PONCA, BILOXI AND HIDATSA GLOTTAL STOP AND QUAPAW GEMINATION AS HISTORICALLY RELATED ACCENTUAL PHENOMENA[1]

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The lexical data base for the Siouan comparative dictionary project, reveals that Ponca, Quapaw, Biloxi, Hidatsa and perhaps other Siouan dialects have a few peculiar and hitherto unnoticed and unexplained reflexes of Proto-Siouan simple consonants in certain well defined environments. This paper represents an attempt to describe and explain phonetically the development of these reflexes and to trace their phonologization.

I will start by discussing the Quapaw data as they show by far the greatest consistency. Quapaw has geminated Proto-Siouan *t postaccentually. The sound change is quite regular; in compiling a Quapaw lexical database (v. Dorsey c. 1890; Rankin 1982, 1986) of about 3300 entries incorporating all available Quapaw vocabularies, I have found virtually no exceptions. It is a development that appears, at least at first, to have affected Quapaw alone among the languages of the Dhegiha subgroup of Siouan. In table 1 I illustrate the gemination by comparing Quapaw with the closely related Kansa and with Dakota, sister languages which typify the situation existing in most other Mississippi Valley Siouan dialects.

Quapaw	Kansa	Dakota	English
ppė̀tte	ppė̀:je	phė̀ta	fire
xó̀tte	xò:je	xó̀ta	be gray
kkítte	kkù:je	khù̀ta	shoot
títte	jù:je	lù̀ta	ripe/red

Table 1. Quapaw gemination.

One might account for this change formulaically with a simple rule such as *t > tt / '__. And although such relatively uncomplicated postaccentual gemination is not unheard of, I believe there is a different and more comprehensive phonetic explanation available for the phenomenon in Siouan.

To find the evidence for this explanation we must examine data from several other Siouan languages. Among Haas's (1968) "Last Words of Biloxi" are found transcriptions of the word for *fire*, one of the words used above to illustrate the Quapaw sound change.[2] Biloxi too shows

an aberrant correspondence for what, in most of the other Siouan languages, is a simple stop.

Biloxi	Dakota
pe<u>ʔt</u>iʔ	phė<u>t</u>a

Table 2. Biloxi glottal stop.

The unexpected syllable-final glottal stop presents a problem for comparatists, since, although glottal stop is at least marginally phonemic in most if not all Siouan languages and is, also marginally, a reconstructable Proto-Siouan phoneme, this syllable final [ʔ] does not correspond well across Siouan. There is really very little basis for its reconstruction. There is little more that we can say about this problem in Biloxi though, since Haas and Swadesh did not record other, analogous items with postaccentual, non-word-final glottal stop, and the earlier field workers on the language, A.S. Gatschet and James Owen Dorsey (Dorsey and Swanton 1912), either did not hear such glottal stops or simply did not bother to record them. We shall return to Biloxi later.

Ponca, the only one of the three "aberrant" languages under discussion that is still spoken, shows a great many unexplained *ʔC* clusters in the notes of Frida Hahn (1933-34), Dale Kinkade (1970) and the author (1979).

Ponca	Kansa	Dakota	English
dȧ<u>ʔbd</u>ị	yȧ:blị	yȧmnị	three
ppė<u>ʔd</u>e	ppė:ǰe	phėta	fire
dȯ<u>ʔb</u>a	ttȯ:ba	tȯpa	four
hịbdị<u>ʔg</u>e	hǫblịge	ṵmnịča	beans

Table 3. Ponca glottal stop.

Frida Hahn, who did field work on Ponca in Oklahoma in 1933 and 1934, was a student of Franz Boas. Her correspondence with Boas (much of it in their native German) along with at least some of her field notes in phonetic transcription are found in the American Philosophical Society Library's Boas Collection. Copies were loaned to me by John Koontz.

Hahn was the first to note the syllable-final glottal stops in Ponca. Note the occurrences of [ʔ] in her indirect object paradigm of the verb *gȧge* 'to make'. I have replaced Hahn's phonetic symbols and accent marks with their modern equivalents but have left her transcription otherwise intact. (See table 4.)

In these paradigms glottal stops occur at the ends

of accented syllables, each of which Hahn perceived as long. This matches the context in which they are found in table 3, above. Though post accentual glottal stop in

	I	thou	he	we
for me		ɻdėiška:gė?	ɻgá:?gai	
for thee	wı?ppagė		digá:?gai	ɻdɻ:?gagai
for him	éippagė	éidėiškage?	éigı:agai	ɻgá:?gai
for us		weidėiškagė?	weigá:?gai	
for them	éiwėi?ppagė?	éiweidėiškage?	weigá:?gaiɻwɻ:?gagai	

Table 4. Ponca glottal stops in Hahn.

Hahn's transcription is not always present in the context I have just described, it is present in the majority of such cases. The only other glottal stops are those that Hahn occasionally writes word finally, and these are not found in the transcriptions of any other linguist. The variability of post accentual glottal stop is confirmed in the later transcriptions of Kinkade and Rankin.

In 1970 Dale Kinkade conducted a linguistic field methods course at the University of Kansas in which he and the class interviewed two speakers of Ponca and one of the mutually intelligible Omaha. The Poncas, both males, perhaps in their 20's, were what these days we might call semispeakers; their speech contained many errors in phonology, grammar and lexicon when compared with Ponca texts collected in the 1880's. The Omaha speaker, an older man, was quite fluent. The speech of all three, however, shows glottal stops in the same environments as in Hahn's 1933 Ponca word list and paradigms.

glė?be	vomit
gú?deha	away from here
mǫsčɻ?ge	rabbit
á?čǫ ~ a?čǫ	very, too
šǫ́šǫ ~ šǫ́?šǫ	always
piá?že ~ piáaže	bad
duá?ma	those (people)
šėa?ka	that one (person)

Table 5. Ponca examples from Kinkade (1970)

One important contribution of Kinkade's notes is that they show great consistency in the occurrence of glottal stop in certain grammatical particles commonly postposed to verbs but only *sometimes* accented. The fact that the glottal almost always occurs in the two subject agreement articles, *-akha* 'anim. sg.' and *-ama* 'anim. pl.', as well as in *-ačǫ* 'very, too' suggests that it may

have become lexicalized in these morphemes; in other words, these morphemes now have a non-predictable, underlying glottal stop. The notes available to me and the language obsolescence conditions under which they were obtained leave this question open, but it will reappear momentarily when we introduce some Hidatsa data.

My own Ponca notes and recordings were obtained with the help of several elderly speakers in 1979. I noted a number of interesting phonetic phenomena related to the long, accented syllables described above. What follows is a brief survey of the types of laryngeal activity associated with these accented vowels.

The original (oral) presentation of this paper was accompanied by a tape recording of several Ponca speakers pronouncing various illustrative words. In the transcription below I have maintained the order of presentation found on the tape so that interested linguists who obtain the recording can follow easily. Bear in mind that in citation forms such as these the amount of laryngeal activity present may have been exaggerated, but they at least have the virtue of making the phenomenon clear. (See table 7, next page.)

Note that the last Ponca forms (e) in table 7 also illustrate the phonetic phenomena discussed above in conjunction with Quapaw and Biloxi, namely, both the syllable final [ʔ] and gemination of a following simple dental stop. In Ponca long accented vowels routinely have variants accompanied by creaky voice, glottal stop or gemination of a following *t*.[3]

There may be other instances of postvocalic glottal stop in the several Siouan languages, but, with one exception, I have not yet been made aware of them. The exception is Hidatsa. Data provided to the comparative dictionary project and via personal communication by A. Wesley Jones show a number of doublets:

	ciiri ~	ciʔiri	yellow (N.B. VʔV)
	cóota ~	cóʔta	gray
	púuši ~	púʔši	speckled, striped
	púuxi ~	púʔxi	spotted
	šiiri ~	šiʔri	brown
but:		tóʔhi	grue

Table 6. Glottal stop in Hidatsa color terms (Jones).

Table 7:

(a) Level varying with falling pitch on the accented vowel:

/dȯ:ba/ 'four' [dȕ:ba], [ᵊdû:ba]

(b) Falling pitch with creaky voice varying with complete glottal closure:

/gdė:ba/ 'ten' [gdê:ba], [gdê?ᵉba]

(c) Falling pitch with creak varying with a completely broken vowel:

/dȧ:bdi̧/ 'three' [dȧ:bdi̧], [dȧ?àbdi̧]

(d) Two more examples of slowed glottal vibration accompanying the falling pitch on accented vowels:

/ppė:dǫba/ 'seven' [ppê:dǫba], [ppê:dǫba]

/ppe:dȧ:bdi̧/ 'eight' [ppe:dȧ:bdi̧], [ppe:dȧ:bdi̧]

(e) Several examples of /ží:de/ 'red', first with ordinary falling pitch:

/wė:dawa ží:de nǫbȧ/ 'two red pennies'

/wė:dawa ží:de dȧ:bdi̧/ 'three red pennies'

-- Then with with full post vocalic [?] replacing length and pitch drop:

[ží?de], [ží?de]

-- And finally [?] assimilation producing geminate [tt] very much like Quapaw:

/waží:de/ "something red" = 'tomato'

[wažítte] (three repetitions)

/ppą:ge ží:de/ 'radishes'

loud: [ppǫ:ge žíde], then softly with a pause for interruption:

[ppǫ...ge žíᵈte]

Table 7. Transcription of author's recorded Ponca data.

All of the items in table 6 are color terms and all but *grue* have the doublets in which glottal stop replaces the unaccented second mora of the expected long vowel. This turns out to be precisely where one would expect [ʔ] in analogy with Ponca and Biloxi, and, by extension, where one would expect Quapaw gemination.

Generally speaking, we do not seem to find other such cases in Hidatsa.[4] Since the Hidatsa [ʔ]'s do occur in positions analogous to where we find them in the other languages discussed, it seems likely that the process described above for Ponca and Biloxi was productive in Hidatsa at some earlier time, leaving lexicalized relics in just this one semantic domain (cf. the Ponca post verbal particles, above).

The explanation for the syllable final [ʔ]'s of Biloxi, Ponca and Hidatsa and, ultimately, for Quapaw gemination lies in the nature of Siouan accent. The author's recordings show that Ponca pronunciations with post vocalic [ʔ] all vary with pronunciations with $\acute{V}_1\grave{V}_1C$ (alternatively $\widehat{\acute{V}{:}}C$) in which the long vowel has a distinctive falling pitch. Long vowels that are accented on the first mora show a clearly audible pitch drop on the second mora. The drop (reinforced by naturally occurring downdrift) is so precipitous that it frequently results in creaky voice near the bottom of the contour, often producing the clear glottal stop in some speakers. The (somewhat variable) rule is approximately:

$$\acute{V}_1 V_1 C \quad \text{--->} \quad \acute{V}_1 \underset{\sim\sim}{\grave{V}_1} C \text{--->} \quad \acute{V}_1 ʔ C$$

The vowel length sometimes remains in Hahn's notes but usually disappears in mine. In other words the creaky voice or [ʔ] generally replaces the second mora of the vowel (via rapidly dropping pitch and failing phonation) and shortens the nucleus of the syllable.

To sum it up then, all of the syllable final glottal stops occur following what we know from the comparative Siouan lexical files to have been long vowels that were accented on the first mora.

To tie up one remaining loose end, since Quapaw already had a contrast between geminate and voiceless plain stops, the additional sound change

ʔ > t/__t
glottal stop assimilates to *t* preceding a *t*

phonologized what had been an automatic concomitant feature of Quapaw accent. Other Quapaw syllable final

[ʔ]'s were apparently lost, as the dental stop alone conditions the assimilation. Note that the one or two instances of this gemination in my Ponca recordings suggest that this is the case in Ponca too.[5]

Comparative work so far suggests that Proto-Siouan accent fell on the second syllable of each word. As a consequence this syllable was lengthened and two secondary laryngeal effects have been generated. First, as Richard Carter has observed, a preceding stop was aspirated, and second, the creaky laryngeal activity or glottal stop, the subject of this paper, resulted from the falling pitch characteristic of Mississippi Valley Siouan long accented syllables.[6]

So the onset of Siouan stressed syllables was characterized by breathiness or aspiration (which may have served to raise the pitch of the initial mora even higher), while the falling coda came to be characterized, in at least several languages, by creaky voice that sometimes resulted in the phonetic [ʔ].

So, expanding our view and rule domain to encompass the syllable structure of entire words, a PS phonetic sequence

(C)VCV́CV- would yield (C)V<u>h</u>CV':<u>ʔ</u>CV-

if all the laryngeal activity rules were contemporaneous.

So, for example, the word for 'fire' cited several times above has the pre-PS form ***wapete*. With accent, lengthening and the predictable laryngeal features added we would have **wahpé:ʔte*. Syncope, assimilations and other regular reductions ultimately yield Dakota *phéta*, Ponca *ppéʔde*, Biloxi *peʔtiʔ* and finally Quapaw *ppétte*. In Quapaw both laryngeal processes have produced geminates, but at different times.

Aspiration must have been phonemicized early through the loss of initial syllable vowels typical of Mississippi Valley Siouan and through the various derivational and inflectional processes that have added numerous prefixes to the left of the PS accented syllable. The post accentual glottal stop that has been the subject of this paper has become regularly phonemicized only in Quapaw, with a marginal existence in the relic doublets of Hidatsa color terms and perhaps the generally unaccented post verbal clitics of moribund Ponca.

Since there was apparently this plethora of *segmental* laryngeal activity associated with Siouan accent,

perhaps experimental phonetic evidence from other languages with similar concomitant features will provide a typology that will enable us to reconstruct the correlates of Proto-Siouan accent with an ever greater degree of certainty.[7]

NOTES

[1] I would like to thank Allan Bell, Karen Booker, Wallace Chafe, Eric Hamp, Geoff Kimball, John Koontz, Marianne Mithun, and Dale Nicklas for their helpful discussion and comment on this paper and/or its topic. Although their interpretation of similar phenomena in other languages may differ from the one I express here for Siouan, their insight has been especially helpful. I would also like to thank the University of Colorado Linguistics Department and especially David Rood for their hospitality during the sabbatical year during which this was written.

The author will provide anyone wishing one with a copy of the tape cassette played during the oral presentation of this paper. I will need a blank tape cassette and return postage with any request. The tape runs less than 5 minutes total time.

In this paper [đ] is used for a voiced interdental fricative, [ǧ] for a voiced velar fricative, [c] for Hidatsa [ts], ['] for accent, [ˆ] for falling pitch and [~] for creaky voice.

[2] I have simplified Haas's transcription in non-essential respects for typographic purposes only. Biloxi *pêʔtiʔ* may be the by product of Western Muskogean glottalization (see Ulrich, 1987 for a description of the phenomenon, which he considers to reflect an underlying contrast), since (a) Haas and Swadesh recorded glottal stops word-finally in Biloxi, precisely where they would occur in Choctaw, and (b) there is independent evidence that some of Dorsey's Biloxi speakers also spoke Choctaw or Chickasaw. At the same time, if this rule is an areal feature of southern Siouan and western Muskogean, all of these accentual phenomena may ultimately be related, with all the glottal stops accent generated.

[3] This is one of several developments that may allow us further to subgroup the Dhegiha languages: [Quapaw, Omaha-Ponca] and [Kansa, Osage]. Others include the merger of **ũ* with *i* in the first three languages, 1st sg. of 'speak' in *ehe*, and possibly the merger of the two back nasal vowels in OM, PN and QU. (V. also the distri-

bution of singular, sitting, inanimate definite articles *-*rą* vs. *-*rikė*.) Geographical distribution of the Dhegiha languages makes late maintenence of a Quapaw-Omaha-Ponca subgroup unlikely, so the abovementioned features would have to have represented dialect differentiation already in Common Dhegiha.

[4]Wes Jones (personal communication) points out that glottal stop also marks questions in Hidatsa. Since it also apparently marks questions in Dakota, it may be that question formation in Common Siouan involved a falling intonation contour which generated phonetic glottal stop in much the same way that falling accent (reinforced by natural downdrift) caused the creaky voice and/or glottal stop described in this paper. It is difficult to imagine how a marginal phoneme like /ʔ/ could become a segmental question marker in any other way. Treating the question marker as a segmentalization of what was originally (and now is presumably underlyingly) an intonation contour offers a reasonable explanation for the development of this peculiar Hidatsa morpheme.

[5]Note the similar phenomenon described by Bright (1957:11) in his discussion of Karok accent. Section 161. "/ ˊ/, called ACUTE ACCENT, has two allophones. Before pause (defined in 186), it is a combination of strong stress, falling pitch, and glottalization. Only long vowels are accented in this position, and glottalization takes the form of a light glottal interruption of these vowels, with about two-thirds of the vowel's duration preceding the interruption. So tí·m 'edge' can be phonetically written [ˈtiʔˈm].... Note that such glottalized vowels are phonetically distinct from the sequence /V̂ʔV/, since the latter has a stronger glottal stop and equal duration of the two vowels....

The other allophone of / ˊ/, occurring everywhere except before pause, is a combination of strong stress and high level pitch, without glottalization: [pú·]fič 'deer.'"

P.17, sect. 186. "...a PAUSE is considered to occur at the end of every contour, even when speech is actually unbroken." Thus, in the example used above, the /í·/ of /tí·m/ 'edge', is considered to precede a pause even though the syllable is closed by a consonant.

Bright also describes (p.9, sect. 130) an allophonic lengthening of obstruents when they follow a long vowel posttonically, an environment very similar to the geminating environment of Quapaw. In Karok, however, these accentually lengthened obstruents contrast with true

geminates, which have a greater duration.

[6] Although many of us had deduced the fact that initial syllable vowels had been lost in a number of Siouan languages, it was Carter who pointed out at the 1984 Comparative Siouan Workshop at the University of Colorado that the aspiration common to all but the northwestern corner of Siouan must have been a secondary development. No one before this had successfully explained Siouan aspiration.

Although in modern Mississippi Valley Siouan languages aspiration affects primarily root initial stops, it has become increasingly clear that it is in precisely these cases that an old initial syllable (most frequently **wa-* 'absolutive' or **ki-* 'dative, possessive') has been lost. Ohio Valley Siouan often maintains the old initial syllable vowel, while Mississippi Valley languages lose the vowel but sometimes show an assimilated reflex of the old initial syllable consonant, e.g., TU *mani*, BI *ani*, DA *mnị* 'water', all from PS **warị*. For a full treatment of the development of Siouan aspiration we must await Carter's analysis.

[7] After a version of this paper given at the 1987 *Siouan and Caddoan Linguistics Conference*, two prominent Iroquoianists, Wallace Chafe and Marianne Mithun, mentioned that they believe syllable final glottal stop to have lowered pitch in that language family, i.e., rather than falling pitch causing a [ʔ] as in Siouan, the Iroquoian /ʔ/ causes falling pitch. This fall would seem to call for a different type of laryngeal activity altogether. Synchronically (phonetically) this is an empirical question, and the evidence I am familiar with so far (e.g. Hombert, *et al.* 1979; Thurgood 1980) supports my position. This does not mean, however, that a pitch lowering glottal stop does not exist, merely that I am not familiar with instrumental or physiological evidence for it. Diachronically, the question is an inferential one, and it could be the case that Iroquoian /ʔ/ in the instances in question is the modern reflex of an appropriately different (pitch-lowering) form of laryngealization that existed at an earlier time.

REFERENCES

Bright, William. 1957. *The Karok Language*. UCPL-13. University of California Press.

Carter, Richard T., A. Wesley Jones and Robert L. Rankin. In prep. *Siouan Comparative Dictionary* MS.

Dorsey, James Owen. c.1890. Quapaw Dictionary MS. National Anthropological Archives, Washington, DC.

Dorsey, James Owen and John R. Swanton. 1912. *The Biloxi and Ofo Languages*, BAE-B 47, Washington, DC.

Haas, Mary R. 1968. The Last Words of Biloxi. *IJAL* 34:77-84.

Hahn, Frida. 1933-34. Unpublished notes on Ponca and correspondence with Franz Boas. American Philosophical Society Library, Philadelphia, PA.

Hombert, Jean-Marie, John J. Ohala, William G. Ewan. 1979. Phonetic Explanations for the Development of Tones. *Language* 55:37-58.

Kinkade, M. Dale, *et al.* 1970. Unpublished field notes on the Ponca language.

Rankin, Robert L. 1982. A Quapaw Vocabulary. *Studies in Native American Languages, KWPL* 7:125-142.

Rankin, Robert L. 1986. *Quapaw-English and English-Quapaw Dictionary.* Unpublished database printout based on Dorsey c.1890 and the author's 1973-74 field work, 262 pp.

Thurgood, Graham. 1980. Consonants, phonation types, and pitch height. *Computational Analyses of Asian and African Languages*, 13:207-219, Tokyo.

Ulrich, Charles H. 1987. The Glottal Stop in Western Muskogean. Paper read at the Kentucky Foreign Language Conference, April 1987, Lexington, KY.