

Relative Chronology

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RELATIVE CHRONOLOGY

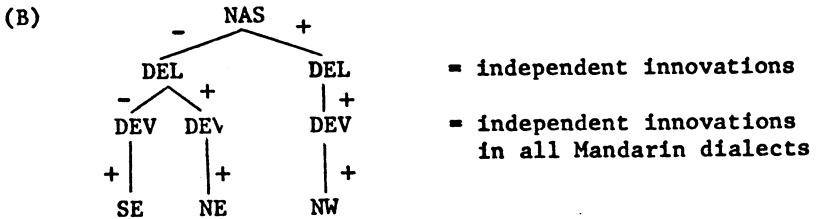
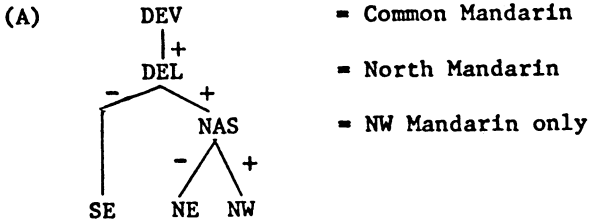
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1. Introduction¹

Traditionally, three procedures have been used to establish the relative chronology of linguistic changes with special reference to phonology: (a) the dating of phonological innovations on the basis of philological evidence. Thus Richter 1934 segmented the history of French from Classical Latin to Gallo-Romance (late 8th c.) into 170 successive shifts. (b) a logical inference of the historical sequence of phonetic laws required to derive modern reflexes from proto-forms. This time-honored technique² has been refined by the concept of the linear ordering of phonological rules developed in the generative school. Halle (1962:347) made explicit the theoretical foundation underlying the method of projecting synchronically motivated rule order onto the dimension of relative chronology. Chafe 1967 best exemplifies such an approach: from the morphophonemic alternations still prevailing in Caddo, he inferred at least 11 time depths among the 67 rules needed. Finally, (c) the method referred to as 'latitudinal reconstruction' in Chen 1973, which consists in a projection from the horizontal plane of geographical distribution onto the vertical axis of time depth. The rationale can best be made clear by an example. Consider, for instance, three major phonological changes -- devoicing (DEV), final stop deletion (DEL), and nasalization (NAS) -- which gave rise to the diversification of three Mandarin subgroups, namely Northwestern (NW), Northeastern (NE), and Southeastern (SE). The hypothetical situation can be schematized roughly in the following way ('+' = application of the relevant change):

(1)	NAS	DEL	DEV	Mandarin
	+	+	+	NW
		+	+	NE
			+	SE

Given these facts, one could hypothesize two (among others) genetic trees (A) and (B):



In terms of branches, nodes and pluses/minuses, (A) is obviously simpler than (B). The formal simplicity reflects the fact that the monogenetic hypothesis (A) makes the least number of (fortuitous) coincidences and independent innovations by positing that, e.g. DEV happened only once, namely early in Common Mandarin, rather than assuming that it was duplicated in each of the dialects. The rationale behind the latitudinal reconstruction of relative chronology is basically the same as the hierarchy of distinctive features that yields the simplest feature tree. For an early example of the application of 'latitudinal reconstruction', the reader is referred to Bremer 1894; and for further discussion, cf. Chen 1973.

In the following sections I will compare these methods of reconstructing relative chronology, using as a case study the apicalization process that is observable in a large number of contemporary dialects of China. It will become obvious in the ensuing discussion that each of the approaches has inherent limitations and that all three are complementary to each other.

Before we proceed further, it would be well to clarify a few concepts and symbols. An apical vowel /i/ typically has its origin in a high, especially front, vowel, and can be regarded as an homorganic vocalic release of the syllable-initial sibilant.³ A sibilant, as the term is used here, is defined as a dental, alveolar, retroflex, alveopalatal or (pre)palatal affricate or fricative; in short, sibilant denotes the class of sounds specified as [+strident, -grave] in Jakobsonian terms. The phoneme /i/ has two contextually determined allophones: a dental [i] after a dental sibilant, and a retroflex [ʲ] after a retroflex sibilant. In the discussion that follows I will ignore this distributional fact.

Here are some of the symbols commonly used in the Chinese linguistic literature:

/t̂, t̂', d̂; t̂s, t̂s', d̂z, ŝ, ẑ/ = (pre)palatals

/t̂š, t̂š', d̂ž; š̂, ž̂/ = alveopalatals

/t̂, t̂', d̂; t̂ʂ, t̂ʂ', dẑ, ʂ̂, ẑ/ = retroflexes (supradentals)

Aspiration is marked by [']; and all digraphs (ts, dz...) represent unitary symbols. The starred forms represent Middle Chinese (hereafter MC) reconstructions.

2. Internal reconstruction à la generative grammar

Let us begin with Wen-zhou, a Wú dialect spoken in Zhé-jiang (an eastern coastal province of China). Consider the following correspondences:

(2)	MC	Wen-zhou	Gloss
	*tsi	tsi	'to nourish'
	*ʂi	si	'teacher'
	*t̂si	tsi	'branch'
	*t̂i	tsi	'to know'
	*ki	tsi	'self'
	*kiaɪ	tsi	'chicken'
	*xi	si	'hope'

Oversimplifying the matter somewhat, one may capture the historical changes by positing simple rules such as:

(3)	I-UMLAUT:	iaɪ > ieɪ > i
	SOFT:	t̂, t̂', d̂ > t̂s, t̂s'
	PAL:	k, k', g > t̂s, t̂s'
		x, ɣ > ŝ } / _____ i
	APIC:	i > î / sibilant _____ #
	RET:	palatals > retroflexes except before i, y
	DENT:	retroflexes > dentals

(SOFT = softening; PAL = palatalization; APIC = apicalization; RET = retroflexion; DENT = dentalization). Both I-UMLAUT and SOFT stand in a feeding order to APIC by either creating more inputs (i's), or more suitable environments (sibilants). Thus:

(4)	*t̂si	*t̂i	*ki	*kiaɪ	MC
	-	-	-	ki	I-UMLAUT
	-	t̂si	-	-	SOFT
	-	-	t̂si	t̂si	PAL
	t̂si	t̂si	t̂si	t̂si	APIC
	t̂ʂi	t̂ʂi	t̂ʂi	t̂ʂi	RET
	t̂si	t̂si	t̂si	t̂si	DENT

The ordering relations postulated in a 'standard' account such as that of (4) suggest that, firstly, apicalization happened only once and, secondly, at a fairly recent date in Wen-zhou. Both of these conclusions -- based solely on internal reconstruction à la generative grammar -- will be shown to be implausible in the light of other methods of reconstruction.

One of the notable facts about Wen-zhou is the absence of the contrast between dental and retroflex sibilants, a shibboleth of 'correct' speech prevailing in the Northern Mandarin provinces. This neutralization of the dental/retroflex contrast (of a fairly

recent origin) has obscured an important phase in the development of Wen-zhou. To illustrate this point, let us look at Lán-zhou, a NW Mandarin dialect. Lán-zhou has maintained a curious contrast: whereas the original MC palatal sibilants have become dentalized, the secondary palatal sibilants derived from MC palatal stops (via SOFT, see above) remained retroflex. Thus MC *tʃi > Lán-zhou /tʃi/; but MC *ti > /tʃi/ > /tʃi/. The Lán-zhou correspondences require the following derivation:

(5)	'branch'	'to know'	Gloss
	*tʃi	*ti	MC
	tʃi	-	APIC-1
	tʃi	-	RET-1
	tʃi	-	DENT-1
	-	tʃi	SOFT
	-	tʃi	APIC-2
	-	tʃi	RET-2
	tʃi	tʃi	== Lán-zhou (to which DENT-2 is not applicable)

The only difference between Lán-zhou and Wen-zhou is that the latter further underwent DENT-2, thereby obliterating the /tʃi/ vs. /tʃi/ contrast still maintained in the former. A full justification of derivation (5) can be found elsewhere (Chen 1975a,b). The important thing to notice is the recurrence of APIC at least at two different points in the history of Lán-zhou.

But, in the generative tradition, according to which each language (or dialect) is considered as a self-contained, homogeneous system in isolation, the evidence from Lán-zhou is irrelevant to Wen-zhou. One of the basic assumptions underlying latitudinal reconstruction, on the other hand, is precisely the concept of 'maximal dialect coverage': phonological rules and their ordering postulated should account for the largest number of related linguistic systems possible. According to this view, Wen-zhou is but a further step ahead of Lán-zhou in the relevant aspects.

Apicalization in Wen-zhou illustrates one crucial problem in the current practice of equating relative chronology with the order of application of the rules which successively convert protoforms into modern reflexes *ad instar* of synchronic description (cf. Halle 1962). Chafe (1967:129) already anticipated this fundamental deficiency, as he observed: "the synchronic ordering minimizes the degrees of depth, maintaining only as much depth as is necessary, while historically the number of intervening stages was at a maximum." The internal evidence as provided by Wen-zhou points to one single instance of APIC occurring at the end of the derivation; cross-dialectal evidence, on the other hand, suggests a very early instance of APIC and its recurrence at the end.

3. Latitudinal reconstruction

The validity of latitudinal reconstruction is predicated on the assumption that comparative data are relevant to the reconstruction of the history of one particular dialect. With reservations to be noted below, one can hardly doubt the soundness of this assumption. An areal study of apicalization among the contemporary Chinese dialects offers a striking example of the usefulness and the well-foundedness of this approach.

For the vast majority of cases, the rule of APIC is exactly as formulated in (3): a syllable final /i/ becomes /ɨ/ when preceded by a sibilant. Now, there are three sources of /i/: /I₁/ from MC *-i; /I₂/ from MC *-iai; and /I₃/ from MC *-iəC (where -C stands for a final stop). Likewise, the sibilant (S) has three origins: /S₁/ is the original MC sibilant; /S₂/ comes from MC palatal stops; and /S₃/ is derived from MC velar stops and fricatives via PAL. The scope of APIC varies from dialect to dialect, and can be defined in terms of the historical sources of /i/ (input) and /S/ (environment). Figure 1 is a synoptic view of four chosen dialects.

Figure 1 is interpreted as follows: the most restricted (and therefore, most primitive) form of APIC, confined to syllable types consisting of /S₁+I₁/, is still observable in Huáng-xiàn, a Northern Mandarin dialect spoken in the Shan-dong province. whereas MC *t_ɕi 'branch' > Huáng-xiàn /t_ɕɨ/, both MC *t_ɕi 'to know' and *ki 'foundation' retain a palatal vowel, becoming both /t_ɕi/.

Jin-huá, a Wú dialect, also spoken in the Zhé-jiang province, shows a slightly more advanced stage of APIC. Here the scope of APIC may be defined as /S_{1,2}+I_{1,2}/ . Thus not only MC *t_ɕi 'branch' and *t_ɕi 'to know' > Jin-huá /t_ɕɨ/, but also *t_ɕiai 'regulation' and *kiai 'stoppage' > /t_ɕɨ/.

Peking and Wen-zhou both show pervasive influence of APIC. In Peking, any pre-modern i from any of the three aforementioned historical sources (i.e. /I_{1,2,3}/) constitute an appropriate input to APIC; on the other hand, only /S_{1,2}/ (but not /S₃/) serve as appropriate environment for the rule. Thus *t_ɕi, *t_ɕiai and *t_ɕiək 'to weave' all became /t_ɕɨ/; but whereas *t_ɕi > Peking /t_ɕɨ/, *ki 'foundation' > /t_ɕɨ/.

The Peking situation is reversed in Wen-zhou: all /S_{1,2,3}/ are appropriate environments for APIC, but only /I_{1,2}/ are the right input. Thus *t_ɕi, *t_ɕi, *ki all became /t_ɕɨ/; but while *ki, *kiai 'chicken' > Wen-zhou /t_ɕɨ/, *kiək 'attack' > /t_ɕiai/.

Figure 1 simply superimposes the varying scopes of APIC operative in these dialects; by projecting the individual frames in succession, one gets a motion picture of the gradual expansions of the domain of APIC from Huáng-xiàn to Jin-huá, then on either in the direction of Peking or of Wen-zhou. It is clear that APIC must have grown by successive stages if only because the other processes fed new inputs into APIC on instalments, so to speak. This dynamic picture obtained from latitudinal reconstruction allows us to recover certain intermediate phases of Wen-zhou not otherwise reconstructible purely from the internal evidence available in this

dialect. A more realistic diachronic picture of APIC in Wen-zhou can be schematized as follows:

(6)	*tʂi	*tʂi	*ki	*kiaɪ	MC	
	tʂi	-	-	-	APIC-1	} as in Huáng-xiàn
	-	tʂi	-	-	SOFT	
	-	tʂi	-	-	APIC-2	} as in Jin-huá
	-	-	-	ki	I-UMLAUT	
	-	-	tʂi	tʂi	PAL	- as in Peking
	-	-	tʂi	tʂi	APIC-3	} as in Wen-zhou
	tsi	tsi	tsi	tsi	other rules	

Notice that we can infer from the comparative dialectological data a sequence of events as (6) for the same reason that we can deduce tree (A) from the comparative evidence given in (1). To make the rationale more explicit, let us define the three occurrences of APIC:

APIC-1 applies to /S₁+I₁/

APIC-2 applies to /S₂+I₂/

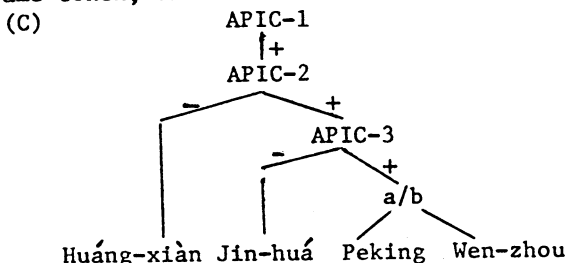
APIC-3 (a) applies to /S₃+I_{1,2}/

APIC-3 (b) applies to /S_{1,2}+I₃/

Having defined APIC-1,2,3a/b, we can construct a matrix (7) like (1):

(7)	APIC-3b	APIC-3a	APIC-2	APIC-1	
	+		+	+	Wen-zhou
		+		+	Peking
			+	+	Jin-huá
				+	Huáng-xiàn

By the same token, one can construct tree (C):



According to (C), Wen-zhou and Peking represent more advanced cases of Jin-Huá, which in turn developed from the Huáng-xiàn prototype. (C) is the simplest tree, covering the largest number of dialects; but it is by no means the only possible tree. One could, for instance, hypothesize that APIC developed independently in Huáng-xiàn, after this dialect split off from the Wú subgroup (represented here by Jin-huá and Wen-zhou). This complicates the tree somewhat; but is a perfectly conceivable turn of events.

This observation brings out the fundamental weakness of latitudinal reconstruction: it is based on an exclusively 'tree' model of linguistic diversification, and ignores other modes of linguistic evolution, such as areal convergence (owing, e.g. to continued contact among speech communities after the initial split)

Figure 1

	I ₃	I ₂	I ₁	
Peking			Huáng-xiàn	S ₁
		Jin-huá		S ₂
		Wen-zhou		S ₃

Figure 2

	I ₃	I ₂	I ₁	
Modern Peking 1962			ZYYY 1324	S ₁
		Trigault's romanization 1626		S ₂
		Modern Wen-zhou 1962		S ₃

and independent innovations (motivated, e.g., by universal tendencies). The simplicity argument underlying latitudinal reconstruction is weakened by the possibility not only of 'wave'-like propagation of linguistic changes (areal convergence) but also of the 'mushrooming' effect of similar but independent developments in non-contiguous speech communities.

4. Philological 'Einfühlung'

Derivation (6) is, then, a plausible schematization of the evolution of apicalization in Wen-zhou, but not a compelling conclusion based on comparative evidence alone. Fortunately, philological records, which abound in a cultural tradition like the Chinese, provide independent validation of the inference expressed as (6) or, equivalently, tree (C). The first unambiguous evidence of APIC is given in Zhong-yuán Yin-yùn (hereafter ZYYY, dated at 1324). This rime book set up a separate category labeled 'zhi-si' (/i/) in contrast to 'qi-wei' (/i/). The striking thing is that it classed /S₁+I₁/ words under /i/, but /S₂+I₁/ as well as /S₁+I₂/ words under /i/ category. Thus MC *tśi 'branch' > ZYYY /tśi/, but *tʰi 'to know' > ZYYY /tśi/. I₂ (from *iai) and I₃ (from *iəC) were grouped under /i/, regardless of the initial (S_{1,2,3}). ZYYY, then, represents the most primitive form of APIC as found in Huang-xian. The stage reached by ZYYY is as follows:

(8)

I ₃	I ₂	I ₁	
-	-	+	S ₁
-	-	-	S ₂
-	-	-	S ₃

(where '+' = application of APIC; '-' = non-application)

The next document giving clues to APIC is the earliest transcriptions of Chinese by means of a Western alphabet. The first romanization of Chinese was devised by the late 16th c. Jesuit missionaries Matteo Ricci (in China from 1583 to 1610) and others, and improved upon by Nicolas Trigault in Xi-rú Ēr-mù-zi, a systematic treatise of Chinese phonology published in 1626. In contrast to ZYYY, both *tśi 'branch' and *tʰi 'to know' were now transcribed as chi /tśi/, and both *tś'i 'owl' and *tʰ'i 'foolish' were recorded as chi /tś'i/. This means that APIC now extended to both S₁ and S₂ when followed by I₁. Furthermore, APIC affected I₂ as well as I₁. Thus *z'iai 'oath' and *s'iai 'earth' were transcribed as xi /śi/. Trigault employed a special symbol é for *iəC. The phonetic value of this symbol is uncertain; at any rate, it had not yet merged with the apical vowel, written i (or ü after dental sibilants). The situation as attested by Xi-rú Ēr-mù-zi can be summed up in the following chart:

(9)

I ₃	I ₂	I ₁	
-	+	+	S ₁
-	+	+	S ₂
-	-	-	S ₃

It becomes obvious immediately that Trigault's romanization resembles the Jin-huá situation, and represents an intermediate phase between ZYYY and modern Peking. With regard to apicalization, the modern pronunciation of Peking differs from the 17th c. Northern Mandarin reflected in Trigault's romanization only in one aspect, namely the further expansion of APIC to I₃ preceded by nondental sibilants. If we compare Trigault's transcriptions with Wen-zhou, on the other hand, the difference consists in the extension of APIC not to I₃ but to S₃. Simplifying somewhat the matter (by ignoring the distinction between dental and nondental sibilants -- which behave differently in the matter of apicalization), the diachronic profile of APIC can be constructed by superimposing the three successive 'frames' defining the scope of APIC at three different points in time: 1324 (ZYYY), 1626 (romanization) and the 1962 survey of Peking and Wen-zhou undertaken by the University of Peking. The resulting composite picture is Figure 2.

The point by point match between Figure 1 and Figure 2 demonstrates in a rather dramatic way the basic well-foundedness of the assumptions underlying latitudinal reconstruction.

However, the method of philological 'Einfühlung' (cf. Malkiel 1968:102) presents certain heuristic problems of its own. The not uncommon uncertainties surrounding the dates, provenience, and the historical background in general of ancient documents are often compounded by the difficulties of interpretation. The process of apicalization itself provides an excellent example in this regard. As I mentioned above, ZYYY offers the first certain proof of APIC-1; we can safely conclude that APIC-1 must have taken place at least before 1324. More specifically, some would venture to place APIC-1 at late 12th or early 13th c., based on the formal rearrangements of the rime dictionary Qiè-yùn Zhǐ-zhǎng-tu (dated at 1176-1023). APIC-2 and APIC-3 came even later, between 1324-1626 and after 1626 respectively. SOFT, on the other hand, apparently had a much earlier beginning. Throughout the Sino-Tibetan transcriptions of the 8-9th centuries, which represent the earliest phonetic records of Chinese in any alphabetic script, both palatal stops /t̪, t̪'/ and palatal affricates /t̪s̪, t̪s̪', d̪z̪/ were transcribed without distinction as c, c', j, interpreted as /t̪s̪, t̪s̪', d̪z̪/. In summary, the existing philological records suggest the following chronology:

- (10) SOFT: 8-9th c.
- APIC-1: late 12th c. or, conservatively, 14th c.
- APIC-2,3: after 1324

The internal evidence from Lán-zhou, on the other hand, requires that APIC-1 preceded SOFT (see derivation (6)); for if SOFT were applied before APIC-1 (and RET-1 and DENT-1), it would obliterate

rate the contrast between *tʃi and *tʃi, and the derivation would result in erroneous output, as illustrated in (11):

(11)	'branch'	'to know'	Gloss
	*tʃi	*tʃi	MC
	-	tʃi	SOFT
	tʃi	tʃi	APIC-1
	tʃi	tʃi	RET-1
	tʃi	tʃi*	DENT

/tʃi*/ for 'to know' would be indistinguishable from /tʃi/ for 'branch', whereas in fact Lán-zhou maintains the retroflex vs. dental contrast: /tʃi/ 'branch' vs. /tʃi/ 'to know'.

Faced with the paradox of conflicting chronologies, one established on documentary evidence, the other inferred from internal systematic correspondences, I have attempted to re-interpret the documentary evidence. The Sino-Tibetan transcriptions referred to in the preceding paragraph still consistently represented MC *-i with i. This fact has led linguists to regard the 9th c. as the terminus post quem of APIC-1. I will argue, instead, that this fact need not be construed as an argumentum ex silentio for the absence of an apical vowel. Notice that APIC began as a transparently context-sensitive rule (i.e. with the context that determined the split still observable in the phonetic output -- cf. Kiparsky 1972): MC *-i > i /sibilant ___#. The emergence of the apical vowel /i/ merely created a complementary distribution in the sound pattern of the 8th and 9th c. Chinese, since the new crop of secondary /i/ (= I_{2,3}) had not yet evolved from MC *-iVi and *-iɔC, but were still symbolized distinctively as -ei and iC respectively. The co-occurrence relations (indicated by '+' during this phase of Late MC may be represented as follows:

(12)		-i	-i	-ei	-iC	-V
	sibilant	+	-	+	+	+
	other init.	-	+	+	+	+

Given this distributional pattern, a new symbol for the apical vowel was not necessary. All that was needed was a simple interpretive rule: syllable-final /i/ = [i̠] after sibilants; = [i] elsewhere. The Sino-Tibetan manuscripts merely reflected this (morpho-)phonemic principle of parsimony, according to which new symbols are used only where ambiguity or unpredictability may arise. The absence, therefore, of a specific symbol for the apical vowel in the Sino-Tibetan transcriptions of the 8-9th c. does not necessarily mean the absence of an apical vowel in the phonological system of the time.

This negative argument presented above is strengthened by a positive one. Traditional Chinese pronouncing dictionaries employ a peculiar system of 'spelling' called 'fǎn-qìè', 'fǎn-qìè' is an analytic phonetic notation by breaking the syllable into the 'initial' (i.e. the initial consonant) and the 'final' (all the rest); the two components of the syllable are then 'spelled' out separately by two characters, the first alliterating with the initial, the second riming with the final of the lexical item in question. E.g.

/fan/ would be phonetically specified by means of /fu/ + /lan/ or similar characters; that is, /fan/ = /f(-u) + (l-)an/, where the elements that do not enter into the phonetic definition enclosed in parentheses. Suppose we let S stand for sibilants, as before, and K for all other consonant types. According to this formula, a syllable like /Si/ can, in principle, be defined either as (a) /S(-X) + (S-)i/ or (b) /S(-X) + (K-)i/, with either S or K in the second 'spelling' character, since neither S nor K in the second character enters into the definition. Curiously enough, however, /Si/-type syllables were uniformly defined as (a) rather than (b) in Hui-lín's Yi-qiè Jīng Yin-yì (810 A.D.), a glossary of Buddhist texts. This self-imposed restriction in the choice of characters serving as phonetic 'spellers' can be explained if we posit two allophones: /i₁/ (= [i̠]) after sibilants, and /i₂/ (= [i]) elsewhere (i.e. = APIC-1). Given this contextually determined value of /i₁/ vs. /i₂/, it becomes obvious why (b) is not a viable definition of the intended /Si/-type syllables, since the definiens would be phonetically /Si₂/ (= [Si]), while the intended definitum is /Si₁/ (= [Si̠]). This fact, first noticed by Chou (1948[1968]:164), lends considerable support to my interpretation of the 'ambi-valent' nature of the symbol i in the Sino-Tibetan manuscripts.

If my interpretation of the relevant philological documents is substantially correct, one must revise the date of APIC-1 upwards, at least to 810 A.D., probably even earlier. The resultant revised chronology (13) is now compatible with the internally motivated diachronic order of rules reflected in the derivation of (6):

- (13) APIC-1: 8-9th c., at least before 810
 SOFT: also 8-9th c.
 APIC-2,3: after 1324

5. Conclusion

It has become patently clear that none of the three methods examined here is self-sufficient for the purpose of reconstructing relative chronology -- and hence for the purpose of recovering linguistic histories in general. Each has its own inherent inadequacies. This fact calls for a healthy dosage of skepticism regarding the conclusions arrived at by any one method. On the other hand, the evidence derived from each procedure can serve as an independent validation (or disconfirmation) of each other. In view of their individual limitations and mutual complementarity, historical linguistics can only benefit from a closer interdisciplinary approach than has been customary, an approach that combines the strengths of the internal reconstruction à la generative grammar, philology, and dialectology.

Footnotes

¹ The present article is based on two substantially longer manuscripts (Chen 1975a,b), in which the issues raised here are more fully developed. The gist of this paper was presented at the First Berkeley Linguistic Society on February 15, 1975.

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² Stolz 1894, for instance, argued on the basis of such attested Latin forms as ornus < *osinus, that rhotacism must have preceded syncope. The reason is obvious, for if the chronology of events were reversed, *osinus would have become osnus (by syncope), to which rhotacism could no longer apply, as s no longer occurred intervocally.

³ For a broader survey of the phenomenon of apicalization, the reader is referred to Baron 1974, where some even more advanced cases of apicalization are discussed.

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