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ON THE SOURCES AND SCOPE OF SIOUAN ASPIRATION
(With special attention to Mandan, Crow and Hidatsa)

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Aspirated voiceless stops are found in the vast majority of Siouan languages. Siouan aspiration is hypothesized to have existed very early in the history of the language family. In 1984 Richard T. Carter pointed out that the Ofo language had a productive rule which caused aspiration of stop (and certain fricative) consonants if they constituted the onset of the accented syllable of a word.[1] In Siouan languages this is normally the second syllable. And although the rule was first articulated for Ofo, it seems to explain the initial appearance of most aspiration in other Siouan languages as well.[2] There are other sources of aspiration in Siouan however, and in this paper I will discuss these along with the extent to which we may say that "Carter's Law" as well as other sorts of aspiration were a Proto-Siouan or pre-Proto-Siouan phenomenon.

The Siouan language family consists of three or four major branches. Using for the sake of continuity the terminology introduced by Voegelin (1941), these are: *Missouri River Siouan* consisting of Crow and Hidatsa, *Mississippi Valley Siouan* consisting of Dakotan, Chiwere-Winnebago and Dhegiha, *Ohio Valley Siouan* consisting of Tutelo, Ofo and Biloxi, and, lastly *Mandan*. Most of the subgroupings are obvious even to the casual observer, and the family generally lends itself well to representation by a traditional *Stammbaum*. Mandan has been the exception. Once the superficial features--mostly vocabulary--held in common with Missouri River Siouan and due to contact with Hidatsa are stripped away however, Mandan can be seen to be either a separate, fourth basic branch of Siouan or a very early offshoot of Mississippi Valley Siouan.[3]

In addition to the very widespread second syllable aspirates, Siouan aspiration can be the product of a number of other factors. These include older clusters, both primary and secondary, organic and morphophonemic. These will be discussed below in the context of our attempt to understand the age and chronology of aspiration.

Seeking to establish the point by which aspiration had become productive in Siouan, we find that Ohio Valley and Mississippi Valley Siouan both show unambiguous evidence of having inherited the same aspiration rule

for stops. If Proto-Siouan really split four ways, then clearly second syllable aspiration was a Proto-Siouan phenomenon. The problem is that we cannot be absolutely sure of the mode or order of dispersal of the major Siouan subgroups. So in order to support the claim that aspiration was Proto-Siouan, it would be useful to find evidence of it in Missouri River Siouan and/or Mandan in addition to the other branches. And neither subgroup has any trace of the usual second syllable aspiration--"Carter's Law." Did they lose it? Or did they never have it?

Philology does not elucidate the matter. The earliest materials show essentially the same state of affairs as the most recent. This leads to a consideration of instances in which aspiration arose from processes other than Carter's Law. Examining such cases it is at least possible to determine what became of some of the aspirates that we can be certain existed at one time in Mandan and probably in Missouri River Siouan. These are cases of secondary aspiration that arose morphophonemically in the inflectional and derivational paradigms of verbs whose stems begin in **h-**. The verbs include such common concepts as 'arrive here, arrive back there' and 'say'. And the first group of inflected forms we want to examine that normally produced aspirates in these particular verbs is the set of first and second singular, active, person-number prefixes.

The underlying and internally reconstructible form of the 1st sg. actor pronominal in Siouan was and is ***wa-**. *Wa- had a number of phonologically conditioned allomorphs however. Prefixed to several classes of stems, both 1st and 2nd sg. actor pronominals underwent syncope losing their vowels, and in the case of verb stems beginning with **h-** the resultant 1st sg. sequence of ***w-h** yielded an aspirated ***ph-**.

The 2nd sg. actor prefix was ***ya** with the regular reflex **ra-** in Mandan. After losing its vowel preceding H-stems, the remaining secondary cluster, ***r-h**, should yield an aspirated ***th**.

Of the several common verb stems with initial **h-** however, all but one show the regular pronominal sets (**wa-, ra-**) restored by analogy in Mandan. In fact, to my knowledge, the verb 'say' retains the only really irregular inflected forms in Mandan, so it is a good example of the importance of qualitative as opposed to quantitative evidence in comparative linguistics. The cognate set for the verb 'say' with its 1st and 2nd sg. actor forms (boldfaced) is[4]

	citation & 3sg form	1st sg. actor	2nd sg. actor
PSI	*e-_he·	*e **w** hé·	*e **y** hé·
CR	_he		
HI	_he·	-**wa** ·c	
MA	é-_he(-re)	é·**p** e?š	é·**t** e?š
DA	e-_yá	e **p** há	e há
CH	e e	i hé	i **s** é
WI	é e	hi hé	hi **š** é
OP	e	e he	e **š** e
KS	e e	e **p** hé	e **š** é
OS	e e	e **p** še	e **š** é
QU	(i ye)	i hé	i **š** é
BI	hé(-di)		há **y** e
OF	é he	**b** é he	č é he
TU	ha hé·	ha **wa**hé·-	ha **yi**he·-
CA	-e?		

Hidatsa, Ofo and Tutelo show paradigms that have been regularized to one degree or another, while several other languages have partially merged ***ehe·** 'say' with ***ie** 'talk'.

These minor problems aside however, Mandan has retained the irregular allomorph of 1st actor, and the important thing to note is that the aspirate that arose morphophonemically via the juxtaposition of 1st person ***w-** and the ***h** of ***é·he** has lost its **h**. The earlier ***é·phe?š** 'I say' has deaspirated. And although the Mandan 2nd person form has evidently been influenced by the productive allomorph, **ra-**, it nonetheless should show a reflex of the **h** of ***é·he**. That is, it should be ***é·the?š**[5] with aspirated **t-h**. But it too has been deaspirated.

Mandan has two more instances of demonstrable deaspiration of morphemically complex aspirates. In a number of Siouan languages the verbs 'arrive here' and 'arrive back there' are formed by compounding a verb root, ***hi·**, with preposed deictic particles, ***re** - ***Re** 'this, here, now' or ***ka** 'that (out of sight), yonder'. The resultant CVhV compounds underwent essentially the same syncope rule as the pronominal prefixes discussed above, yielding an aspirated sequence which is preserved in several other Siouan languages.

***re-hi·** > ***r-hi·** > ***thi** > MA **ti**

***ka-hi·** > ***k-hi·** > ***khi** > MA **ki**

	arrive here	arrive back there
PSI	*re-hi·	*ka-hi·
HI		k í·
MA	t i	k í
DA	hí	k hí
CH	j̃ í·	g í·
WI	j̃ í·	g í·
OP	t hí	k hí
KS	č hí	k hí
OS	c hí	k ší
QU	t hí	k hí
BI		k i
OF	ofthahi (?)	
TU	hi·	

Again we see a deaspiration process at work in Mandan. So in Mandan, one of the two subgroups that show no reflexes of regular Carter's Law aspiration, we find morphophonemic traces (the h-conditioned reflexes of ***w** and ***r**) of a *d*easpiration rule that must have been active prehistorically in the language.[6]

The outcome of the morphophonemically complex aspirates makes it clear why we can probably expect to find no evidence for other earlier aspirates in Mandan. They would all have been wiped out by the same deaspiration rule that eliminated aspiration in the forms 'I say, you say', 'arrive here' and 'arrive back yonder'.[7]

There are other aspirates in Siouan that cannot be accounted for by either Carter's Law or by any of the morphophonemic processes. They cannot be the result of Carter's Law, since their Dhegiha reflexes show post-aspiration rather than the expected preaspiration. Several are animal names.[8]

	grizzly	cow elk	mosquito
PSI	***wąthó**	***ųphą**	***ya·phąke**
CR			a p á aka
HI			a p á aka
MA	mą t ó?	ų p a	há p arake
DA	mą thó	ų phą́	čha phų́ ka
CH	mą thó	hų́ m ą	ra·w ą́ ge
WI	mą č ó	hų·w ą́	ra·w ą́ k
OP	mą thó	ǫ́ phǫ	ná hǫ ge
KS	mi čhó	ó phą	yá phą ɨge
OS	mi chó	ó phą	ðá phą ke
QU	mą thó	ǫ́ phǫ	da phą́ ke
BI			ya m ə kí
OF	ų́ thi		čá m ə ki
TU	hamų́·thih	ma·pha-	
CA	nəmę ?		

Another grouping of terms with Proto-Siouan post-aspirates may involve phonosymbolism: ***(a)phe** 'grind', ***rathé** 'chew'[9], ***aphá** 'hit', ***yá·phe** 'stab', ***-khɨ́te** 'glance off', ***-čhi** (?) 'dance' all have reconstructible **Ch** stops. A few of these may be old compounds, but numerous remaining post-aspirates are simply conundra at the moment, e.g., ***yophé** 'wade'[10], ***awá·thi** 'river', ***i-šíkhą** 'woman's sister-in-law', **wathą́** 'squash'[11]. Whatever their ultimate source in Siouan, none has an aspirated reflex in Mandan.

There is one further source of Siouan aspiration that centrally involves Mandan. This aspiration is clearly secondary, since it involves the Proto-Siouan sequences ***xk** and/or apparently ***xVk.** These sequences produce aspirates in Mississippi Valley Siouan and perhaps in Biloxi. There are few examples.

	heron[12]	move[13]	shoulder[14]
PSI	***ó·xka**	***xaką́·he**	***ɨ-xkéte**
CR		xaká·	
HI		xaká·	
MA	ą xk á	x ką́ he	ąxkit
DA	ho kh á	k hą́	
CH	o kh á	k hą́	
WI	ho·k é	x gą́	
OP		k hą́	ɨkhéd e
KS		k hą́	ɨkhéj̃ e
OS		k hą́	ɨkšéc e
QU	ho kh á	k hą́	ɨkhétte
BI	ó·xk a	ok xá he	ax é
OF	ó skha		

The fate of aspiration in Crow and/or Hidatsa is even more problematic than in Mandan. However the most prominent Siouan H-initial verb stems present a pattern that suggests that they may have undergone an evolution similar to that of Mandan. The obstruentized allomorphs of the 1st and 2nd person actor prefixes are missing altogether from Crow and Hidatsa, and the productive set of allomorphs (**wa-** '1sg/' and **ra-** '2sg', phonetically [ba-], [da-] in Crow) has been restored throughout. All of our evidence, then, must come from the allomorphs of the verb roots themselves. Do these roots retain their initial **h-**, or has it been lost in a process perhaps like Mandan deaspiration?

The Crow paradigms (Graczyk 1984, Lowie 1941) for the three normally irregular H-stems follow: the underlying form of each is the 3rd sg. The cognate phonemes are lined up beneath the underlying representations as well as I have been able to align them. There has been

so much vowel truncation following the loss of **h-** in each of the conjugated forms that determining exact reflexes for the remaining original vowels is difficult and assignment to a "column" somewhat arbitrary.

	hée 'say'	**híi** 'arrive'	**húu** 'come'
1sg	ba	ba á	bo ó
2sg	da	dalá a	daló o
3sg	hée	híi	húu

The third person forms look almost suppletive, but they are not. Note that, just as in Mandan, the **h-** appears only in the 3rd sg. form of the verb, the unmarked form in which no morphophonemic interaction with prefixes was possible. In the other persons the **h-** has been deleted and the remaining vowels of the verb root have coalesced with those of the prefixes, resulting in various long vowels and variable accent.

Yet intervocalic **-h-** is not normally lost in Crow: there are many instances of its regular preservation. In other words, we wouldn't expect these **h**'s to be missing if the regular allomorphs of the 1st and 2nd person pronominals had simply been restored.[15] So there must have been something about the earlier morphophonology of the verb roots and actor prefixes that caused loss of the **h**. I maintain that the most plausible explanation for this loss is to assume earlier forms like those of the Mandan analogs. Crow (and Hidatsa?) deaspiration rules identical to the one we have seen at work in Mandan account for the loss of **h-**, *then* analogical replacement of the pronominal stop allomorphs with modern, productive variants completes the picture we see today.

The demonstrable loss of aspiration in Mandan and its probable loss for the same reasons in Missouri River Siouan leaves us free to posit at least some Siouan aspiration as Proto-Siouan, but on a weaker basis than if we had discovered positive traces of Carter's Law in all major subgroups. Occam's Razor is not the most satisfying tool to have to use in linguistic reconstruction. Carter's Law may have operated in Mandan, Crow and Hidatsa also, but the deaspiration processes in those three languages would have removed its effects without leaving a trace.

All three languages seem to have simplified the aspirated stops in words such as 'grizzly', 'cow elk' and 'mosquito' also, along with the possibly phonosymbolic aspirates. Those arising from ***x(V)k** clusters are clearly secondary and keep their original clusters

in Crow, Hidatsa and Mandan.

One last source of Siouan aspiration helps explain the phonetically different reflexes of Carter's Law products across Siouan. Carter's Law reflexes are preaspirates (or their secondary geminates) in Dhegiha alone. In Dakota, Chiwere, Winnebago, and Ofo they are postaspirates. Because these languages are members of various Siouan subgroups, it is necessary to posit separate ***hC > Ch** rules in each subgroup. At first glance this would seem a rather unlikely development, but there is synchronic evidence for such independent changes in virtually all the languages named.[16] The best sources of evidence are aspirated stops that arose morphophonemically as preaspirates when a stop-initial suffix like **-ka** was affixed to a verb stem that historically ended in ***-he**. In such cases, Mississippi Valley languages, Dhegiha excluded, have an aspirated allomorph of **-ka**, the common noun and stative verb formative, namely ***-kha**.[17]

	raccoon	adult
PSI	***wihé**	***x?ó·he**
LA	wičhá	x?o khá
CH	mįkhé	
WI	wak é	x?ó·k e
OP	mikká	
KS	mikká	
OS	mihká	
QU	mikká	
BI		x o hí
OF	iy á	sh ó hí
TU	wih á	h o·hka

Since Ohio Valley Siouan (and Missouri River Siouan and Mandan, although not shown in these two sets) preserves unaugmented reflexes of **-h** final stems, and metathesis of the **-h** and suffixed **-ka** is found only in certain Mississippi Valley languages and in Ofo, clearly this last source of aspiration cannot date from Proto-Siouan. It does show that there was an active **hC → Ch** rule in Dakotan, Chiwere-Winnebago (and Ofo), and thereby explains how the original Carter's Law preaspirates became post aspirates in the affected tongues.[18]

Wolff (1950-51) did not reconstruct Proto-Siouan aspirates at all. This was primarily because he was forced to use materials for many languages in which aspiration had not been properly recorded. Even Haas (1969) felt that aspiration was certain only in Ofo and Dakota. Since then we have found reflexes of aspiration in nearly all Siouan languages, and Matthews

(1958) reconstructed Proto-Siouan ***ph**, ***th**, and ***kh**.

At the Siouan Workshop in 1984 the author presented evidence for two series of aspirates in Proto-Siouan, one preaspirated and one postaspirated. At least two distinct types of Proto-Siouan aspiration are apparently still necessary, one to account for Dhegiha preaspirate correspondences and the other to account for the distinct Dhegiha, Chiwere-Winnebago and Dakotan postaspirates, but we now see that the situation was much more complex, as aspiration arose at presumably different times from a variety of different sources. In summary, these were:

(1) The Carter's Law or accented (second) syllable aspirates, which Dhegiha evidence suggests were probably originally preaspirates, ***hp**, ***ht**, ***hk**, (although this is not certain). Carter's Law was probably Proto-Siouan, but it is not shared with Catawba.

(2) Postaspirates that arose morphophonemically from juxtaposition of consonantal prefixes to **h**-initial roots. These are the ones exemplified by the verbs 'say', 'arrive here', 'arrive there'. They may also have been Proto-Siouan, although this would imply that initial syllable syncope was Proto-Siouan, and evidence from the Ohio Valley Siouan languages suggests that this was not the case. There are still complex problems to resolve here.

(3) Aspirates that apparently arose (irregularly?) from Proto-Siouan sequences of ***xk/xVk > kh** via metathesis. There are one or two examples of PSI ***xw > ph**, e.g. 'comb'. This was apparently in Mississippi Valley Siouan only, as the other languages retain the original sequences.

(4) Postaspirated stops that arose morphophonemically as preaspirates in Dakota, Chiwere, Winnebago and often Ofo when a stop-initial suffix like **-ka** was affixed to a verb stem that historically ended in ***-h**. ***hC > Ch** rules are found in all the languages just named.

(5) And finally a number of lexical sets with postaspirated stops that cannot be accounted for by any of the other processes. These include the several animal terms, some of which may be borrowings. Others may involve phonosymbolism: 'grind, chew, hit, stab, glance off, move/shake, dance'. A few may be old compounds, but others, those that do not involve sound symbolism, still present problems 'wade, river, woman's sister-in-law', etc. These aspirates are products of a grab bag

of developments, probably involving loanwords in several cases, that took place at different times. Many of the terms appear to be reconstructible however, making it necessary to reconstruct Carter's Law products differently, as ***hC**, since they have different reflexes.

The precise phonetic correlates of Proto-Siouan aspiration and the relative chronologies of the rules and changes that generated it, along with the various metatheses, deaspirations, etc. that followed still need clarification before we can say we understand them completely.

Notes

(1) This was an oral presentation by Carter at the Comparative Siouan Workshop held at the University of Colorado and sponsored by NSF and NEH. The discovery was one of the most important contributions of the Workshop. Following historical linguistic tradition, in this paper I refer to the second syllable aspiration rule as "Carter's Law".

(2) Initial appearance is only the beginning of the story. Since accent in Siouan is assigned to the second syllable counting from the left and Siouan languages are largely prefixing, most nouns and verbs should show massive allomorphy. Accent normally shifts leftward as prefixes are added or compounds are formed, and this should cause aspiration to appear and disappear in virtually every morpheme where it ever occurred. This is generally not the case however, except in Ofo where numerous roots do have aspirated and unaspirated allomorphs. (This Ofo allomorphy has been described as a kind of Grassmann's Law (De Reuse 1981), but I believe that aspiration moves as accent shifts, not because of the action of dissimilation.) In the Mississippi Valley Siouan languages once a root was aspirated, that aspiration spread analogically to all instances of the root accented or not. Thus aspiration was phonologized very early in Siouan, and even in Ofo it is clearly phonemic despite the relic alternations.

(3) More serious work on the earliest divergences within the Siouan family tree is needed. Here I take the pragmatic view that Mandan is a separate branch.

(4) In my tables the following standard two letter abbreviations for the Siouan languages are used: CR Crow, HI Hidatsa, MA Mandan, LA Lakota, DA Dakota, CH Chiwere, WI Winnebago, OP Omaha-Ponca, KS Kansa, OS Osage, QU Quapaw, BI Biloxi, OF Ofo, TU Tutelo. CA is

Catawba, a language distantly related to the Siouan language family.

The examples used in this paper are for the most part from the *Comparative Siouan Dictionary* database (Carter, Jones, Rankin, *et al.*, in prep.), sponsored by NEH grants RT-21062-89 and RT-21238-91. Other important contributors of data to the dictionary include: Willem De Reuse, Louanna Furbee, Randolph Graczyk, Jimm Good Tracks, Jill Hopkins, Eli James, John Koontz, Ken Miner, David Rood, Pat Shaw, Paul Voorhis.

(5) If MA had not been influenced by ra-, the regular allomorph of PSI ***ya-**, the expected form in the 2nd sg. would have been something like ***é·š(h)eʔš**.

'Step, tread' (and its various derivatives, 'enter, follow, path, wade, ford', etc.) shows parallel development of ***w-h** clusters following syncope. Proto-Siouan ***wahé** > ***w-hé** > ***phé** over much of Siouan territory. Unfortunately no Mandan cognate has been found.

(6) Quite generally across Siouan the two laryngeals, h and ʔ, cause preceding glides to obstruentize: r, y, w → t, š, p respectively.

(7) Very recent compounds in Mandan can and do produce aspirated stops. These have all arisen since the earlier deaspiration was completed and the rule was lost. So, for example, rok + hu·re → [dokhú·re] 'table'. (Richard T. Carter, Mandan field notes.)

(8) 'Grizzly' has been contaminated by ***mą́te**, the term for a smaller species of bear, in Ofo and Tutelo. The Catawba 'bear' term may not be cognate. ***Mą́te** may be a borrowing; the set is phonologically irregular and there are Uto-Aztecan look-alikes. 'Mosquito', shows signs of multiple restructurings and perhaps original status as a loanword also (with look-alikes in Algonquian and, especially, Muskogean). Nevertheless, these are very widespread forms and would have to have been borrowed very early. All three items appear to call for Proto-Siouan post-aspirates.

The compound ***hį·-tahą́·-(-ka)** 'mouse' has developed secondary aspiration in several languages via syncope, ***tahą́·** > **thą́**, and the Mississippi Valley languages have reflexes of ***hį́·rhą** 'owl' with **th/ch**. These animal names do not call for aspiration in PSI however as the aspiration is clearly secondary.

(9) This may be a compound stem containing the root **hį** 'to screw up' (loosely translated), which recurs in

other compounds, and affixal elements. In this case it would be another morphophonemically complex aspirate.

(10) As mentioned above in a note, 'wade' may well be a secondary derivation from ***wahé** 'step, tread', a stem that forms the basis for o-**phé** 'enter' in several languages as well as a further derived form for 'path, follow'. The uncertainty comes from our inability to identify the initial element of the compound. The verb is infixing with reflexes of ***yo-** isolated at the left. An attractive but not entirely secure solution would relate ***yo-** to Catawba **yą** 'water' (with nasalization lost irregularly). Otherwise this CA term has no Siouan cognate. I believe Carter made this suggestion in discussion.

(11) 'Squash' is pretty clearly a diffused term that made its way into Siouan along with its referent, which also diffused. Further derivation produces 'corn' terms in the more southerly Siouan languages. There are strong look-alikes in Yuchi and Western Muskogean.

(12) The meanings within this set vary among 'heron, crane' and MA 'gull'. These three sets appear to bolster one another, but there are phonological irregularities that make it possible to consider the MA form a borrowing. Whatever the ultimate analysis of these sets, they should be looked at as a group.

(13) Meanings here vary between 'move' and 'shake'. In several languages the term can mean either. It is not impossible that two distinct sets have been collapsed here.

(14) Forms with a- incorporate the root for 'arm', PSI ***á·-re**. There is a second, distinct 'shoulder' term found in most of the remaining languages.

(15) The expected paradigms would be [*bahée, *bahíi, *bahúu] in the 1st person and [*dahée, *dahíi, *dahúu] in the 2nd.

(16) Tutelo is the only exception. Aspiration was written in Tutelo only in the small sample transcribed by Edward Sapir. There is not enough information to speculate further. Tutelo aspiration seems to follow the Ofo pattern most closely (cf. Tutelo and Ofo 'dog' in which PSI ***š** > **čh**) however.

(17) In Dakotan this is -kha; in Chiwere-Winnebago -a > -**e** after velars, so the reflex is -khe. In Winneba-

go this is just written -ke, since all aspirates are written with the voiceless stop and affricate symbols. Dhegiha retains reflexes of the original *-hka in Osage with further development to -kka in Omaha-Ponca and Kansa. Reflexes are -kka in Quapaw, but as recently as 1941 Siebert (1989) recorded preaspirated hC's in that language. Unaccented final -e is always dropped in composition; its loss here (accented) in 'raccoon' is unexplained. Ofo has an independent metathesis rule not exemplified here.

(18) The author assumes that the pre- to post-aspiration rule affected *hp and *ht as well as *hk. The prediction is that if suffixes with the forms -pV or -tV are suffixed to -h stems, they too will have modern reflexes -phV, -thV. Instances of this have not yet been found, but there are locative derivational suffixes with the requisite initial consonants which may ultimately provide examples.

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