to the formulat-

ion of general principles of syntactic change.

To avoid repetition of the relevant grammatical properties of various languages and proto-languages in the discussion below, we refer instead to two grammatical types, G1 and G2. G1 embodies the features of Quiche and proto-Eastern Mayan relevant to the behavior of instrumental NPs (cf. Section 2 above); in particular, G1 embodies what we shall term the Advancement Analysis of -b'e, wherein -b'e signals instrument to direct object advancement. This advancement is subject to the restriction that any instrument which advances to direct object must subsequently be extracted. G2 embodies the relevant grammatical properties of Ixil (Cakchiquel will be discussed later), including the Extraction Analysis of -b'e wherein -b'e marks the direct extraction of an instrumental NP without any redistribution of grammatical relations.

The comparative evidence presented in the preceding section indicates that the use of -b'e in G1 is more archaic than its use in G2; at some point in the prehistory of Ixil and Cakchiquel, a G2 grammar replaced the earlier G1 grammar. Before discussing why this change occurred, it would be helpful to identify the mechanism involved in the replacement of G1 by G2. The principal difference between G1 and G2 concerns whether instruments pass through the intermediate stage of direct object before being extracted: in G1 instruments are advanced, then undergo direct object extraction rules, while in G2 they are extracted directly by special instrument extraction rules. In G1 it requires the application of two rules to extract an instrument, while in G2 only one rule application is required. The type of reanalysis which has resulted in the replacement of G1 by G2 is known as telescoping, a form of reanalysis first recognized in studies of phonological change (Wang 1968:708, Hyman 1975:173-5, Kenstowicz and Kisseberth 1977:64-5). Telescoping designates the diachronic process whereby two rules, the first of which feeds the second, are collapsed into a single rule as a result of the loss of the intermediate stage of the derivation. Suppose that a language once had two rules, R1: A > B and R2: B > C. The ultimate effect of these two rules is to map A onto C, with B as intermediate stage. Suppose that subsequently the synchronic motivation for positing the intermediate stage B is lost. Language learners will now reconstruct a single rule R3: A > C, mapping A directly onto C with no intermediate stage. From a diachronic perspective, R1 and R2 have been telescoped into a single rule whose effect is identical to the net effect of the two earlier rules.

Positing a change of this sort accounts for the different functions of -b'e in G1 and G2: in by-passing the intermediate stage of direct object in the instrument extraction process, G2 has telescoped two earlier rules into a single rule. In G1 the net result of advancing an instrument to direct object, then extracting that direct object, is an extracted NP which represents an underlying instrument. Once these two rules were telescoped, there resulted a new instrument extraction rule in G2 whose immediate effect was identical to the net effect of the two G1 rules. The new rule

in G2 retained the surface signals of the earlier advancement rule (the suffix -b'e, the absence of any case marker on the instrumental NP) and of the direct object extraction strategies. Since the new rule was an extraction rule, -b'e was reanalyzed as an extraction marker in G2. The change in the function of -b'e was thus an automatic consequence of the telescoping process.

Since G2 was chosen to represent Ixil, the preceding remarks are sufficient to account for the function of -b'e in Ixil. For Cakchiquel, however, further discussion is necessary, since -b'e in Cakchiquel at times functions as an advancement marker and at times merely appears to register the presence of an instrumental NP in the clause. This may be explained by assuming that Cakchiquel went through the G2 stage but in addition had wi as a marker of instrument and locative extraction. During this phase, Cakchiquel marked instrument extraction sometimes with -b'e, sometimes with wi. But wi is a more general extraction marker than -b'e, since wi marks locative extraction as well as instrument extraction. Therefore the domain of wi was extended to all clauses where instruments had been extracted, including those where the extraction was already marked by -b'e. Since wi functions as an extraction marker in environments where -b'e does not occur, Cakchiquel speakers attempting to analyze a clause containing both -b'e and wi might identify wi as the real extraction marker, in which case the only information provided by -b'e would be that the extracted NP was an instrument, not a locative. In such cases, -b'e would simply be registering the presence of an instrument. Next, -b'e might be employed as registration marker in clauses from which the instrument had not been extracted, since the link between -b'e and extractions had been severed in the previous change. Apparently, modern Cakchiquel is currently undergoing a change of this type: the generalization of wi as an extraction marker is rendering -b'e superfluous.

So far no explanation has been offered for why telescoping took place. We now provide an explanation for the reanalysis within the framework of Andersen's (1973) model of 'abductive' and 'deductive' change. The elimination of the direct object stage was an abductive innovation based ambiguities in the output of G1; the reanalysis of -b'e as an extraction marker was a deductive innovation which, as argued above, followed as an automatic logical consequence of by-passing the direct object stage. The fact that in the output of G1 -b'e occurred only in association with extracted instruments served to validate this deductive innovation, thereby contributing to its successful implementation.

The transition from G1 to G2 was due to internal properties of the linguistic system rather than to external influences. Such internally motivated changes Andersen calls 'evolutive' and he proposes (1973:780) that evolutive changes proceed in the following fashion. Motivated by structurally ambiguous features of the speech

of his models, a language learner makes an 'abductive' innovation: he accounts for the verbal output of his models by positing a rule not present in their grammar. At the same time, the language learner compensates for any discrepancies between the speech of his models and his own speech by means of 'adaptive' rules, ad hoc rules which adjust his speech to the received norms of the speech community. Subsequently, 'deductive' innovations occur as the language learner follows through the logical consequences of his reanalysis.

The abductive innovation involved in the replacement of G1 by G2 was the elimination of the direct object stage in the instrument extraction process. This innovation was possible because some sentences in the output of G1 to which Instrument to Direct Object Advancement had applied did not contain unequivocal evidence that the instrumental NP had in fact advanced to direct object. This indeterminacy stems from two factors: 1) instruments are nearly always third person; 2) in many Mayan languages, third person direct object *chômeurs* do not have to be marked with a relational noun. In Quiche, for instance, demoted direct objects are obligatorily marked with relational nouns if they are first or second person, but if they are third person, they may be left unmarked. This is shown in (27) and (28), which may be compared with (14) and (11) respectively.

- (27) x-∅-inw-elaq'a-j lee ch'iich'
 asp-3sA-lsE-STEAL-suffix THE MACHETE
 [x-∅-u-rami-b'e-j jun chee7 lee achih]
 [asp-3sA-3sE-CUT-instr-suffix A TREE THE MAN]
 'I stole the machete that the man used to cut a tree'
- (28) jaswach x-∅-rami-b'e-x lee chee7 ?
 WHAT asp-3sA-CUT-instr-passive THE TREE
 'what was used to cut the tree?'

In both sentences the demoted object (jun chee7 in (27), lee chee7 in (28)) is left unmarked. Since both the underlying instrument and the underlying direct object in (27) and (28) are third person unmarked NPs, either could be construed as controlling absolutive agreement on the verb. Note that in (28) the application of Passive has not reduced the indeterminacy, since either NP could be interpreted as subject of the passivized verb. Thus the overt structural features of (27) and (28) do not indicate that the underlying direct object has actually been put en *chômeage*. A language learner could account for these sentences by assuming that the underlying direct object remained surface direct object and that instruments were extracted directly.

A language learner who adopted this reanalysis would not be able to account for sentences like (9) and (11)-(14) where there is clear evidence that the underlying object has been demoted. At this point he could either abandon his analysis or attempt to mask its deficiencies by means of an ad hoc adaptive rule. Since the most conspicuous difference between the output of G1 and the

language learner's grammar is in the use of relational nouns, he might try to minimize his deviations from the received norm by inventing an ad hoc rule such as 'insert ree~reech optionally after verbs with the suffix -b'e and before the direct object'. With this rule he could approximate (14) by inserting the relational noun r-e in (27).

Preliminary investigations indicate that there are Quiche dialects (Momostenango, Santa Maria Chiquimula) where -b'e is in the process of being reanalyzed as an extraction marker. Significantly, some speakers of these dialects have an adaptive rule of the type just mentioned. Consider the following data from a speaker of the Chiquimula dialect (examples provided by Thomas Larsen, personal communication):

- (29) chi jun machet x- \emptyset -in-ket-b'e-j
 prep. A MACHETE asp-3sA-1sE-CUT-instr-suffix
r-e la jun chee7
 3sE-GEN. THE ONE TREE
 'I cut that tree with a machete'
- (30) chi jun machet x-in-u-sok-b'e-j r-e
 prep. A MACHETE asp-1sA-3sE-WOUND-instr-suf. 3sE-GEN.
 la achii
 THE MAN
 'the man wounded me with a machete'

(29) and (30) are anomalous under either the Advancement or the Extraction Analysis of -b'e. In (29), the Advancement Analysis could account for the use of r-e to mark the demoted direct object but not for the use of the preposition chi to mark an instrumental NP which has presumably advanced to direct object. The Extraction Analysis could account for chi, since the instrumental NP retains its original grammatical relation under that analysis, but not for r-e, since the direct object is not demoted. The occurrence of r-e in (30) constitutes a more serious anomaly, since (a) the object has obviously not been demoted, as it continues to control absolutive agreement, and (b) the direct object is first person, while r-e has a third person prefix. Furthermore no rule of Quiche grammar would sanction the use of r-e to refer to either the subject NP or the instrumental NP in (30).

The anomalies of (29) and (30) may be explained by assuming that r-e has been inserted by an adaptive rule. The speaker has internalized an extraction analysis of -b'e and is employing an adaptive rule to make his speech conform to that of more conservative speakers. His adaptive rule inserts an optional 'pleonastic' r-e following verbs suffixed with -b'e. In (29) he almost succeeds in disguising his reanalysis, but in (30) he commits a form of syntactic hypercorrection since he has failed to realize that more conservative speakers use r-e only when the underlying object is third person.

We have shown that a class of sentences generated by G1 can be explained by the Extraction Analysis, and that adaptive rules

could have been used to cover up some of the shortcomings of this analysis. Nevertheless, the Extraction Analysis is quite inadequate as an analysis of sentences like (9) and (11), where the demoted object is not third person. This raises the puzzling question of why language learners should have preferred a deficient analysis to one which was observationally more adequate. The answer may lie in the fact that the Extraction Analysis made a prediction about the distribution of -b'e which turned out to be correct.

If a hypothesis leads to predictions which can be tested with empirical data, and the data conforms to the predictions, then the hypothesis has been confirmed. Once the direct object stage was eliminated from the instrument extraction strategy, language learners reinterpreted -b'e as an extraction marker. This was a deductive innovation, since it was a logical consequence of the loss of the intermediate stage of the derivation (see the discussion of telescoping above). The hypothesis that -b'e was an extraction marker made a testable prediction: if -b'e is an extraction marker, then it should occur only where instruments have been extracted. Upon testing this prediction, it was confirmed. Unbeknownst to these language learners, the prediction was confirmed because in G1 instruments which had advanced to direct object had to be extracted. Thus even though -b'e was an advancement marker in G1, in the output of G1 -b'e only occurred in association with extracted instruments. Despite its deficiencies the Extraction Analysis was adopted because its predictions about the distribution of -b'e were confirmed.

To summarize the main points of this diachronic analysis, we have shown that 'telescoping' is an accurate designation for the type of reanalysis which resulted in the loss of instrumental voice in Ixil and Cakchiquel. A prerequisite for telescoping was the ambiguous status of the old direct object in some sentences where the instrument had undergone advancement. This indeterminacy made way for an abductive innovation--by-passing the direct object stage in instrument extraction--and the reanalysis of -b'e followed as a deductive innovation. Adaptive rules could have been employed to minimize the discrepancies between the output of the new grammar and that of its predecessor. A crucial factor in the adoption of the new grammar was its successful prediction of the distribution of -b'e, made possible by the restricted function of Instrument to Direct Object Advancement in the earlier grammar.

6. Conclusion: Advancement and Extraction Rules in Syntactic Change
 This case study has brought to light a diachronic interaction between advancement rules and extraction rules. This interaction suggests two possible generalizations. First, some types of syntactic change may exhibit the same sort of directionality found in many phonological changes: we have seen ^{that} under certain conditions it is natural for an advancement rule to be telescoped with an extraction rule, whereas a change in the opposite direction appears much less probable. Second, advancement rules with specialized 'promotional'

functions may be diachronically unstable. Instrument to Direct Object Advancement in Quiche is an example of an advancement rule whose sole function is promotional: it promotes instrumental NPs up the Accessibility Hierarchy (Keenan and Comrie 1977) thereby making them accessible to extraction rules which operate on NPs nearer the top of the hierarchy. The restricted function of this rule made possible the reanalysis of -b'e as an extraction marker, a factor which facilitated telescoping. Regardless of whether these generalizations turn out to be correct, the interaction of advancement rules with extraction rules promises to be a fruitful area of investigation for diachronic syntax.

FOOTNOTES

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²Quiche data represents the dialect of Nahuala and Santa Catarina Ixtahuacán (except for ex. (29) and (30)) and was elicited during my work with Quiche linguists at PLFM. Ixil data was drawn from Ayres 1977. Data on the Tecpan dialect of Cakchiquel was provided by Wenceslao Tucubal S. of PLFM. All examples are transcribed in the practical orthography in use at PLFM. Symbols have their normal phonetic values except for the following: C' = glottalized consonant, ʔ = glottal stop, VV = long vowel, ɨ = /ɨ/, x = /š/ in Quiche and Cakchiquel but /ʃ/ in Ixil, xh = /š/ in Ixil, j = /x/ or /h/, ch = /č/, tz = /tʃ/.

³Extraction rules are rules which alter clause structure without affecting grammatical relations. In this paper, the term 'extraction rule' is used to characterize Focus, WH-Question Movement, and Relative Clause Formation.

⁴Instrumental NPs in the Nahuala dialect must be advanced to direct object to be questioned or relativized. Thus it might seem that the rule of wih insertion is too general, since Focus is the only extraction rule which can apply directly to instruments. The extraction of locatives, however, also is marked by the insertion of wih; since locatives are focused, questioned, and relativized directly, a general rule of wih insertion is needed. Furthermore, in the Quiche dialects and other Quichean languages (e. g. Kekchi) where instruments may be questioned or relativized directly, the extraction is marked by the cognate of wih.

⁵The discussion of -b'e is restricted to the 'instrumentive' use of this suffix in clauses which have a transitive agent. In the

languages discussed here, other uses of -b'e include marking a kind of 'circumstantial' transitive verb derived from an intransitive (Quiche), marking focused instrumental subjects (Quiche, Cakchiquel), and marking the lexically-governed advancement of indirect object to direct object. The last-mentioned use of -b'e is a historical relic (cf. Section 4 of this paper), while the other two functions may be regarded as secondary extensions of the instrumentive function of -b'e. Omitting the discussion of these secondary uses of -b'e does not materially affect the analysis presented here.

⁶The analysis of Ixil follows Ayres 1977.

⁷Focused instruments also lose their case-markers in some Quichean languages where no advancement has taken place (e. g. Kekchi). Presently I know of no synchronic explanation for these facts.

⁸The family tree presented here differs from earlier work (e. g. Kaufman 1976) in regard to the relative affinities of Yucatecan, Western Mayan, and Eastern Mayan. I believe that it is necessary to posit a common ancestor, proto-Central Mayan, for Western Mayan and Eastern Mayan in order to account for grammatical similarities (of which -b'e is an instance) unique to these two branches.

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