

NUMERAL SYSTEMS IN AMERICAN INDIAN LANGUAGES

11

EAST OF THE ROCKY MOUNTAINS

by

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## ABSTRACT

The numerals one through ten in the American Indian languages east of the Rocky Mountains are often arranged in what we shall term quinary, subtracting and multiplying systems. By examining the reconstructed proto-languages, we see that the modern languages have often evolved new numeral systems, sometimes superimposing these on the original numeral systems. Thus, they have mixed systems, e.g., a mixture of subtracting and quinary, multiplying and quinary, etc. A further comparison of each numeral system with the numeral systems of the surrounding languages reveals that the new systems, i.e., the systems which are not found to be inherited, are often the result of diffusion.

After examining the numeral systems of the proto-languages found east of the Rocky Mountains, we attempt to demonstrate that there are/were three main diffusion areas. These are the quinary, the subtracting, and the multiplying areas. We also compare these diffusion areas to the culture areas described by the anthropologists, to see if their boundaries coincide.

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## KEY TO ABBREVIATIONS

Ab	Abnaki	D	Delaware
Al	Alabama	Da	Dakota
An	Andaste	F	Fox
Ar	Arapaho	H	Huron
Ari	Arikara	Hd	Hidatsa
At	Atakapa	Hi	Hitchiti
C	Cree	I-O	Ioway and Otoe
Ca	Caddo	Since Ioway and Otoe are mutually	
Ch	Choctaw	intelligible, they are regarded as	
Ch-A	Choctaw-Alabama	the same language in this study.	
(See also Cr-H below)			
Che	Cherokee	K	Kansa
Chi	Chitimacha	Ko	Koasati
Cr	Creek	L	Laurentian
Cr-H	Creek-Hitchiti	M	Menomini
		Ma	Mandan

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The labels Cr-H and Ch-A above are used to point out the fact that certain forms are spread through borrowing in the Choctaw dominated areas in the west of the Muskogean speaking territories, and in the Creek dominated areas in the east. These labels do not indicate genetic relationships.

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Ct	Catawban	Mc	Micmac
Cy	Cayuga	MD	Munsee Delaware
Cw	Crow	Mh	Mahican

Mi	Miami	PM	Proto-Muskogean
MI	Malecite	PMpVS	Proto-Mississippi Valley
Mo	Mohawk		Siouan
Moose C	Moose Cree	PMsVS	Proto-Missouri Valley
Ms	Massachusett		Siouan
Mt	Montagnais	PNC	Proto-Northern Caddoan
N	Nottoway	PNI	Proto-Northern Iroquoian
Na	Natchez	Po	Powhatan
MNpVS	Northern Mississippi Valley		Siouan

---

This abbreviation is used to indicate the common origins of Ioway-Oto, Dakota, and Winnebago numerals. However, this group of languages does not necessarily form a sub-branch of Mississippi Valley Siouan.

O	Ojibwa	POVS	Proto-Ohio Valley Siouan
Oi	Oneida	PP	Pre-Pawnee
Om	Omaha	PS	Proto-Siouan
Oo	Onondaga	PS/Ct	Proto-Siouan/Catawban
Os	Osage		This abbreviation is used to indicate
P	Ponca		the possible genetic relationship
Pa	Pawnee		between Proto-Siouan and Proto-Catawban.
PA	Proto-Algonquian	Q	Quapaw
PC	Proto-Caddoan	S	Seneca
PCT	Proto-Catawban	Sh	Shawnee
PDh	Proto-Dhegiha	SNE	Southern New England
Pe	Penobscot		Algonquian dialects
PI	Proto-Iroquoian	Su	Susquehanna

T	Tuscarora
Tu	Tunica
W	Winnebago
Wi	Wichita
Wo	Woccon
Wy	Wyandot
Y	Yuchi

## INTRODUCTION

An examination of the words for the numerals one through ten in Indian languages of eastern North America shows frequent relationships among these numerals. The numerals one through ten fall into what we shall call quinary, subtracting, multiplying, and decimal systems. If we compare the modern numerals, we discover that the modern systems are not always retentions from a common ancestral system, but that they are in some cases the result of diffusion, or the result of parallel innovation. This research was undertaken with the desire to determine the types and the origins of the various numeral systems and their patterns of diffusion in the languages of eastern North America.

The numbers and the numeral systems of individual modern languages investigated in this study are presented by language family. After listing the numerals one through ten for each language to be examined, we compare the numerals and numeral systems and, where possible, reconstruct the proto-system for each linguistic family. In cases where the reconstructed numerals are not available in the published literature, and often they are not, the task of reconstructing those numerals is undertaken and the results are discussed. Then, comparing the original systems with individual systems of each language, we try to determine whether the numeral systems of the individual languages are inherited, i.e., represent retentions from the proto-language, are the result of diffusion, or are the result of parallel innovation.

Quinary, subtracting, multiplying, and decimal systems

In quinary, subtracting, and multiplying systems, the higher numerals, i.e., the numerals six through nine, show systematic relationships to the lower numerals, one through four. In a decimal system, the numeral words for one through ten are separate.

In a quinary system, the numerals six through nine contain the roots of the numerals one through four respectively, and there is usually a recurrent morpheme in the derivation of higher numerals, which implies an adding operation, e.g., the Muskogean and Algonquian languages. The numerals six through nine in a quinary system will be represented by the numerals one through four, preceded with a (+) sign which indicates the adding operations: (5), +1, +2, +3, +4, (10).

In a subtracting system, the numerals six through nine are derived using the roots of the numerals four through one respectively, often with the use of a morpheme which means approximately 'less than', 'lacking', e.g., the words for nine in most of the Siouan languages. Numerals six through nine in a subtracting system will be represented by the numerals four through one preceded with a (-) sign to indicate the subtracting operations: (5), -4, -3, -2, -1, (10).

In a multiplying system, the numerals six and eight (and often twelve) contain the roots for the numerals three and four (and six) respectively. The root for two is also often used in the derivation of these even numerals. Thus, six means 'two threes', eight means 'two fours', e.g., in Atakapa and Tonkawa. Multiplying systems are symbolized with a (x) sign to indicate the multiplying operations: (5), 2x3, (7), 2x4, (9), (10), etc.

In a decimal system, the numerals one through ten are all derived

from separate roots. That is to say they are not the product of operations such as adding, subtracting, or multiplying. Iroquoian languages exemplify this.

#### A brief historical survey of the numeral systems

This study of numeral systems takes an areal-typological perspective. Attention has been given to this aspect of numeral systems by only a few linguists. For example, Kroeber (1907) discusses the distribution of different types of numeral systems in California languages, V. Hymes (1955) points out the various numeral patterns in Athabascan languages, Haas (1976) mentions the diffusion of northern Californian number systems, and Rankin (1979) discusses converging patterns in Southeastern languages. Numeral systems have been considered from various other perspectives by several authors, for example, Trumbull (1874), McGee (1900), Conant (1892), Kluge (1938), Salzman (1950). Besides these and a few others, most authors of American Indian language grammars have merely pointed out the peculiarities of the numerals and numeral systems used by particular tribes.

#### The validity of "finger bending" theories in numeral systems

It has been claimed by several authors that American Indian counting systems originate from using the ten fingers of the hands to count up to ten, sometimes including the toes to reach to twenty. These include McGee (1900), Nykil (1926), and Trumbull (1874). It is believed that quinary and decimal systems go back to counting with both hands. Trumbull (1874) gives many examples to illustrate this claim, and generally tries to relate all numerals to a "finger bending" theory.

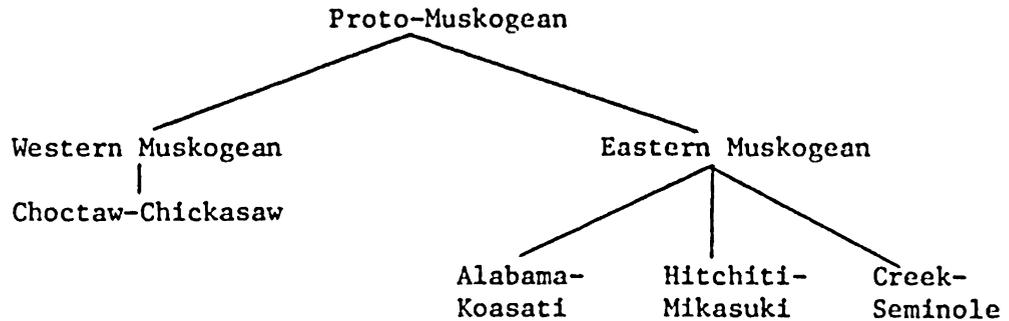
The principle of using fingers while counting seems more or less

valid for all counting systems. Therefore, the names of the numerals sometimes contain reference to hand, finger, for finger bending, and often American Indian names for numerals contain morphemic evidence of such origins. Counting systems that contain literal references to the hands, fingers, or other physical counters are called descriptive systems, e.g., in the western dialect of Atakapa, woc icól han 'nine' is from woc 'finger, hand', icol 'small', and han 'back, behind'. This gives the Atakapa numeral a meaning as 'little finger [left] behind' implying that the little finger of one hand is left unextended or unbent. This word clearly reflects what we would call a subtracting operation, but it is at the same time descriptive in character since it contains reference to 'finger' or 'hand'. In this respect, quinary systems can also be related to a descriptive system originally or in principle; for example in Muskogean languages, which clearly have quinary systems, the prefix on- is reconstructible as part of the Western Muskogean words for seven and eight. This implies that Proto-Western Muskogean numerals seven and eight were derived from the practice of bending the fingers on or over one hand. Thus, seven means 'two (fingers) on one hand', eight means 'three (fingers) on one hand'. However, neither in Muskogean nor in other language families are we able to identify all number morphemes as referring to fingers or hands. Hence a complete descriptive numeral system in which all the numbers contain reference to physical counters is not found, and we cannot reconstruct a descriptive system for the proto-language.

Chapter 1

MUSKOGEAN

In this chapter, the four principal languages of the Muskogean family are examined, namely, Choctaw-Chickasaw, Alabama-Koasati, Creek-Seminole and Hitchiti-Mikasuki. Geographically, Choctaw and Chickasaw form the western division, while the rest of the languages form the eastern division. Haas (1979:303) posits the following family tree:



Muskogean numerals one through ten

	<u>Choctaw</u> <sup>1</sup>	<u>Alabama</u> <sup>2</sup>	<u>Creek</u> <sup>3</sup>	<u>Hitchiti</u> <sup>4</sup>	<u>Mikasuki</u> <sup>5</sup>
one	čaffa	čaffaaka	hámkin	łamin	łaamin
two	tóklo	toklo	hokkôolin	túklan	toklan
three	toččfina	toččiina	toččiinin	tutchinan	točiinan
four	óšta	ostaaka	ôostin	sitakin	šitaakin
five	tałłáapi	tałaapi	čahkîipin	tchakgipan	čahkiip
six	hannáali	hannaali	iipâakin	fpagin	
seven	ontoklo	ontoklo	kolapâakin	kolapakin	
eight	ontoččfina	ontoččiina	činapâakin	tusnapakin	

## Muskogean numerals continued

nine	čakkáàli	čakkaali	ostapâakin	ustapakin	
ten	pokkóòli	pokkooki	pâalin	pokolín	pokoolín

Except for the Hitchiti numeral words, the numeral words listed above are morphophonemically transcribed. In order to see Hitchiti sound correspondences with the other Muskogean languages, we phonemize the Hitchiti words for one through ten below, on the basis of the vowel length and certain other features of the Mikasuki numeral words we have access to.

Hitchiti phonemicized

one	łaamin
two	toklan
three	točłinan
four	sitaakin
five	čahkiłpan
six	(f)paakin
seven	kolapaakin
eight	tosnapaakin
nine	ostapaakin
ten	pokoolín

With the problem of Hitchiti transcription out of the way, we are in a position to compare and reconstruct the Muskogean numerals one at a time.

Proto-Muskogean numerals

## ONE

Cr	h a m -
Hi	ɬ a a m -
Al,Ch	h a n - 'six'
PM	*h a m -

All Muskogean languages have quinary systems, as seen in the numerals seven and eight, which contain the numerals two and three respectively. For this reason, Proto-Muskogean six is also assumed to be quinary, judging from the Creek and Hitchiti words for one, and Alabama and Choctaw words for six. However, the Choctaw and Alabama words for one obscure the system, since they appear to be innovations.

The suffix -i marks the participial ending, and the suffix -n marks the oblique case in these languages. The -k which precedes the suffixes -i and -n in Creek and Hitchiti is a passivizer.

## TWO

Haas (1966:234) reconstructs this numeral as \*hotokolo. She gives the following table to explain the processes involved:

Ch,Ko	t o k l o	∅ t o k ∅ l o
Hi	t o k l -	∅ t o k ∅ l -
Cr	h u k k o l h o t → k o l	h o t ∅ k o l -
PM	*h o t o k o l o	*h o t o k o l o

(→) indicates an assimilation process, which is explained as follows by Haas, "pre-Creek had a two-stop cluster tk,...and \*t has assimilated to

\*k in position of articulation giving the geminate cluster kk in modern Creek" (Haas 1966:239).

## THREE

Ch t o č č í ì n -

Al t o č č í í n -

Cr t o č č í í n -

Hi t o č í í n

PM \*t o č č í í n -

These forms are clearly cognate, and their reconstruction requires no special comment.

## FOUR

Ch o š t -

Cr ô o s t -

Al o s t -

Hi s i t -

PM \*o s i t -

PM \*osit- is also represented in Creek and Hitchiti ostapaakin 'nine'.

Choctaw has developed š (Haas, 1966:236), whereas the other languages preserved \*s.

In the numerals five through nine, we see a Choctaw-Alabama pattern in the west as opposed to a Creek-Hitchiti pattern in the east. In the former pattern, the numerals seven and eight are derived from the numerals

two and three by means of a prefix, on-; in the latter pattern, the numerals seven through nine are derived from two through four respectively, with a suffix -(a)paa-. The -(a)paa- seems to be a Creek suffix derived from the Creek verb apa- $\left\{ \begin{smallmatrix} k \\ y \end{smallmatrix} \right\}$ ita 'to mix in, to add to' (Karen Booker, personal communication). The prefix on- which is used in the quinary system of the Alabama and Choctaw pattern means 'on' in these languages.<sup>6</sup> However, neither the Choctaw-Alabama nor the Creek-Hitchiti pattern represents the Proto-Muskogean quinary system sufficiently, because the two different patterns appear to spread from the two culturally dominant languages, from Choctaw in the west, and from Creek in the east. We cannot be certain how the two competing systems developed.

## FIVE

Ch	t a ɿ ɿ á à p -	Cr	č a h k i i p -
Al	t a ɿ a a p -	Hi	č a h k i p -
Ch-A	*t a ɿ ɿ a a p -	Cr-H	*č a h k i i p -

Above, we reconstruct two versions of five, one of which spread in the east and the other in the west. We cannot reconstruct a Proto-Muskogean five.

## SIX

Ch	h a n n á à l -
Al	h a n n a a l -
PM	*h a m -

The pattern represented by Choctaw and Alabama is chosen to represent Proto-Muskogean in the case of six, because the reconstructed \*ham-

is also represented in Creek and Hitchiti one.

Compare: PM \*h a m - 'six'  
Cr,Hi h a m - 'one'

Creek and Hitchiti six look as if they may be truncated from a form which once contained PM \*ham 'one' and Cr (a)paa-, suffix from the Creek verb apa-<sup>{k}</sup>ita 'to add to, mix in with'.

Compare: \*\*h a m (a) p a a -  
Cr i i p a a -  
Hi p a a -

In spite of the posited similarity between Proto-Muskogean one and Creek and Hitchiti six, we cannot precisely trace the development of Proto-Muskogean six.

#### SEVEN

Ch o n t o k l o  
Al o n t o k l o  
Cr k o l a p â a -  
Hi k o l a p a a -  
PM \*h o t o k o l o - 'two'

Proto-Muskogean seven clearly contains Proto-Muskogean two. Choctaw and Alabama employ the prefix on-, whereas Creek and Hitchiti employ the suffix -(a)paa-. If Haas's reconstruction for Proto-Muskogean two is correct, Choctaw and Alabama have both lost the initial syllable \*ho- and the vowel between \*k and \*l. Creek and Hitchiti have lost the initial

\*hoto-, and  $V_1 + V_2$  has become  $V_2$  by a regular assimilation rule.

## EIGHT

Ch	o n t o č č í ì n -
Al	o n t o č č i i n -
Cr	č i n a p â a -
Hí	t o s n a p a a -
PM	*t o č č i i n - 'three'

Proto-Muskogean eight also clearly contains Proto-Muskogean three, although Choctaw and Alabama, and Creek and Hitchiti have the different derivational patterns seen in seven.

Choctaw and Alabama eight have retained the Proto-Muskogean three. Creek appears to have lost the initial syllabel \*to- while Hitchiti appears to have lost \*-či-.

## NINE

Cr	o s t a p â a -
Hí	o s t a p a a -
PM	*o s t 'four'

The Creek and Hitchiti forms for nine appear to represent the Proto-Muskogean quinary system, since they contain PM \*ost- 'four'. The Choctaw and Alabama forms for nine do not show the expected quinary pattern by which nine is derived from Proto-Muskogean four. The form čakkaal- 'nine' appears to have been innovated in Choctaw and subsequently borrowed by Alabama.

## TEN

Ch p o k k ó ò l -

Cr p â a l -

Al p o k k o o l -

Hi p o k o o l -

PM \*p o k k o l -

The nature of the Creek long vowel aa is not explained in Proto-Muskogean ten. It may have resulted from the loss of the second syllable.

### Conclusion

The examination and the attempted reconstruction of the Muskogean numerals point towards a Proto-Muskogean quinary system in which the numerals six through nine were derived from one through four respectively. Therefore, the Muskogean quinary counting system is inherited, but the morphological mechanisms by which the higher numbers were formed from the lower numerals were different in the Creek and Choctaw dominated areas of the Southeast.

## NOTES

<sup>1</sup>Robert L. Rankin, class notes.

<sup>2</sup>Karen Lupardus, field notes on Alabama.

<sup>3</sup>Haas, 1936a.

<sup>4</sup>Gatschet, 1884.

<sup>5</sup>Personal communication from Karen Booker.

<sup>6</sup>The prefix on- is found only in the numerals in Alabama.

Chapter 2

CADDOAN

The Caddoan language family includes Pawnee, Arikara, Wichita, Kitsai, and Caddo (Taylor, 1963b). Lesser and Weltfish (1932) consider Arikara a dialect of Pawnee, since they are more or less mutually intelligible. Chafe (1979:214) agrees that they are very closely related and adds that "the deepest division within the family is that between Caddo on the one hand, and Northern Caddoan, consisting of all the other languages, on the other hand".

Caddoan numerals one through ten

	<u>Pawnee</u> <sup>1</sup>	<u>Arikara</u> <sup>2</sup>	<u>Wichita</u> <sup>3</sup>	<u>Caddo</u> <sup>4</sup>	<u>Kitsai</u> <sup>5</sup>
one	ásku	áxkUx	chi'ass	wísc'i'	arísko
two	pítku	pítkUx	wi:c	bít	txúsu
three	táwit	táwIt	táwi	daháw'	
four	kskí:ti'iks	či:ti'Iš	tákwi:c	hiwí'	kinák't
five	sihuks	šíhux	isk <sup>w</sup> í:c	dí:sik'án	
	<u>Pawnee</u>	<u>Arikara</u>	<u>Wichita</u>	<u>Caddo</u>	
six	ksiksa:pic	tša:pis	kíyehess	dán:kih	
seven	pítkusiksa:pic	tawIša:pišwá:Na	kiyáhwic	bíssikah	
eight	tawisa:pic	taWišá:pis	kiyátawi	dahâw:sikah	
nine	rihuksiri:wa:ra	no:xini:wá:Na	chi'asskinti:'i	hiwî:sikah	
ten	rihuksiri	no:xíni	iskiri'awá:s	bina	

All of the Caddoan languages listed above clearly show some sort of

quinary system. However, they also seem to have subtracting systems. A reconstruction of Proto-Caddoan numerals is presented below in order to determine the source of modern Caddoan numeral systems.

### Proto-Caddoan numerals

Taylor (1963b) reconstructs the numerals one through three for Proto-Caddoan. These are shown below. We reconstruct the rest of the numerals on the basis of Taylor's and Chafe's (1979) Caddoan sound correspondences. What Taylor reconstructs as Proto-Northern Caddoan is "the reconstructed proto-type from which Pawnee, Arikara, and Wichita have diverged. Such reconstructions do not include Kitsai evidence." Proto-Caddoan represents all the languages of the stock, although only the Pawnee, Arikara, Wichita, and Caddo evidence is used by Taylor (1963b).

#### ONE

Pa	a s k -
Ari	a x k
Wi	- a s
PNC	*a s

The Pawnee and Arikara forms have the absolute suffix -u when they stand independently, as do most noun stems. The final sibilants, s or x, are deleted when the stems occur independently (Parks 1976:97 and 57). Wichita chi, as seen in chi'ass, means 'just, only' (David Rood, personal communication).

Taylor (1963b) moreover explains that Pawnee and Arikara -ku is probably from the verbal stem -ku 'sit'. He quotes from Weltfish (1936:49): "abstract concepts are most commonly referred to 'sitting',

e.g., 'this story' is tirara:i:tusku 'this story is sitting'. Taylor notes also that Wichita chi 'only, just', as seen in chi<sup>?</sup>ass, is present in Caddo wisc<sup>?</sup>i 'one'.

## TWO

Pa p í t k -

Ari p í t k -

Wi w í c

Ca b í t

PC \*p i t

These forms are clearly cognates, but the source of the long i: in the alternate Wichita form that Rood attested is undefined.

## THREE

Pa t á w i t

Ari t á w I t

Wi t á w i

PNC \*t a w i t

Caddo daháw' is probably cognate with the Northern Caddoan forms.

## FOUR

Pa k s k í: t i <sup>?</sup> iAri č i: t i <sup>?</sup> iPP \*(k s)k i: t i <sup>?</sup> i

In reconstructing this form, the term 'Pre-Pawnee' (PP) is used after Taylor (1963b) since the reconstructed \*(ks)ki:ti<sup>?</sup>i is a form based

upon Pawnee and Arikara. Wichita ta:kwic and the alternate takwicha, and Caddo hiwi' do not correspond with the Pre-Pawnee form. Yet, Wichita takwi:c and the alternate takwicha can be related to Wichita wi:c 'two' and the alternate wicha. This would imply a multiplying process in the formation of Wichita four.

## FIVE

Pa s i h u -

Ari š í h u -

PP \*s i h u

Pawnee and Arikara forms correspond which enables us to reconstruct a Pre-Pawnee five. Wichita and Caddo forms do not regularly correspond to the Pre-Pawnee form.

Compare: PP \*s i h u  
 Wi i s k<sup>w</sup> í: c  
 Ca d i: s i k<sup>?</sup> -

Wichita is- resembles the Pre-Pawnee form with metathesis. i regularly corresponds with Pawnee and Arikara u. Caddo k<sup>?</sup> regularly goes back to PC \*k and \*?, but we cannot reconstruct these sounds in the case of five. The affixes (?) di: and -an are also unclear.

Pawnee, Arikara, and Wichita five may incorporate Proto-Northern Caddoan \*iks- 'hand', but it is hard to be certain of such a development. Rood also suggests that Wichita five may be derived from Wichita isk<sup>?</sup>a 'hand' (David Rood, personal communication).

## SIX

Pa k s i k s a : p i c

Ari t š a : p i s

PP \*(k s i)k s a : p i c

A comparison of the reconstructed Pre-Pawnee form with Pawnee and Arikara seven and eight shows that the suffix \*-sa:pic occurring in Pre-Pawnee six is also used in deriving Pawnee and Arikara seven and eight from two and three respectively. In principle, this seems to confirm the supposition that Pre-Pawnee six is derived from one.

The Caddo form dán:kih is not cognate with the reconstructed Pre-Pawnee form, or with the Wichita form. Caddo dán:kih is not directly related to Caddo wísc'i 'one' either. But the suffix -kih occurring in dán:kih 'six' is perhaps related to the suffix -sikah used in deriving Caddo seven, eight, and nine from two, three, and four respectively. If -kih and -sikah are related, then Caddo six may also be analyzed as if having been derived from one.

The Wichita form bears a direct relationship to the Proto-Northern Caddoan \*as 'one'.

Compare:	Wi	k í y e h e s s	'six'
	PNC	*a s	'one'

This relationship evidently indicates a quinary system, which is also confirmed by the Wichita numerals seven and eight. A comparison of Wichita six, seven, and eight indicates that the prefix used in the Wichita quinary system is kayah-. Rood glosses this form as the 'locative' (Rood, 1976:285). So, Wichita kíyehess 'six' is derived from kayah



Pawnee and Arikara nine are clearly related to ten. This suggests a subtracting system.

Compare:	PP	*n(i h)o k s i n i: w a: n a	'nine'
	Pa	r i h u k s i r i'	'ten'
	Ari	n o: x i n i'	'ten'

This kind of subtracting system is different from other North American subtracting systems in that nine includes the numeral ten rather than the expected one. This can be symbolized as 10-(1). Hence, Pre-Pawnee has the same subtracting system in the derivation of both seven and nine.

Wichita chi<sup>?</sup>asskínti:<sup>?</sup>i has also a subtracting system which can be symbolized as -1. The word is derived from chi<sup>?</sup> 'just, only' + ass 'one' + kiri + ti-i-<sup>?</sup>i 'it is' (David Rood, personal communication). This makes Wichita nine mean '(just) one is not [bent or extended]'

Caddo híwî:sikah follows the quinary pattern and is derived from four by means of the suffix -sikah.

Compare:	Ca	h i w í'	'four'
		h í w î: s i k a h	'nine'

#### TEN

Pa	r i h u k s i r i'
Ari	n o: x i n i'
PP	*n(i h)o k s i n i'

Wichita iskiri<sup>?</sup>awá:s perhaps corresponds to Pawnee and Arikara with metathesis and an epenthetic i.

Compare:      PP    \*n (i h) o k s i n i'  
                   Wi                    i s k i r i'-

The meaning of -awa:s is not clear, but it might include ass 'one'. This would make Wichita ten mean 'one ten', a pattern often found in eastern North America. Also note the similarity of Wichita iskiri?awá:s 'ten' and Wichita isk?a 'hand'. If Wichita ten refers to hand, then we must classify it as "descriptive".

The Caddo form bina or the alternate bínáyah do not correspond to the other Caddoan forms.

### Conclusion

On the basis of Pawnee, Arikara, Wichita, and Caddo evidence, we can assign a quinary system to Proto-Caddoan in which the numerals six through nine were derived from one through four respectively. The derivation of six from one is not entirely clear in all the languages, but there are indications that Proto-Caddoan six was derived from one. The quinary system is almost completely retained in Caddo and Wichita, in the southern part of the Caddoan speaking territory. However, Wichita has deviated from this pattern by deriving nine through a subtracting system. Pawnee and Arikara numerals retain the original system in most respects, but both languages have innovated subtracting systems in the derivation of nine and, Arikara has extended the same system to the derivation of seven as well.

This comparison of the Proto-Caddoan numeral system with the modern Caddoan systems shows that the Proto-Caddoan quinary system has become obscured by a subtracting system especially in the northern part of the Caddoan speaking territory. The subtracting system appears to be an areal

feature of the northern plains of North America. This is confirmed by the numeral systems of Siouan languages spoken in that area. The subtracting system in southern Caddoan speaking territory also appears to be an areal feature. This may have resulted from contact with the subtracting systems of the Gulf isolates.

### Adai

Adai, or Adaize in Gallatin (1836), was once spoken in a small area south of the Caddo speaking territory. There have been attempts to group it with Caddoan. We examine Adai numerals mainly from an areal perspective.

#### Adai numerals one through ten

one	nancas
two	nass
three	colle
four	tacache
five	seppacan
six	pacanancus
seven	pacaness
eight	pacalcon
nine	sickinish
ten	neusne

The forms are taken from Gallatin (1836), who obtained them from Sibley (c. 1804). Although the transcriptions seem to be based on English orthography, we can still see the relationship of one to six, two to seven, and three to eight.

Compare:                    n a n c a s    'one'  
                               p a c a n a n c u s    'six'  
                                       n a s s            'two'  
                               p a c a n e s s        'seven'  
                                       c o l l e            'three'  
                               p a c a l c o n        'eight'

These similarities clearly point to a quinary system for Adai numerals in which the prefix used with the upper four numerals is approximately of the form pakal-.

There are also similarities between some of the Adai numerals and the reconstructed Proto-Caddoan numerals.

Compare:            'one'    Ad    n a n c a s  
     PC            \*a s  
     'five'    Ad    s e p p a c a n  
     PP    \*s i h u

'ten' which looks as if it might be a syncopated form  
of the Pre-Pawnee form:

Ad    n e    u    s    n e  
PP    \*n i h o k s i n i'

This brief examination of the Adai counting system confirms that the languages of southern North America predominantly have quinary numeral systems (cf. Wichita, Caddo, and the Muskogean systems). It is interesting that Adai did not have the multiplying features of the Gulf

isolates to which it was geographically close (see the multiplying systems discussed in Chapter 3).

## NOTES

<sup>1,2</sup>Douglas Parks, personal communication.

<sup>3</sup>Rood, 1976.

<sup>4</sup>Chafe, n.d.

<sup>5</sup>Lesser, 1936. Lesser has only the numerals one, two, and four for Kitsai.

### Chapter 3

#### LANGUAGE ISOLATES

In this chapter, the five language isolates of the lower Mississippi Valley, Atakapa, Chitimacha, Natchez, Tonkawa, and Tunica, along with Yuchi, a language isolate of the east, are covered.

There have been attempts to group the Gulf isolates in one language family, but a genetic relationship has not been proved. We give the numerals of the above-mentioned languages below to determine if there are any features they share with each other or with surrounding languages.

#### Atakapa

"The Atakapa lived in the region bordering the Gulf coast of Louisiana and Texas, from Vermilion Bay, below Franklin, Louisiana, to about the Trinity River at Galveston Bay, Texas" (Crawford 1975:59).

Below, we give the Atakapa numerals, which are taken from Gatschet and Swanton (1932). Haas (1958a) and Swadesh (1946) also give some Atakapa numerals which we include with Gatschet and Swanton's forms. We use the abbreviation Hs for Haas (1958a) and Sw for Swadesh (1946).

#### Atakapa numerals one through ten

##### Western dialect

one	tanúk; (ta)nuk (Hs); tanuk (Sw)
two	tsík
three	lāt; lat (Hs); lat (Sw)
four	himatól

five	nīt; nit (Sw)
six	latsīk
seven	pax, páxě
eight	himatól tsīk
nine	woc icól han
ten	wóc pe, wucpé, wúspe; wošpe (Sw)

Eastern dialect

one	hannik; (ha)nik (Hs); hanik (Sw)
two	happalst; hapalst (Sw)
three	latt
four	tsets
five	nītt
six	latst
seven	paghu
eight	tsikhuiau
nine	tegghuiau
ten	heissign, hiissing; heyciŋ (Sw)

In Atakapa, there is a direct relationship between three and six and between four and eight which suggests a multiplying process. These relationships are clearer in the western dialect.

Compare:      l a t            'three'  
                   l a t s <sup>í</sup> k      'six'

The morpheme used in the derivation of six is tsīk 'two' as we see again comparing four to eight.

Compare:        h i m a t ó l                    'four'  
                   h i m a t ó l t s ĩ k        'eight'

Apparently, six is 'two threes', and eight is 'two fours'.

Similar relationships are seen in the eastern dialect, although they are not as clear. See six below, where k and the pre-final ĩ are lost and there is a metathesis of t and s.

Western dialect    l a t t s ĩ k

Eastern dialect    l a t s t

The relationship of four and eight is clearly one of multiplication, because eight involves tsĩk 'two', but the meaning of the morpheme huiau is not clear. Compare two in the western dialect and eight in the eastern dialect below.

Western dialect    t s ĩ k                    'two'

Eastern dialect    t s i k h u i a u        'eight'

The numeral nine in the western dialect shows a subtracting system. The numeral word (or words) woc icól han consists of the morphemes woc 'hand, finger' + icól 'small' + han 'back, behind' (Gatschet and Swanton 1932:121). Thus, it means 'little finger [left] back'. In the same dialect, wóc pe 'ten' involves the morphemes woc 'hand, finger' and pe 'finish'. Therefore, ten means 'hand(s) [are] finished'. The words for both nine and ten are clearly descriptive since they refer specifically to fingers and hands.

The forms for nine and ten in the eastern dialect cannot be analyzed. This could mean that the western dialect has innovated these numerals on

a descriptive basis.

Before examining the numeral systems of the other languages to be covered in this chapter, note the similarity of Atakapa three to Proto-Siouan \*raawri 'three', and especially to Ohio Valley Siouan three. The Tutelo forms recorded by Hale and Dorsey are especially suggestive.

Atakapa	l a a t
Ofo	t a r ɨ
Tutelo	l a a t ‹ /raarɨ/
Biloxi	d a r ɨ

So Atakapa may have borrowed three from an Ohio Valley Siouan dialect of Mississippi such as Ofo or Biloxi.

### Chitimacha

"When first encountered by the French about 1700, the Chitimacha were living in southern Louisiana on the shores of Grand Lake and the banks of Grand River" (Crawford 1975:61). As regards Chitimacha numerals, we have access to Gallatin (1836), Swanton (1919), and Swadesh (1946). We give the numerals below. The abbreviation S indicates Swanton's and Sw indicates Swadesh's forms.

#### Chitimacha numerals one through ten

one	hongo; ʔungu (Sw); unku (S)
two	hupau; ʔupa (Sw); ūpa (S)
three	kahitie
four	mechechant; meša (Sw); mēsa (S)
five	hussa
six	hatcka; hatka (Sw)

seven	micheta; kišta (Sw)
eight	kueta
nine	knicheta
ten	heihitie; heyži (Sw); hēitci (S)

Of the languages covered in this chapter, Chitimacha is the only language whose numerals do not bear a direct relationship to one another. Although some morphemes appear in more than one numeral, no systematic relationship can be discovered. Hence, Chitimacha seems to have had a decimal system.

### Natchez

"The Natchez in the eighteenth century occupied eight or nine villages along St. Catherine's Creek east and south of present-day Natchez, Mississippi" (Crawford 1975:63). Data on the Natchez language were collected by Mary Haas, among a few others. The numerals as seen below are from Haas (1936b).

#### Natchez numerals one through ten

one	wi·ta·N
two	ʔawiti·
three	ne·ti̇
four	kinawiti·
five	ʔišpi·ti·
six	lahanah
seven	ʔaŋk <sup>w</sup> ah
eight	ʔapkatupiš
nine	witipkatupiš
ten	ʔo·ko

The numerals eight and nine show a systematic relationship to two and one respectively.

Compare:      ? a w (i t i)                    'two'  
                   ? a p k a t u p i š        'eight'  
  
                   w i · t (a · N)                        'one'  
                   w i t i p k a t u p i š        'nine'

According to this analysis, the suffix -pkatupiš, which is seen in both numerals, appears to mean 'lacking, which lacks'. So, the system is what we might call a partial subtracting system.

### Tonkawa

The Tonkawa speaking tribes "...lived in central Texas during most of the eighteenth and nineteenth centuries" (Hoijer 1936:289).

The numerals below are taken from Hoijer (1933).

#### Tonkawa numerals one through ten

one	we·'ic-bax
two	gedai
three	med'ic
four	cigid
five	gacgwa
six	cikwa·lau
seven	cikye'ecdau
eight	cigidye·'ec
nine	cik-we·'ic-xw'e·l'a
ten	cik-bax

In Tonkawa, we see a multiplying relationship between four and eight again, although the meaning of the suffix ye·'ec is not clear.

Compare:       c i g i d                   'four'  
                  c i g i d y e·' e c   'eight'

The numeral nine includes one in its construction, and this suggests a subtracting operation.

Compare:               w e ·' i c                   'one'  
                          c i k w e ·' i c - x w e·' l' a   'nine'

Hoijer (1933:121) analyzes nine as cik, a theme which all the numbers except two, three, and five incorporate, and which corresponds to nothing else in the language; + we·'ic 'one' + xw'e·l'a a morpheme which resembles the theme xw'e·l- 'to miss'. The numeral ten is derived from the unknown theme cik with bax 'just, only'. bax also occurs in the numeral one which makes it mean 'just, only one'.

### Tunica

"The Tunica were living on the Yazoo River in Mississippi when they first came to the notice of the French at the close of the seventeenth century" (Crawford 1975:67).

The data on the numerals are taken from Haas (1953).

#### Tunica numerals one through ten

one	sáhku
two	ʔíli
three	ʔéniḥku
four	mánku

five	sínku
six	másahki
seven	táyihku
eight	tísihku
nine	tóhkusáhku
ten	míču, míču sáhku

In Tunica, a relationship between one and nine is also noticeable.

Compare:                   s á h k u   'one'  
                               t ó h k u s á h k u   'nine'

The form tohku occurs only in this numeral in the language, so its meaning is unknown (Haas 1953), but the system appears to be subtractive.

Apart from the possible relationship of one and nine, there is no direct relationship between the other numerals of Tunica. However, Haas mentions the similarity of Tunica sínku 'five' and Spanish cinco 'five', although the possibility of direct borrowing is not confirmed either by Haas or any other linguist.

### Yuchi

Crawford (1975:69) explains that very little is known about the early history of the Yuchi. Crawford mentions a legend published in 1776 which places the Yuchi on the Savannah River above Augusta, Georgia, and a 1739 source which places them five and twenty miles above Ebenezer (Ebenezer is about thirty miles above Savannah).

We have access to two sources for Yuchi numerals. These are Ballard (1974) and Wagner (1934), as shown below.

Yuchi numerals one through ten

	<u>Ballard</u>	<u>Wagner</u>
one	tʰe, [hi]tʰe	hitʰé
two	nōwē	nɔ̄wε
three	nōkæ	nɔ̄Ká
four	tæɪæ	Taɪá
five	tʃʰwahe	tcʰwahé
six	ʔiʃdu	icdú
seven	latʃu	laʃdʒú
eight	bifæ	bifá
nine	tʰek[j]æ, [dekæ]	tʰeʰxKa
ten	ɪʰæpe	ɪaʃPé

khotʰa (in compounds)

In Yuchi, we see a relationship between one and nine also.

Compare:            tʰ e x K a    'nine'  
                       h i tʰ e            'one'

The Yuchi subtracting system may be an innovation parallel to the Catawban subtracting systems (cf. Catawba and Woccon systems discussed in Chapter 4).

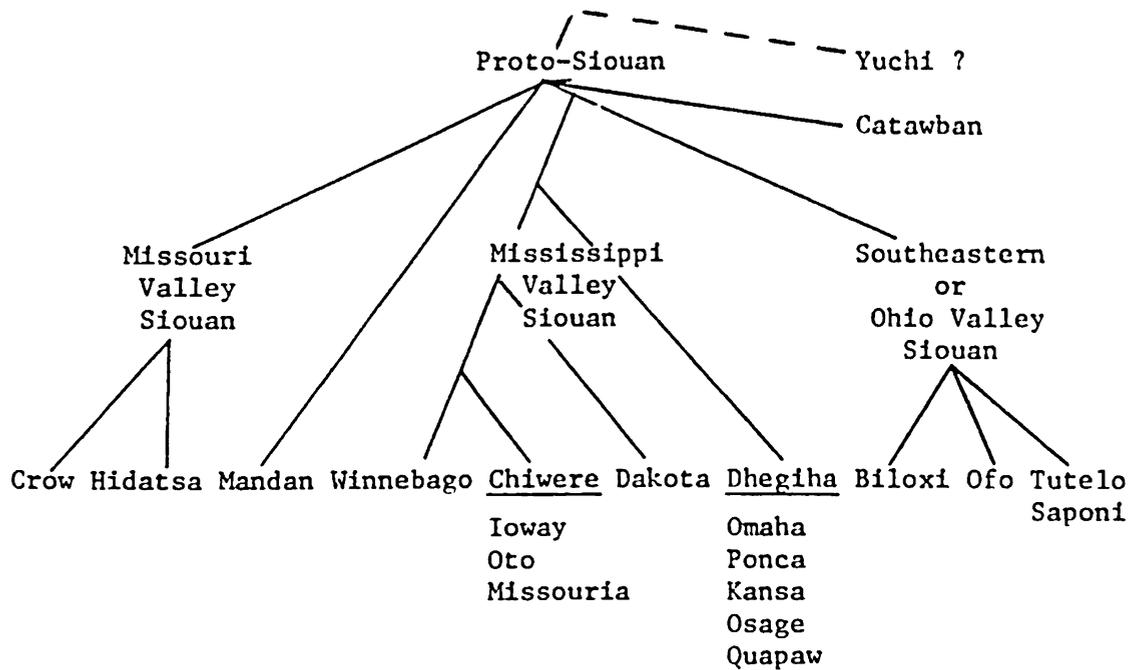
Yuchi may be distantly related to Siouan and Catawban. The numeral two is one of the putative Siouan-Yuchi cognates. Compare Proto-Siouan, Catawban, and Yuchi numerals two, below.

PS	*r	ɥ	h	p	a
Ct	n	ə	p	r	e
Y	n	ɔ̄	w	ε	

Chapter 4

SIOUAN

Traditionally, Siouan languages are classified into three sub-groups. Rankin illustrates the separation of Siouan languages in a family tree as follows.



Most Siouan numeral systems show a mixture of partial quinary and partial subtracting systems which are sometimes also partially descriptive in nature. A few languages appear to have marginal multiplying systems. These systems are examined and compared with the reconstructed numerals of each branch below. We reconstruct the numerals of each subgroup separately, because reconstructing Proto-Siouan numerals directly without considering the different sound patterns of the sub-branches is difficult if not impossible. After analyzing the numerals of each

sub-group in this way, we attempt to reconstruct the Proto-Siouan numerals as a whole, and discuss the numeral systems. These are then compared with the distantly related Catawban.

### Ohio Valley Siouan

For Tutelo, we have access to the following works: Hale (H) (1883), Sapir (S) (1913), Frachtenberg (F) (1913), and Dorsey (D) (1891), which includes some of J.N.B. Hewitt's transcriptions. We compare the numerals as recorded by each linguist listed above, and attempt to phonemicize the Tutelo forms. Below, numerals one through ten are given as they appear in the original works.

#### Tutelo numerals one through ten

	<u>Hale</u>		<u>Sapir</u>
	<u>Separate</u>	<u>Construct</u>	
one	nōns, nōs	nosāi, noñsāi	blōs
two	nomp	nombāi	nōs
three	lāt, nān	nāni	nā
four	tōp	topāi	tū
five	kisē, kisāñ	kisāhai	bī
six	agās, akás, akāsp	akāspē	agās
seven	sāgóm	sagomēi	sakú
eight	pālán	palāni	pelāk'
nine	sā, sāñ, ksañk	ksāhkan	sək'
ten	putçk, lūtçk'	putskai	bitská'

	<u>Dorsey</u>		<u>Frachtenberg</u>
	<u>Separate</u>	<u>Construct</u>	
one	no <sup>n</sup> s, nōs	nosáí, no <sup>n</sup> sáí	no <sup>n</sup> s
two	no <sup>n</sup> p (Hw)		kisé <sup>n</sup> g, ksén, no <sup>m</sup> p
three	nān (Hw), lāt	nāni	sagóm
four	tōb (Hw)	topāí	tup, balá <sup>i</sup> n
five	kisáhai	kisahá <sup>n</sup> i	níswa
six	a-gás, a-kas	akāspei, agespeq	akás, būz, niswá <sup>l</sup>
seven	sā-gūm (Hw)	sagomí-i	sagóm, níli, yawenó <sup>n</sup>
eight	pā-lān (Hw)	paláli	balá <sup>i</sup> n, yawinó <sup>n</sup> , nihilí
nine	ksañk	ksañkai	kse <sup>n</sup> k, sagá <sup>l</sup>
ten	potsk, putsk		butsk, gwīs, gwī

### Phonemicizing Tutelo forms for numerals

Below, each numeral is given along with reference to the names of the linguists who transcribed the forms. The first letter(s) of each linguist's name is used as an abbreviation.

By the "construct" forms, we understand a suffix which is used when numerals occur in conjunction with other words in the discourse. Hence, -i is dropped in the phonemic forms. But the vowel(s) preceding -i is retained, since there seems to be a rule which often deletes final vowels in discourse.

## ONE

H n  $\bar{o}$  n s  
 n  $\bar{o}$  s  
 n o s  $\bar{a}$  i  
 n o ñ s a i

S b l  $\varrho$  s

D n o<sup>n</sup> s  
 n  $\bar{o}$  s

F n o<sup>n</sup> s

/r  $\varrho$   $\varrho$  s a/

## TWO

H n o m p  
 n o m b a i

(Hw) D n o<sup>n</sup> p

F n o<sup>m</sup> p

/r  $\varrho$  p a/

Sapir's forms for two were recorded from a marginal (Cayuga) speaker and mean one, not two.

[<sup>m</sup>] transcribed by Hale and Dorsey is due to the previous nasal vowel and the following labial.

	THREE	FOUR	FIVE
H	l ā t	t ō p	k i s ē
	n ā n	t o p ā i	k i s á ñ
	n ā n i		k i s ā h a i
S	n ā	t ū	
D	l ā t	t ō b	k i s á h a i
	n ā n	t o p ā i	k i s a h á <sup>n</sup> i
F		t u p	
	/r a a r i/	/t o o p a/	/k i s á h/ or /kisaahə/

	SIX	SEVEN	EIGHT
H	a g ā s	s ā g ó m	p ā l á n
	a k á s	s a g o m ē i	p a l ā n i
	a k ā s p		
	a k á s p ē		
S	a g ā s	s a k ú	p e l ä k'
D	a-g ā s	s ā - g ū m	p ā - l ā n
	a-k ā s	s a g o m í-i	p a l á l i
	a k ā s p e i		
F	a k á s		
	/a k á a s p e/	/s a a k ú w i/	/p a r á a r i/

	NINE	TEN
H	s ā	p u t c k
	s ā ñ	l ū t c k
	k s a ñ k	p u t s k a i
	k s ā h k a n	
S	s ɛ k'	b i t s k ā
D	s a g á	p o t s k
	k s e n k	p u t s k
F		b u t s k
	/k s ɛ ɛ k a/ or /ksɛhka/	/p u t s k a/

Philological problems in the analysis of Tutelo sources

A quick look at the numerals as they were transcribed by Sapir and Frachtenberg reveals some errors, probably on the part of the informants, all of whom also spoke Cayuga. The errors are listed below, accompanied by the correct glosses.

1. Sapir:

nōs glossed as 'two' should be 'one'.

2. Frachtenberg:

kisé<sup>n</sup>g, kisén 'two' should be 'five'.

sagóm 'three' should be 'seven'.

bala<sup>i</sup>n 'four' should be 'eight'.

In Frachtenberg's data, there are alternate forms for the numerals five, six, seven, and ten, which do not appear in other linguists' data. These alternate forms are listed below, accompanied by explanations of their possible origin.

1. nīswa 'five' and nišwá 'six' both appear to be borrowings from Shawnee nešwa 'five' or from some other Algonquian language.
2. būz 'six' does not resemble any Algonquian or Siouan numeral. We cannot determine its origin for the moment.
3. nīli, yawenón 'seven' do not appear to be Siouan terms. nīli looks like a borrowing from an Algonquian language, since it starts with n- as do most Algonquian numerals one through eight. But, the donor language of nīli cannot yet be determined. The form yawenón appears to be borrowed from Cree yānānāw 'eight', or from some similar form in a related Algonquian dialect.
4. gwīs, gwi 'ten' appear to represent Tutelo bitska 'ten' pronounced by an Iroquoian speaker, probably a Cayuga who developed g<sup>w</sup> for b. Such an innovation is not unexpected, because Iroquoian languages have no labial obstruents. Hence, bit(s) > gwīs, gwi. Compare the similar treatment of Cherokee seven, below.

For both Biloxi and Ofo, Dorsey and Swanton (1912) is the only published source we have. The Biloxi material was collected by Dorsey and published with Swanton's notes on Ofo. Swanton re-arranged the Biloxi material collected by Dorsey, who died before finishing his work on it.

The numeral words of Biloxi and Ofo are given below, accompanied with the phonemicized forms.

Ofo and Biloxi numerals one through ten

	<u>Ofo</u>		<u>Biloxi</u>	
one	núfha	/rúfha/	so <sup>n</sup> sá	/sqsá/
two	núpha	/rúpha/	no <sup>n</sup> pá	/rqpá/
three	táni	/tári/	dáni	/dári/
four	tópa	/tópa/	topá	/topá/
five	kifá <sup>n</sup>	/kifá/	ksá <sup>n</sup> , ksani	/ksá/ or /ksani/
six	akapě	/akapé/	akūxpě	/akaxpe/
seven	fakúmĭ	/fakúwĭ/	ná <sup>n</sup> pahudi	/rāpahudi/
eight	pátanĭ	/pátari/	dánhudi	/rārhudi/
nine	kictacga	/kištaška/	čkane	/čkane/
ten	ĭftapán	/iftaptá/	ohí	/ohí/

Before examining the Proto-Ohio Valley Siouan numerals and numeral systems, we summarize the phonemicized forms of Tutelo, Ofo, and Biloxi numerals below.

	<u>Tutelo</u>	<u>Ofo</u>	<u>Biloxi</u>
one	rqsas	rúfha	sqsá
two	rqpas	rúpha	rqpas
three	raari	tári	dári
four	toopas	tópa	topá
five	kisah	kifá	ksá
six	akáaspe	akapé	akaxpe
seven	saakúwĭ	fakúwĭ	rāpahudi
eight	paráari	pátari	rārhudi
nine	ksąąka	kištaška	čkane
ten	putska	iftaptá	ohí

Proto-Ohio Valley Siouan numerals

A comparison of the Biloxi, Ofo, and Tutelo numerals one through six indicates that they are clearly cognate, whereas the Biloxi numerals seven to ten are not. In each case, Biloxi appears to have innovated.

## ONE

T r q q s a

O r ʋ f h a

B s q s a

POVS \*r q q s a

The problem of reconstructing the sets in which Ofo f and fh appear to contrast as seen in one has not been solved.

## TWO

T r q p a

O r ʋ p h a

B r q p á

POVS \*r q p h a

## THREE

T r a a r ʎ

O t á r ʎ

B d á r ʎ

POVS \*r á a r ʎ

## FOUR

T t o o p a

O t ó p a

B t o p á

POVS \*t o o p a

## FIVE

T k í s ą h

O k í f ą

B k s ą

POVS \*k í s ą h

## SIX

T a k á á s p e

O a k a p é

B a k a x p e

POVS \*a k a a x p e or \*akaaspe

## SEVEN

T s a a k ú w ɿ

O f a k ú w ɿ

POVS \*s a a k ú w ɿ

The Biloxi word rapáhudi 'seven' is not considered in reconstructing Proto-Ohio Valley Siouan seven because rapáhudi is a non-cognate term derived from Proto-Ohio Valley Siouan \*roppha 'two' and ahudi 'bones' (Dorsey and Swanton 1912). Thus, this word means 'two bones (fingers on

the other hand?')' and points towards a quinary relationship between two and seven. The term is also clearly descriptive, since it refers overtly to the use of fingers while counting.

## EIGHT

T p a r á a r ɨ

O p a t a r ɨ

B r ɔ r - 'three'

POVS \*p a r á a r ɨ

Biloxi rərɥudi 'eight' is also a descriptive form derived from three with the use of ahudi 'bones'. Thus, it means 'three bones (fingers on the other hand?)'. Tutelo and Ofo have also derived eight from three, but they used the prefix pa- instead of the word ahudi 'bones'. In either case, eight is derived from three, and the system is quinary in nature although the morphology is different. This prefix pa- may be related to Dhegiha ppe- and Mississippi Valley Siouan -pi, which are discussed below.

## NINE

T k s ɔ k a

O k i š t a š k a

POVS \*k š ɔ k a

Many Siouan words for nine, including Ohio Valley Siouan nine, appear to be borrowed from Algonquian nine. In reconstructing Proto-Siouan numerals as a whole, we shall discuss this case further.

Biloxi čkane 'nine' appears to be borrowed from Choctaw čakkáali 'nine' (Mary Haas, personal communication).

## TEN

T                    p u t s k a

O   i f t a p   t   a

POVS                    \*p u t(s)k a

The Tutelo and Ofo forms for ten do not fit regularly. The main problem is the unexplained nature of ifta- in Ofo. The form \*put(s)ka is a tentative reconstruction.

Biloxi ohí, which is not included in the correspondence set for ten, appears to be an innovation, derived from Proto-Siouan \*ohi 'hundred'.

### Conclusion

Biloxi derives seven and eight from two and three respectively, which indicates a partial quinary system. However, Ofo and Tutelo derive only eight from three, so Ohio Valley Siouan partial quinary systems cannot properly be said to be genetically related. Ofo and Biloxi systems appear to be areal features that are shared with Muskogean and some Caddoan languages which have quinary systems as a family trait. This makes south and southeastern North America a diffusion area. Examination of Mississippi Valley Siouan languages also supports this. On the other hand, the partial quinary system of Tutelo, which is geographically isolated from Biloxi, Ofo, Caddoan, and Muskogean languages can only be classified as a parallel innovation, or a borrowing from Algonquian languages, to which it is close geographically.

### Mississippi Valley Siouan

Mississippi Valley languages include the Dhegiha languages (i.e., Kansa, Osage, Quapaw, Omaha, and Ponca), Ioway-Oto, Winnebago, and Dakota.

The study of the numerals one through ten shows that there is a Dhegiha quinary pattern as opposed to a somewhat mixed Ioway-Oto-Dakota-Winnebago pattern. Sometimes, Ioway-Oto fits better with the Dhegiha pattern, and this makes it hard to consider the Ioway-Oto, Dakota, and Winnebago languages as one group.

Mississippi Valley Siouan numerals one through ten

	<u>Kansa</u> <sup>1</sup>	<u>Osage</u> <sup>2</sup>	<u>Quapaw</u> <sup>3</sup>	<u>Omaha</u> <sup>4</sup>	<u>Ponca</u> <sup>5</sup>
one	míxti	wíxci	míxti	wí	wí, wí, wíaxci
two	nq̄bá	ḍq̄pa	nq̄pá	nq̄ba	nq̄bá, nq̄ba
three	yábl̄i	ḍápr̄i	dábn̄i	ḍábḍ̄i	ḍábḍ̄i, ḍáʔabḍ̄i
four	dóba	tópa	tówa	dúba	dú̀uba
five	sátt̄a	sáht̄a	sátt̄a	sátt̄a	sátt̄a
six	šáppe	šáhpe	šáppe	šappe	šáppe
seven	ppéyq̄ba	ppeḍq̄ba	ppénq̄pa	ppéḍq̄ba	ppé·ḍq̄ba
eight	ppeyábl̄i	kiḍatopa	ppedábn̄i	ppéḍabḍ̄i	ppeḍábḍ̄i
nine	šákka	šq̄kka	šákka	šákka	šákka
ten	lébl̄a	lébr̄a	kdébn̄a	gḍébo	gḍé·ba
		<u>Ioway-Oto</u> <sup>6</sup>	<u>Winnebago</u> <sup>7</sup>	<u>Dakota</u> <sup>8</sup>	
one		i·yán-ki	hižá-kííra	wąži	
two		nq̄wé	nuyup	núpa	
three		dañi	taaní	yámn̄i	
four		dówe	joop	tópa	
five		ḍá·t̄a	saačá	zápt̄a	
six		sá·gwe	hakewé	šákpe	
seven		sáhma	šaagóow̄i	šaków̄i	
eight		greráp̄ri	haruwák	šaklóga	

## Mississippi Valley Siouan numerals continued

nine	sáke	hižakííčášgūŋ	ŋapčíyuka
ten	grebra	kerepána-ižá	wikčemna

Proto-Mississippi Valley Siouan Numerals

## ONE

K	m ɪ x t i		
Os	w ɪ x c i		
Q	m ɪ x t i	I-O	i · y á n k i
Om	w ɪ	D	w ą ž i
P	w ɪ	W	h i ž ą -
PDh	*w ɪ x t i	NMpVS	*w i ž ą

Kansa, Osage, and Quapaw numerals are derived from the Dhegiha stems \*wɪ 'a, one' and \*xti 'real'. Thus, this gives the numeral one the meaning of 'real one' in Dhegiha Siouan. Omaha and Ponca appear to have retained only the root \*wɪ 'a, one'.

The Dakota word for one seems to be a compound of wą 'one' and ži 'erect'. Thus, Dakota one agrees with the plains sign language where one is expressed by extending the (left) little finger. (The plains sign language and the reanalysis of certain Siouan numerals are explained in more detail below.) The Ioway-Oto and Winnebago forms for one correspond with the Dakota form. Both Ioway-Oto and Winnebago frequently lose the initial w, Winnebago replacing it with h. Thus, Ioway-Oto and Winnebago forms appear to have developed from the

reconstructed \*wǎži by vowel metathesis.

Comparing the reconstructed Dhegiha and Northern Mississippi Valley forms, we see that they contain the roots \*wǐ and \*wǎ for one. We can assume that \*wǐ is a doublet for \*wǎ. The development of \*wǐ from \*wǎ is perhaps due to the word-final e/a alternation in Siouan, where e when nasalized became ǐ. Also compare the Dakota forms wǎ 'a, one' and wǐ 'a, one' as seen in Dakota wikčemna 'ten' (wǐ + kčemna 'ten').

## TWO

K	n	ǫ	b	á
Os	ǒ	ǫ	p	a
Q	n	ǫ	p	á
Om	n	ǫ	b	a
P	n	ǻ	b	á
I-O	n	ǫ	w	é
D	n	ǔ	p	a
W	n	ǔ	ǔ	p

PMpVS \*r ǔ p á

ǫ and ǔ do not contrast in Siouan languages, so in reconstructing two and other numerals, ǔ is used. Winnebago long ǔ appears to be "compensatory", due to the loss of a final vowel.

## THREE

K	y	á	b	l	ɨ
Os	ǒ	á	b	r	ɨ
Q	d	á	b	n	ɨ
Om	ǒ	a	b	ǒ	ɨ
P	ǒ	a	b	ǒ	ɨ ~ ó'abǒɨ
I-O	d	a		ñ	ɨ
D	y	á	m	n	ɨ
W	t	a	a	n	ɨ

PMpVS \*r a a w r ɨ

On the basis of the Winnebago and Ponca evidence, the first vowel is reconstructed as long in Proto-Mississippi Valley Siouan three. Vowel length has often gone unrecorded in Siouan languages.

## FOUR

K	d	ó	b	a	
Os	t	ó	p	a	
Q	t	ó	w	a	
Om	d	ú	b	a	
P	d	ú	ù	b	a
I-O	d	ó	w	e	
W	ɟ	ó	ó	p	

PMpVS \*t ó o p a

The forms for four are clearly cognate. The vowel \*o is again

reconstructed as long on the evidence of Ponca and Winnebago.

## FIVE

K	s á	t t ą
Os	s á	h t ą
Q	s á	t t ą
Om	s á	t t ą
P	s á	t t ą
I-O	θ á a	t ą
D	z á	p t ą
W	s a a	č ą

PMpVS \*s á (a) p t ą

\*a is tentatively reconstructed as long on the basis of the Winnebago and Ioway-Oto evidence alone. The medial consonant \*p appears to have assimilated to \*t in Kansa, Quapaw, and Ponca. Dakota has maintained the original consonant cluster, Osage has developed h and Winnebago has retained a single consonant. z in Dakota is irregular.

## SIX

K š a p p e  
 Os š a h p e  
 Q š a p p e  
 Om š a p p e  
 P š a p p e  
 I-O s a a g w e  
 D š a k p e  
 W h a k e w e

PMpVS \*š a a k p e

The forms for six are clearly cognate. The Winnebago form has lost š and developed h perhaps at a later stage. Winnebago e appears to be epenthetic (by Dorsey's Law), compare the closely related Ioway-Oto form for six.

## SEVEN

K p p é ð q b a  
 Os p p e ð q p a  
 Q p p e n q p a I-O s a h m a  
 Om p p e ð q b a D š a k ó w i  
 P p p e · ð a b a W š a a g ó ó w i  
 PDh \*p p e r u p a NMPVS \*š a a k ó (o) w i  
 and \*š a a k - w a

The Dhegiha languages derive seven from Proto-Mississippi Valley

Siouan \*rypa 'two' with the prefix \*ppe-. The meaning of this affix is not totally clear, although its use in quinary systems is consistent; see Proto-Dhegiha eight below. Without supporting evidence, we can only assume that this prefix represents a re-analysis of Proto-Siouan clitic or adposition \*-ppe with an approximate meaning of 'down'. An analysis such as this gives the Dhegiha forms a descriptive meaning as 'two [fingers] down'. Compare Ohio Valley Siouan pa- described above.

Ioway-Oto, Dakota, and Winnebago forms correspond morphologically with each other. However, analyzing Dakota šakowǰ (as seen above) and comparing it to the plains sign language suggests that Ioway-Oto and Winnebago may have innovated seven on a similar descriptive basis.

In American Indian languages generally, a numeral word which includes the morphemes for hand plus one finger means six. However, in Dakota, the numeral which includes the abovementioned morphemes means seven: Dakota šakowǰ 'seven' < Proto-Siouan \*šaak 'fist, hand, claw' + Proto-Siouan \*wi ~ \*wǰ 'a, one'. This peculiar system appears to be reinforced in the Dakota language by the extensive use of plains sign language. In representing the numerals one through five in the plains sign language, the fingers and the thumb of the right hand are extended upwards consecutively, starting with the little finger. In representing the numeral six, the left fist is placed beside the extended fingers of the right hand, and the left thumb touches the right thumb. In representing the numerals seven through ten, four bent fingers of the left hand are extended consecutively, starting with the index finger. Thus, seven is represented with the index finger

[of the left hand] extended, eight with the second finger [of the left hand] extended, etc. (cf. Plate 1 below). Notice that seven is represented with the index finger extended from the [left] hand. This supports our analysis of Dakota šakowǫ 'seven' above.

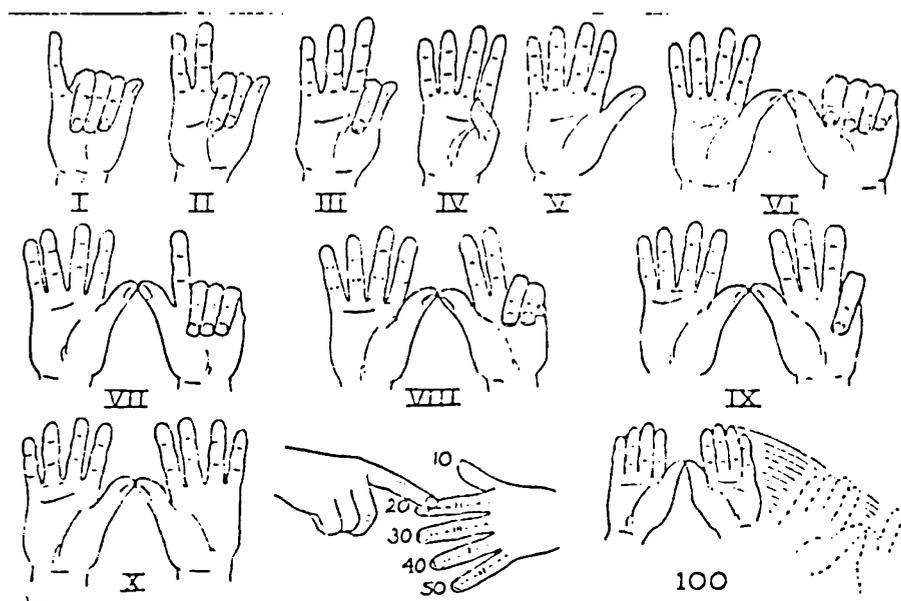


Plate 1. Numerals in Indian sign language (Tomkins 1931:22)

EIGHT

K p p e y a b l i

Q p p e d á b n i

Om p p e ð a b ð i

P p p e ð a b ð i

PDh \*p p e r á a w r i

The Dhegiha languages derive eight from Proto-Mississippi Valley

Siouan \*raawri 'three' by means of the prefix \*ppe-, which is assumed to mean 'down'. If this is the case, Dhegiha eight has a descriptive meaning 'three [fingers] down' and a somewhat different system of finger bending is implied. Dhegiha eight also shows a quinary pattern.

Ioway-Oto also conforms to this quinary pattern, since eight is derived from three, by means of a prefix, kre-. Compare the reconstructed Dhegiha form with the Ioway-Oto form below. kre (gle) means 'standing up, placed upright' in Dakota (Buechel, 1970) and presumably also in Ioway-Oto.

Compare:	PDh	*p p e r á a w r i	'eight'
	I-O	g r e r á p r i	'eight'

Ioway-Oto eight, then means 'three standing up [on one hand]'. This is also a quasi-descriptive term, as is the Dhegiha word.

The Osage form, kiđatopa 'eight' along with the alternate Kansa forms kiyadóba and kiyalóba, which depart from the usual Dhegiha pattern, is evidently borrowed from Wichita kiyatáwha 'eight', but Osage and Kansa speakers interpret it as 'two fours', comparing it to topa 'four'.

Dakota šaklóga also seems to contain Proto-Siouan \*šaak 'fist, claw, hand'. This suggests that it is a descriptive word, as are Dakota six and seven. But, the meaning of loga is not entirely clear. The closest form in Buechel (1970) is Dakota loga, without a final nasal ǵ, which means 'extended, spread'.

Winnebago háruwak remains unidentified.

## NINE

K š á k k a

Os š ó k k a

Q š á k k a

Om š á k k a

P š á k k a

PDh \*š á k k a

Ioway-Oto conforms to the Dhegiha pattern. Compare the Ioway-Oto form with the Proto-Dhegiha form below.

Compare: PDh \*š á k k a

I-O s á k e

Dakota and Winnebago numerals do not form a separate group, but they both have subtractive patterns in the derivation of nine. Dakota napčiyuka can be analyzed as napči from napčóka 'palm of the hand' and yuka 'to lie'. Another form for nine in Dakota is napčiwaka from the same root, napči and waka 'lying down'. This gives the Dakota forms an approximate meaning of 'one finger lying down [on one hand]'. The Winnebago form, hižakíičašgunj is based on hižə + kíiča 'only' + -šguni 'negative particle' (Kenneth Miner, personal communication). Thus, Winnebago nine has the meaning alternant of 'only one less'. Moreover, Osage lebráčewíke 'nine', which is an alternant of Osage šókka, also seems to be subtractive, since it contains lebrá 'ten' and wi 'one'. This gives Osage nine an approximate meaning of 'ten minus one'.

The Dakota, Winnebago, and perhaps the Osage forms for nine appear to agree with the plains sign language system, where nine is represented by the small finger of one hand over the palm (see the description of nine in Plate 1 above).

TEN	
K	l é b l ą
Os	l é b r ą
Q	k d e b n ą
Om	g ǒ e b ǵ
P	g ǒ e · b ą
I-O	g r e b r ą
D	w i k č e m n ą
W	k e r e p á n ą
PMpVS	*k r é w r ą

The forms for ten are cognate, however, č in Dakota wikčemna (< Proto-Siouan \*wǐ 'a, one' + kčemna 'ten') is not well understood.

### Conclusion

Reconstructing Mississippi Valley Siouan numerals, we see that the Proto-Mississippi Valley Siouan numeral system was neither consistently quinary nor subtracting. Yet Dhegiha Siouan shows strong quinary characteristics, and Dakota and Winnebago clearly show subtracting systems. Both systems appear to be the result of areal diffusion. This is discussed below.

Missouri Valley Siouan

The Missouri Valley Siouan languages are Hidatsa and Crow. We have two different sources for Hidatsa which are complete and which give enough information on the subtracting system of this language. We have access to most of the Crow numerals, but six, eight, and nine are missing from Kaschube's (1967) Crow data. The numerals extracted from Gallatin's early vocabularies (Gallatin 1836) give useful hints about the numerals six and eight, but fail to give any information on nine.

Missouri Valley Siouan numerals one through ten

	<u>Hidatsa</u> <sup>9</sup>	<u>Hidatsa</u> <sup>10</sup>	<u>Crow</u> <sup>11</sup>	<u>Crow</u> <sup>12</sup>	<u>Crow phonemicized</u>
one	duetsa, luetsa	ruwá-co	hawát-, hawáta	?	hawáta
two	dopa, nopəts	rúipa	rúhp-, rúhpá:	noomcat	rúhpaa
three	dami, nawi	ráahawi	-rà:wí-	namena	-ràawí-
four	topa	tóapa	šó:pa	?	šóopa
five	kixu	kixhú	ciaxxo	chi-hho cat	čiaxxo kat
six	akama	akáwa	?	ah cam a cat	akawa kat
seven	sa(h)pua	sáhpuo	sahpua	sappoah	sáhpuo
eight	dopapi, nopapi	ruipa pi	?	noom pa pi	ruhpa pi
nine	duetsapi	ruwá-co pi	?	?	?
ten	pitika	piraka	-piraká-	perakuk	piraká(k)

Proto-Missouri Valley Siouan numerals

## ONE

Hd r u w á - c o

Cw h a w á t a

PMsVS \*r o o c (o)

Comparing the Hidatsa and Crow numerals one to the Proto-Ohio Valley Siouan \*roosa suggests that Hidatsa uwa and Crow awa go back to an earlier \*oa and to Proto-Siouan \*oo. Compare Hidatsa and Crow four, where we also see the development of \*oo > oa. Hence, Proto-Missouri Valley Siouan one might be reconstructed as \*rooc(o). This makes Crow initial h- innovative.

## TWO

Hd r ú i p a

Cw r ú h p a

PMsVS \*r u h p a

The Hidatsa diphthong in two is perhaps from an earlier long vowel \*uu, i.e., Proto-Siouan \*uh > \*uu > ui. In the above and following, we see that Hidatsa diphthongizes long vowels frequently, if not always.

## THREE

Hd r á a h a w i

Cw r à à w í

PMsVS \*r a a w i

Hidatsa and Crow three appear to be cognate. Hidatsa must have innovated -ha-, perhaps at a recent stage, because G.W. Matthews (1873) does not show it. The Crow list reproduced by Gallatin (1836) suggests that a final syllable (-na ?) may have been lost relatively recently.

## FOUR

Hd t ó a p a

Cw š ó ó p a

PMsVS \*t ó ó p a

Hidatsa and Crow four are cognate. Note that Hidatsa has again diphthongized the long vowel, \*oo > oa.

## FIVE

Hd k i x h ú

Cw č i a x x o

PMsVS \*k i x h o/u

In five, Crow appears to have assimilated \*h to \*x. The change \*i > ia / \_x (a common phonetic change in Dhegiha Siouan), is assumed to have taken place in Crow. The \*o/u split in final position may be the regular outcome of Proto-Siouan nasal \*u as opposed to \*o or \*u in Hidatsa and Crow.

## SIX

Hd a k á w a

Cw a k a w a-

PMsVS \*a k á w a

Hidatsa and Crow six are clearly cognate. The ending -kat which appears in certain numerals in Gallatin's data (where it is spelled -cat) may be a kind of numeral marker. For this reason, it is not included in the correspondence sets.

## SEVEN

Hd s á h p u o

Cw s á h p u a

PMsVS \*s á h p u a/o

Hidatsa and Crow seven are also clearly cognate, but it is uncertain whether the final vowel was \*o or \*a in Proto-Missouri Valley Siouan.

## EIGHT

Hd r u i p a p i

Cw r u h p a p i

PMsVS \*r u h p a p i

Hidatsa and Crow eight are derived from two, hence eight is subtractive in these languages. We assume that the suffix -pi is from

the Proto-Siouan adposition \*-pe or, is somehow related to the pluralizer \*-pe. Therefore, eight is also descriptive in nature since it means 'two [fingers] down'. This system also matches the plains sign language system.

The numeral nine is not fully reconstructible because the Crow word is missing. However, when we analyze Hidatsa ruwá-co pi 'nine', we see that it is derived from ruwá-co 'one' and the suffix -pi, from Proto-Siouan \*-pe 'down' (or 'plural') which is also used in the derivation of Hidatsa and Crow eight. Therefore, it is probably safe to assume that nine is subtractive in both Hidatsa and Crow. Note also that Hidatsa (and Crow) nine, which means 'one [finger] down' matches the plains sign language system.

#### TEN

Hd p i r a k á

Cw -p i r a k a

PMSVS \*p i r a k a

The Hidatsa and Crow words for ten are clearly cognate.

#### Conclusion

This examination of the Missouri Valley Siouan numerals shows that they have subtracting systems for the derivation of both eight and nine. In this subtracting process, they use the suffix -pi which we assume goes back to the Proto-Siouan adposition \*-pe 'down'. Thus, the Hidatsa and Crow subtracting systems resemble those found in other

northern plains languages of the Siouan and Caddoan families (see Chapter 7).

#### Mandan and the Siouan languages

Although Mandan is clearly a Siouan language, the problem of where to group it is still unsolved. Unfortunately, a study of the numerals themselves does not clarify how Mandan should be grouped, because the numerals display similar characteristics to both the Mississippi Valley and the Missouri Valley Siouan languages. Therefore, in this section, we merely examine the Mandan numerals and establish what numeral system Mandan employs.

The numerals of Mandan as they are recorded by Kennard (1936) and Hollow (1970) are given below. However, there are transcription differences between them. For example, Kennard has vowel length in the numerals three, six, and eight, which Hollow may have missed. Comparing Mandan three to three in other Siouan languages suggests that Kennard's transcriptions showing length are correct. To reconcile the two different transcriptions, it is better to use Hollow's forms since they are morphophonemic, but to indicate length in his forms for three, six, and eight on the basis of Kennard's transcriptions. Apart from the problem of vowel length, Hollow's rather abstract morphophonemic rendering may be looked upon as a kind of internal reconstruction which facilitates comparison with other Siouan languages.

Mandan numerals one through ten

	<u>Kennard</u>	<u>Hollow</u>
one	máxana	wáxrą
two	nup	rúp
three	ná:mini	ráwrı̄
four	top	tóp
five	kíxu	kixú
six	kí:ma	kíwą
seven	ku:pa	kúpa
eight	té:tuki	tétoki
nine	máxpe	wáxpe
ten	pírək	pirák

Mandan numeral system

An examination of Mandan numerals reveals a subtracting system in the derivation of nine.

Compare:   w á x p e       'nine'  
               w á x       r ą   'one'

The suffix used in this system resembles the Hidatsa and Crow suffix -pi used in subtracting operations in those languages. The Mandan suffix -pe can be associated with Hidatsa and Crow -pi, cf. also Dhegiha ppe- and Ofo/Biloxi pa-. On the other hand, the subtracting system in Mandan has obvious affinities to the other posited northern plains counting systems.

Proto-Siouan numerals one through ten

In this section, we attempt to reconstruct the Proto-Siouan numerals as a whole, by comparing the reconstructed numerals of three Siouan sub-branches and Mandan. This will enable us to determine the Proto-Siouan numeral system, which should eventually help us to understand the present Siouan numeral systems and their historical development in different culture areas.

Below, the reconstructed numerals of the Siouan sub-branches are summarized, along with the Mandan numerals.

	<u>POVS</u>	<u>PMpVS</u>		<u>PMsVS</u>	<u>Mandan</u>
		<u>PDh</u>	<u>NMpVS</u>		
one	rɔɔsa	wɪxti	wiʒa	rooc(o)	wáxrą
two	rɔpha		rɔpá	rúhpa	rúp
three	ráari		ráawri	ráawi	ráawri
four	toopa		tóopa	tóopa	tóp
five	kisáh		sáaptą	kixhu/o	kixú
six	akaax/spe		šaakpe	akáwa	kiiwą
seven	šaakowi	pperɔpa	šaakó(o)wi	sáhpua/o	kúupa
eight	paráari	pperáawri	? <sup>13</sup>	ruhpa	téetoki
nine	ksąka	šąka	? <sup>14</sup>	rooc(a)pi	wąxpe
ten	putska		kréwra	piraká	pirák

## ONE

NMpVS \*w ą -

POVS \*r ɔ ɔ s a

PDh \*w ɪ -

PMsVS \*r o o c (o)

Ma w ą -

PS \*w ą or wɪ 'a, one'

PS \*r ɔ ɔ s a 'one'

In discussing the development of the Mississippi Valley Siouan forms for one, we mentioned the possibility of Proto-Dhegiha \*wɪ and Northern Mississippi Valley Siouan \*wą being doublets. The Mandan form waxrą which appears to be derived from wą 'one' and xra < kre/a 'standing up' (also compare Ioway-Oto gre- in grerapɪ 'eight') confirms that \*wą was a doublet for \*wɪ in Proto-Siouan. Recall that the word-final e/a split in Siouan may be the cause for the development of ɪ from e. Nasal e always becomes ɪ.

The reconstructed form \*rɔɔsa is suggested on the basis of the similarity of Proto-Ohio Valley Siouan and Proto-Missouri Valley forms for one.

## TWO

Ma r ɹ p

POVS \*r ɔ p h a

PMpVS \*r ɹ p á

PMsVS \*r u h p a

PS \*r ɹ h p a

In two, the Ohio Valley languages seem to have undergone a

metathesis in the development of the medial cluster; Mississippi Valley languages and Mandan have lost the first member of the medial cluster.

## THREE

Ma r á a w r ʃ  
 POVS \*r á a r ʃ  
 PMpVS \*r á a w r ʃ  
 PMSVS \*r á a w i  
  
 PS \*r á a w r ʃ

The forms for three are regular and otherwise self-explanatory.

## FOUR

Ma t ó p  
 POVS \*t o o p a  
 PMpVS \*t ó o p a  
 PMSVS \*t ó o p a  
  
 PS \*t ó o p a

The forms for four are also regular and largely self-explanatory.

## FIVE

Ma k i x ú  
 POVS \*k i s ą h  
 PMSVS \*k i x h o/u  
  
 PS \*k i x h ą/ų

In five, the final vowels do not show regular change. Crow and Hidatsa o/u may be from Proto-Siouan nasal \*u. Hence, we have a Proto-Siouan nasal vowel, but it is unclear if it was \*a or \*u. Moreover, \*h seems to have been metathesized in Ohio Valley languages, and has been lost in Mandan. Mississippi Valley Siouan sáapta does not appear to correspond to the other forms. However, Mandan, Ohio Valley, and Missouri Valley Siouan forms are considered sufficiently representative for purposes of Proto-Siouan reconstruction, since those groups are at geographical extremes.

## SIX

Ma		k	í	i	w	ą
POVS	*	a	k	a	a	s p e
PMpVS	*š	a	a	k		p e
PMsVS	*	a	k	a		w a
PS	*	a	k	a	a	s p e/a

We have explained above, that the northern Mississippi Valley Siouan languages, namely Dakota, Winnebago, and Ioway-Oto, appear to have analyzed seven in terms of the signs—or reinterpreted signs—used for those numerals in the plains sign language. Comparing the reconstructed six of the Siouan sub-branches above suggests that the plains sign language may also have had an impact on the use of Mississippi Valley Siouan six, which we reconstructed as \*šaakpe. An analysis of Proto-Mississippi Valley Siouan \*šaakpe reveals the relationship of this form to Proto-Siouan \*šaak- 'fist, claw, hand',

and Proto-Siouan \*-pe 'down'. Hence, it means 'fist, hand down'. Recall that in most purely descriptive counting systems, six includes the morphemes for hand plus one finger or thumb, but six here is only 'hand'. Therefore, we might speculate that the use of Mississippi Valley Siouan \*šaakpe 'six' has been innovated by folk etymology, apparently reinforced by the plains sign language. In any case, we see that the numeral six is reanalyzed as fist instead of thumb.

In addition, note that Mandan kiwa 'six' may still include Proto-Siouan \*wa 'one'.

## SEVEN

Ma		k	ú	p	a
POVS	*s	a	a	k	o w ǀ
PMpVS	*š	a	k	o (o)	w ǀ
PMsVS	*s	a	h		p u a
PS	*s	a	k	u	p/w a

In discussing the Mississippi Valley Siouan forms for seven, we have analyzed Dakota šakowǀ 'seven' as derived from Proto-Siouan \*šaak 'fist, hand, claw' and Proto-Siouan \*wǀ ~ \*wa 'one', and indicated that the Dakota, and the related Ioway-Oto and Winnebago forms appear to have reanalyzed seven under the influence of the signs used in the plains sign language, so that six was interpreted as '[left] fist' and seven as 'fist + one'. Comparing seven in Siouan sub-branches, we furthermore see that Ohio Valley Siouan languages (namely Tutelo and Ofo) might also have been influenced by the more westerly languages,

and thus innvated \*saakowj.

In addition, note that Missouri Valley languages may have retained the original Proto-Siouan form most closely in spite of the fact that they are geographically closer to the Mississippi Valley languages, the sub-branch of Siouan which is influenced by the plains sign language most.

Eight is not reconstructible for Proto-Siouan. We know that Ohio Valley and Dhegiha Siouan languages derive eight from three and that Missouri Valley languages derive it from two, but neither group necessarily represents Proto-Siouan. In both cases, eight seems to have been subject to areal diffusion, following a quinary pattern in the former and a subtractive pattern in the latter case. The diffusion of these numeral patterns is discussed below. Furthermore, note that Dakota (Mississippi Valley Siouan) šakloga appears to contain Proto-Siouan \*šaak 'fist, hand, claw', which suggests that Dakota eight has also been subject to folk etymology, reinforced by the plains sign language.

Proto-Ohio Valley Siouan, Proto-Dhegiha, and Ioway-Oto forms for nine match, however, since the Mandan, Missouri Valley, Winnebago, and Dakota forms do not match, we are not able to reconstruct Proto-Siouan nine in a way which would account satisfactorily for a majority of the subgroups. The languages of the northern tier of Siouan speaking tribes—Winnebago, Dakota, Hidatsa, Crow, and Mandan—derive nine from one, and evidently form a diffusion area. To determine the origin of nine in the other Siouan languages is difficult, but there

may have been borrowing from Proto-Algonquian \*ša·ka·- 'nine'. Compare Proto-Algonquian and the Ojibwa nine with the various Siouan words for nine below.

## NINE

PA	*	š a ·	k a ·-
Ojibwa		š ą ·	n k
POVS	*	k s ą	k a
PDh	*	š ą	k k a
I-O		š ą	k e

A nasal ą is not reconstructible for Proto-Algonquian nine, although Ojibwa has a nasal ą. Hence, we do not yet know whether or not some Siouan languages borrowed nine from Algonquian.

## TEN

Ma		p i	r a	k
POVS	*	p u	t	k a
PMpVS	*	k r e w	r	ą
PMsVS	*	p i	r a	k a
PS	*	p i/u	r a	k a

Except for the Mississippi Valley Siouan form, the forms for ten show regular sound correspondences. The origin of Proto-Mississippi Valley Siouan \*kre- is not entirely clear. It means 'standing upright' in Dakota, and we assume provisionally that it refers to the fingers of both hands, and is prefixed to \*wra, which, in turn, may be a

truncated remnant of Proto-Siouan \*pi/uraka.

The reconstruction \*piraka may be slightly preferable to the form with u since (a) the u could be explained as labial attraction from p and (b) the Tutelo form on which \*put(s)ka is based had variants with i.

### Conclusion

Reconstruction of the Proto-Siouan numerals shows that Proto-Siouan had neither a quinary nor a consistently subtracting system. However, certain Siouan languages and subgroups do have quinary and subtracting systems. Both appear to be areal features which spread through diffusion. The quinary systems are found in central and southern Siouan languages (cf. the geographically adjacent Muskogean, southern Caddoan, and Algonquian quinary systems), the subtracting systems are found in the northern portions of Siouan speaking territory (cf. the Arikara and Pawnee (Caddoan) subtracting systems).

Besides these major diffusion areas, the area in which six and seven are described by referring to the fist and fingers of the left hand as in sign language, forms a third diffusion area. This descriptive pattern of six and seven, which is widespread in the northern and central parts of Siouan speaking territory appears to be due to folk etymology, reinforced by the extensive use of sign language.

In addition, there is the possibility that Ioway-Oto, some Ohio Valley, and the Dhegiha Siouan languages have borrowed nine from Algonquian languages or even from Proto-Algonquian. However, this is hard to prove, because Proto-Algonquian nine did not have a nasal vowel whereas the above-mentioned Siouan languages do.

Catawban

Woccon and Catawba form the Catawban language family. Both languages are extinct now. Catawba was spoken in South Carolina, near the border between North Carolina and South Carolina. Woccon was spoken near the coast of North Carolina.

A relationship between the Catawban and Siouan language families has long been postulated. In a study of numeral systems such as this, we shall not attempt to discuss at length the degree of genetic association of Siouan and Catawban, however we shall examine the Catawban numeral systems primarily in order to determine any areal influence and possibly to shed light on the Proto-Siouan system.

Below, the numerals one through ten of the Catawban languages are given. Following this, we attempt to reconstruct the Proto-Catawban numerals in order to determine the original Catawban system(s).

Catawba numerals one through ten

	<u>Swadesh</u> <sup>15</sup>	<u>Gatschet</u> <sup>16</sup>	<u>Gallatin</u> <sup>17</sup>
one	təpɛ, :tǝpɛʔ	dubé, něpé	dupunna
two	nápɛrɛ, na·pɛré	no <sup>n</sup> prě-ré, nópre	naperra
three	námɔ	nomně-ré, nómně	namunda
four	pərpɛrɛ, :pərpɛréʔ	porprě-ré, pórpre	purrepurra
five	pɔktré, paktǝré	poktrě-ré, póktire	pukte-arra
six	dɛpkɛrɛ	dipkra-ré, dipkrara	dip kurra
seven	dɯwosā	wassignurě-ré, wassignúre	wassin-e-u
eight	wɔ'ča	dowesa-ré, dáwěsa	lubbossa
nine	?	wantchare-ré, wantcháre	wunchah
ten	picənɪ, picənɛ	pitchině-ré, pitchine	pechuna

## Catawba numerals continued

	<u>Speck</u> <sup>18</sup>	<u>Lieber</u> <sup>20</sup>
one	nəpé, dəpə	d'no-pö-neh, ně-páing
two	nápri, náprəre, náprire	nāo-prēh
three	námənəre, náməna, namənda	nāo-me-nēh
four	párpəre	pār-ō-prēh
five	páktəre	pöck-trēh
six	dípkəre	dīp-crēh
seven	?	wās-sīg-nīu
eight	?	nā-pö-sāh
nine	?	wánt-tchāh
ten	pitcə (?) <sup>19</sup>	pīтч-ī-nēh

	<u>Catawba numerals phonemicized</u>	<u>Woccon</u> <sup>21</sup>
one	nupə, nupɯnna	tonne
two	nəpre, nɯpre	num-perre
three	nəmma, nəmme	nam-mee
four	parpre	punnum-punne
five	poktre	webtau
six	dipkra	is-sto
seven	wassigne	nommis-sau
eight	nɯposa	nupsau
nine	wəčare	wiehere
ten	pičine	soone noponne

Philological problems of analysis

Here, inaccuracies (probably due to the informants) noticed in Swadesh's Catawba data should be mentioned. Comparing his numerals to the others' and to Lawson's Woccon, we see that what he glossed as seven is actually eight and what he glossed as eight is actually nine:

Swadesh

duwosā 'seven'

wq'ča 'eight'

<u>Gatschet</u>	<u>Gallatin</u>	<u>Lieber</u>	<u>Lawson (Woccon)</u>	
dowesa(ré)	lubbose	nā-pō-sāh	nupsau	'eight'
wantchare-ré	wunchah	wānt-tchāh	wiehere	'nine'

Proto-Catawban numerals

## ONE

Ct d u p ŷ n n a

Wo t o n n e

n o p o n n e

(in soone noponne 'one ten')

PCt \*d u p ŷ n n e/a

The doubled consonant as seen in one and four may have been used by earlier transcribers to give the preceding vowel the value of schwa, or to show nasalization of the preceding vowel. If so, then, the reconstructed form may possibly be \*dupane/a, since schwa is an allophone of /a/.

## TWO

Wo n u m p e r

Ct n a p r e

PCt \*n ʉ/ǻ p e r

The second vowel in Proto-Catawban two may be either \*ʉ or \*ǻ. We might ultimately argue for \*ʉ, comparing it to Proto-Siouan \*rʉhpa 'two'. In addition, it should be noted that the problem of ʉ/ǻ reflexes merging to ɔ̄ is common throughout Siouan.

## THREE

Wo n a m m e e

Ct n ǻ m n e a/e

PCt \*n ǻ m n e/a

The development of the final vowel in three is unclear, but it may be related to the e/a alternation found throughout Siouan.

## FOUR

Wo p u n n u m p u n n e

Ct p a r p r e

PCt \*p a r ʉ p r e/ɛ

The forms for four seem to fit together if we assume that Lawson used the doubled consonants to give the preceding vowel the value of schwa. Then, the reconstructed form looks as if it contains Proto-Catawban two with the familiar Siouan prefix pa-.

Compare: Pct \*p a r ɥ p r e 'four'

Pct \* n ɥ/ą p e r 'two'

Woccon webtau 'five' (au is probably used for a) and Catawba poktire 'five' do not correspond precisely, so we cannot reconstruct Proto-Catawban five for the moment.

We cannot reconstruct Proto-Catawban six either, because Woccon is-sto seems to have been borrowed from Yuchi ?iřdu 'six'. The Catawba word dipkra presumably represents Proto-Catawban six.

#### SEVEN

Wo n o m m i s s a

Ct w a s s i g n e

Pct \*n ą m n a/e s a

Woccon seven seems clearly to be derived from Woccon namnee 'three'; and while Catawba seven does not show a direct correspondence to three, it is partially similar to Woccon seven. So, although Catawba seven is opaque, the Woccon numeral preserves a clear subtracting system using a suffix -sa. Catawba -(i)gne, then, must represent another suffix. The subtracting nature of the system is confirmed by the numerals eight and nine.

#### EIGHT

Wo n u p s a

Ct n ɥ p o s a

Pct \*n ɥ/ą p (e r) s a

Woccon and Catawba forms for eight resemble the reconstructed \*ny/aper 'two', providing further evidence that Proto-Catawban eight was derived by a subtracting system. Recall that seven incorporated three and was also subtractive.

Woccon wiehere 'nine' and Catawba wąča(re) 'nine' do not show regular sound correspondences, except for the initial w- which might be a coincidence. However, when we compare these forms to Proto-Siouan \*wą, wi 'a, one', we see that the Woccon (and Catawba) w- may well not be coincidental. If wi- in these languages means 'a, one', as it does in Siouan, this would make nine the result of a subtracting system also.

In an attempt to trace the development of the Catawban words for nine, we might postulate an earlier \*\*wą-sa(re) which gave rise to \*wątsa and eventually the form wąča, since ts ~ č in Catawba. That would yield the derivational suffix, -sa, for seven, eight, and nine. Also, note that wą is 'a, one' in Siouan generally and that there is a doublet form wi in many Siouan languages. So, although the forms for nine are less tractable than seven and eight, it appears that nine incorporates variant stems for one in both Woccon and Catawba and further illustrates the Catawban subtractive system.

TEN

Wo            s o o n e -

Ct    p i č i   n e

The relationship of Catawba and Woccon ten is not entirely clear.

We can analyze the Woccon word as 'one ten', since its full form is attested as soone noponne, and noponne is clearly 'one'. The Catawba form may correspond to the Woccon form as shown above, but this is not certain, since only a few words were ever recorded, and the correspondences are not all known.

### Summary

Reconstructed Proto-Catawban numerals one through ten suggest that Proto-Catawban seven, eight, and nine were derived from three, two, and one respectively. This implies the existence of a subtracting system in Proto-Catawban.

Richard Carter notes that Woccon seven and eight are derived from three and two respectively, but he attributes the origin of this phenomenon to a possible historical restructuring of the Siouan adding systems or to a translation error by Lawson (Carter 1980:177). However, comparing Woccon and Catawba seven and eight shows that Catawba also had a subtracting system for the derivation of these numerals. Thus, Carter's assumption of an earlier quinary system for Siouan/Catawban or a recording error is unfounded. The Proto-Catawban subtracting system is further demonstrated by the analysis of nine.

### Catawban and Siouan counting systems and the numerals

Above, we have discussed the Catawban numerals and the counting systems. We have pointed out certain similarities between the Catawban and Siouan numerals. Since Catawban/Siouan sound correspondences are still poorly worked out, we can say little more at present. So, in the

following, we shall compare only the numerals one, two, three, and ten as they seem to be reconstructible. The Catawban numeral four may have been derived from two, and does not correspond with Siouan four. Catawban five and six do not correspond with the Siouan numerals five and six either. Moreover, the Catawban numerals seven, eight, and nine are not comparable to Siouan seven, eight, and nine since Catawban appears to have a subtracting system in the derivation of those numerals, as we mentioned above. Partial subtracting systems are often seen in Siouan too, for example, see Hidatsa and Crow eight and Dakota, Winnebago, Osage, Mandan, Hidatsa, and probably Crow nine. So, the numerals eight and nine in those languages share the subtractive feature with the Catawban languages. However, these forms cannot properly be said to be cognates, because the morphemes used to indicate the subtractive patterns are not cognate.

A comparison of Siouan/Catawban numerals one, two, three, ten

The Siouan and Catawban numerals for one do not correspond directly; however, as we explained above, there is a similarity between Catawba/Woccon nine and Proto-Siouan one.

Compare:	Ct	w ą č a-	'nine'
	Wo	w i (ehere)	'nine'
	PS	*w ą ~ wɪ	'one'

## TWO

Pct \*n ɥ p e r

PS \*r ɥ h p a

PS/Ct \*r ɥ (h) p e/a

Proto-Catawban and Proto-Siouan forms for two correspond in spite of the uncertainty on the development of \*h and the split in the final vowels \*e/a, which is a persistent problem in Siouan.

## THREE

Pct \*n ʔ m n e/a

PS \*r a a w r ɨ

PS/Ct \*r a/ʔ a w r ʏ

Proto-Catawban and Proto-Siouan forms for three appear to correspond, but the development of the second and the final vowels is not clear.

## TEN

Ct p i ʧ i n e

Wo s o o n e (noponne)

PS \*p i r a k a

PS/Ct \*p i s/c V r e/a (k a) (?)

The Catawban forms for ten appear to correspond only partially with the Proto-Siouan form for ten. The development of the vowels

still needs to be worked out.

### Conclusion

In this chapter, we reconstructed Catawban numerals, mainly in an attempt to isolate the Catawban numeral system. The reconstructed numerals showed that Catawban had a subtractive system in the derivation of the numerals seven, eight, and nine. Then we compared the Catawban and Siouan numerals in order to see if there was a relationship between the numerals and/or the numeral systems. Only the numerals one, two, three, and ten appear to be reconstructible for Siouan/Catawban. The subtracting systems of various Siouan languages do not seem to be cognate with the Catawban subtracting system since the morphology is different.

Moreover, we saw that the Catawban numeral system was not necessarily influenced by the quinary systems of the geographically adjacent languages. Neither did the Catawban numeral system influence other languages.

## NOTES

- <sup>1-3</sup>Rankin, personal communication.
- <sup>4</sup>Thompson, 1974.
- <sup>5</sup>Rankin, personal communication.
- <sup>6</sup>Vantine, 1982.
- <sup>7</sup>Kenneth Miner, personal communication.
- <sup>8</sup>Buechel, 1970.
- <sup>9</sup>Matthews, W., 1873.
- <sup>10</sup>Matthews, H.G., 1965. H. Matthew's data are in phonemic notation.
- <sup>11</sup>Kaschube, 1967. Kaschube's data are in phonemic notation.
- <sup>12</sup>Gallatin, 1836.
- <sup>13</sup>The Dakota word šakloga is not totally analyzable. The Winnebago word háruwak is unidentified. Hence, we cannot reconstruct a form for eight in this case.
- <sup>14</sup>Both Dakota and Winnebago forms are analyzable as subtracting one, but are not reconstructible. The Ioway-Oto form corresponds with the Dhegiha languages.
- <sup>15</sup>Swadesh, 1937.
- <sup>16</sup>Gatschet, 1900.
- <sup>17</sup>Gallatin, 1836.
- <sup>18</sup>Speck, 1934.
- <sup>19</sup>This numeral is extracted from pitcənaprəre 'twenty' ('two tens').
- <sup>20</sup>Lieber, 1858.
- <sup>21</sup>Lawson, 1714.

## Chapter 5

### IROQUOIAN

The Iroquoian languages were spoken mostly in the areas to the south of the easternmost Great Lakes. Linguistically, the Iroquoian family consists of a Southern branch represented only by Cherokee, and a Northern branch mainly composed of Tuscarora-Nottaway, Laurentian, Huron-Wyandot, and the Five Nations languages, Seneca, Cayuga, Onondaga, Oneida, and Mohawk (Mithun 1979:133). We shall examine the numerals one through ten in these languages where the data are available, and attempt to reconstruct Proto-Northern Iroquoian numerals and then compare them to the numerals of the Southern branch, Cherokee.

The Iroquoian languages do not show any trace of quinary patterns. They appear to have decimal systems. Nevertheless, the numerals of this family will be examined, and reconstructed for the sake of completeness, and in a search for possible areal features or borrowings.

#### Proto-Iroquoian numerals one through ten

The numerals one, two, three, five, and, except for one, the accompanying reconstructions are from Mithun (1979). Most of the numerals are extracted from her data, but some numerals like those of the extinct Susquehanna, Laurentian, Huron, and Nottoway are from older documents. We shall try to phonemicize the forms from the older sources; the original spellings will be shown in parentheses.

The numerals four, six, seven, and, except for six, the accompanying reconstructions are from Lounsbury (1961). Mithun (1979) reconstructs six. We attempt to reconstruct the other numerals, i.e., one, nine, and ten on the basis of Mithun's Proto-Northern Iroquoian sound system.

		ONE			
Mo	ʔ	h	s	k	a
Oi	ʋ		s	k	a
Su	ɔ		s	k	a t (onskat)
Oo			s	k	á : t a h
Cy			s	k	a : t
S			s	k	a : t
L			s	k	a t a (scada)
H	e		s	k	a t (escate)
Wy			s	k	á t
T	ʔ :	ts	i		
N	ɔ	t	e		
PNI		*ɔ	s	k	á t a

Cayuga and Seneca a: may be due to compensatory lengthening after the loss of the final vowel.

Compare: PNI \*ɔ s k á t a  
Che s o : k w u

## TWO

Mo t é k e n i  
 An t i g g e n e  
 Oi t é k n i  
 Oo t e k n i  
 Cy t e k h n i  
 S t e k h n i  
 L t i k n e n i (tigneny)  
 H t é n i  
 Wy t e n d i  
 T n á : k t i :  
 PNI \*t é k n i

e in Mohawk, Andaste, and Laurentian, and h in Cayuga and Seneca are epenthetic and serve to break up the obstruent clusters. This is a common process in Iroquoian languages (Mithun 1979:164).

The Tuscarora form is from an earlier ?næ:kti: which has the following development from Proto-Northern Iroquoian: \*tékni > ?næ:kti: > næ:kti:. The Nottoway form dekanee, which is not included in the correspondence set for two, may be innovative or reborrowed from Andaste, Onondaga or Mohawk according to Mithun (1979:165).

Proto-Northern Iroquoian \*tékni 'two' may possibly be related to the posited Proto-Northern Iroquoian \*tekro? 'eight' although their relationship is not at all clear.

Compare: \*t é k n i 'two'  
 \*t e k r o ? 'eight'

Compare the reconstructed Proto-Northern Iroquoian two to Cherokee two below. These two forms appear to be cognate.

Compare: PNI \*t é k n i  
Che t h a : l i

## THREE

Mo á h s ʔ  
Oí a h s ʔ  
Su á (x) e (axe)  
Oo á h s ɛ  
Cy a h s ɛ  
S s ɛ h  
L a š (asche)  
H a š ɛ (hachín)  
Wy a h s e k  
T a h s ɛ  
N a r s a

PNI \*a h s ɛ k

We assume that x in the Susquehanna form represents the consonant cluster ks, and corresponds to the hs of the other languages. Huron and Laurentian ch apparently represent š; r in the Nottoway form may indicate vowel length.

Compare: PNI \*a h s ɛ k  
Che t s o ? i

## FOUR

Mo	k a y e r i	L	h ǔ ? n a h k ǔ
Oi	k a y e l i-	H	ǔ ? d a h k
Oo	k a y e i	Wy	ǔ ? d a h k
Cy	k e i	T	h ǔ ? t a h k
S	k e i h	Che	n ǔ ? h k i
PI	*k a y e r i	PI	*h ǔ ? n a h k

Above, the forms, which together account for Proto-Iroquoian four, are cited from Lounsbury (1961).

## FIVE

Mo	w i s k
Oi	w i s k
Su	w i s k (wisch)
Oo	h w i k s
Cy	h w i s
S	w i s
L	w i s k o (ouyscon)
H	w i š (ouyche)
Wy	w i s
T	w i s k
N	h w i s k
PNI	*h w i s k

Most of the languages seem to have lost the initial \*h of

Proto-Northern Iroquoian five, except Onondaga and Cayuga. We also see the metathesis of \*sk in Onondaga.

Compare the Proto-Northern Iroquoian form to the Cherokee form below. They are clearly cognate.

Compare: PNI \*h w i s k  
Che h i : s k i

## SIX

Mo y a h y a ʔ k  
Oi y a h y a ʔ k  
Oo a h y a ʔ k  
Cy y e · ʔ i  
S y e · ʔ i  
H w a h y a ʔ  
Wy w a h y a ʔ  
T w u h y a ʔ k  
PNI \*y á : h y a ʔ k

The modern forms of six listed above are from Lounsbury (1961), whereas the posited Proto-Northern Iroquoian form is from Mithun (1979). The Laurentian form is recorded as šutayeʔ by Lounsbury and he indicates that it must be a result of confusion on the part of the person who transcribed it because it looks like the form for seven in some other Iroquoian languages. However, the Cherokee word su:tali also resembles the word for seven and this leads Lounsbury to wonder

if there was not some sort of a semantic instability between the Proto-Iroquoian numerals six and seven. Perhaps the Laurentian numeral was accurately transcribed after all. See also Cherokee seven in this connection.

## SEVEN

H	t s u t a r e ?	Mo	t s (y) a t a k
Wy	s u t a r e ?	Oi	t s y a t a k
PI *	s u t a r e ?	Oo	t s y a t a k
		Cy	t s y a t a k
		S	j a · t a k
		L a h	y a k a
		T	t s a n a h k
		PI *	t s y a t a h k

The two reconstructed forms which together account for Iroquoian seven are cited from Lounsbury (1961).

The Cherokee word kahlkwō·ki 'seven' appears to be borrowed from the Creek word kolapâ·kin 'seven' (Haas, 1969a:312). Cherokee must have borrowed this Creek numeral to replace Proto-Iroquoian \*šutare? 'seven', since Cherokee su:tali, which corresponds to the Huron and Wyandot word for seven, was apparently reinterpreted as six.

## EIGHT

Oi	d é g	l u ?	
Su	t i k	e r o	m (tickerom)
Oo	t e k	i r o	
Cy	t i k (k)	o	(tikkeugh)
S	t e k	y o ?	
L	a d d e g	n e	
T	n a k	r o h	(nakreuh)
N	d e k	r a	
PNI *	t é k	r o ?	

The Mohawk form, sa'té·kah does not correspond to the other forms for eight, although it appears to contain the root \*tek-.

Compare: PNI \*t é k r o ?  
Che c a n e · l a

## NINE

Mo	k y ó h t u	Oi	w á · d l u ?
S	t y o t o · h	Oo	w a t i r o
Cy	t y o t o h	L	w a d e l l o (wadellon <sup>r</sup> )
PNI	*t y ó h t o	T	n e r o h (ne reuh)
		N	d e h e · r y (daheerunk)
		PNI	*w a t r o ?

Again, two reconstructed forms account for Northern Iroquoian

nine.

In the first set, the Seneca and Cayuga forms appear to have metathesized \*h. In the second set, all the languages except for Oneida have an epenthetic e between \*t and \*r. In Nottoway, \*r and \*h were apparently metathesized.

The Cherokee form for nine is probably comparable to the first Proto-Northern Iroquoian form.

Compare: PNI \*t y ó h t o  
Che s o h n e · l a

## TEN

Mo	o y é · l i ?	Oo	w a s	s h e
Oi	o y e · l í ?	Cy	w a s	h a h (ushagh)
		S	w a s	h ε · h
PNI	*o y e · l i ?	H-Wy	a h	s ɛ (ahsen)
		L	a s	s ɛ (assam)
		T	w a h t h ' s	ɥ k (wahth'suk)
		N	w a s	h a
		PNI	*w a s	s h v/ɥ

The two reconstructed forms above account for Northern Iroquoian ten.

The final vowels in the second set do not correspond regularly.

The Cherokee form is possibly comparable to the second reconstructed form.

Compare: PNI \*w a s s h ʔ  
Che s g o h i

### Conclusion

Reconstructed Iroquoian numerals one through ten show that the Proto-Iroquoian numeral system was purely decimal. With the exception of one or two borrowings, the Iroquoian languages do not seem to have been influenced by other numeral systems.

## Chapter 6

### ALGONQUIAN

The Algonquian languages cover a large area of eastern North America and extend westward into the high plains. Several linguists have undertaken the reconstruction of Proto-Algonquian including the numerals. The various studies of Proto-Algonquian numerals show that the Algonquian languages have predominantly quinary systems. In what follows, we examine the numerals and the numeral systems referring to the works of several linguists, whose names will be abbreviated for reference. These linguists are: Bloomfield (Bl) (1946), Haas (Hs) (1958a and b), Siebert (Sb) (1975), Michelson (M) (1935), Goddard (G) (1965), Hewson (Hws) (1968), and Aubin (A) (1975). Among these linguists, Siebert (1975) reconstructs two different systems for Proto-Algonquian. These are quinary (abbreviated as Q) and decimal (abbreviated as D) systems and are also given below. He also posits portions of a third, descriptive counting system for Proto-Algonquian.

Before discussing the reconstructed Algonquian numerals and the numeral systems, we present the subgrouping of the Algonquian languages. There are still uncertainties although Bloomfield's 1946 classification, which is cited below, is still a widely accepted one.

## I. Central Eastern

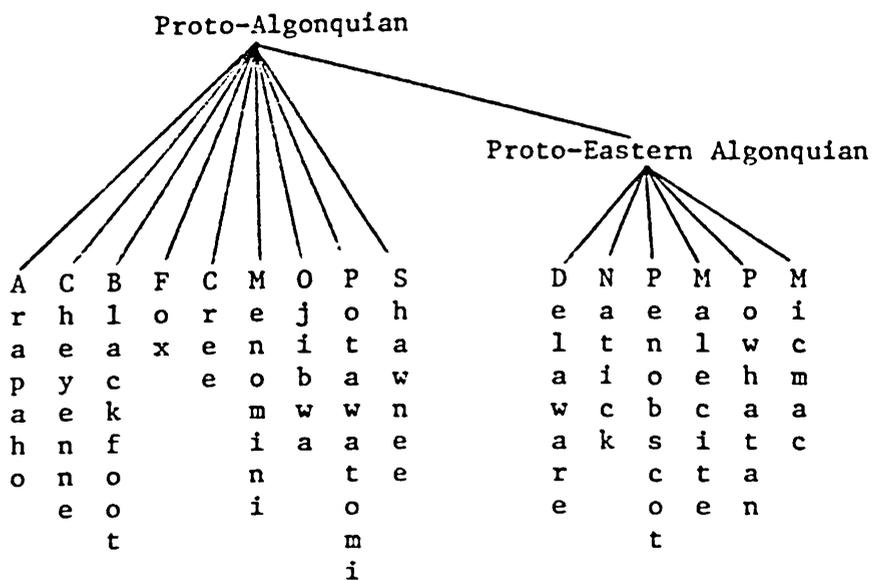
- A. Central type: Cree, Montagnais-Naskapi, Menomini,  
Fox-Sauk-Kickapoo, Shawnee, Peoria-Miami,  
Potawatomi, Ojibwa-Ottawa-Algonquin-  
Salteaux, Delaware, Powhatan
- B. New England type: Natick-Narragansett, Mohegan-Pequot,  
Penobscot-Abnaki, Passamaquoddy-Malecite,  
Micmac

## II. Blackfoot

## III. Cheyenne

## IV. Arapaho-Atsina-Nawathinehena

A more recent grouping of the Algonquian languages is by Goddard, as cited in Teeter (1967). On the basis of shared innovations, he includes certain languages under Proto-Eastern Algonquian. The following is Goddard's grouping of Algonquian languages.



Proto-Algonquian numerals one through ten

## ONE

F	n e k o t i	Sh	p e e l e k o 'one'
M	n e k o t	U	p e e š i k
MD	n k é t i	Pe	p è s ə k <sup>w</sup>
Mh	n k w í t a	C	p e e y a k
Po	n e k o t	PA	*p e e š y e k w i (Sb,D)
PA	*n e k o t <sup>w</sup> - (A)		(from PA *peθ 'single')
	*n e k o t w i (Bl)		*p e e š i k w i (Hs)
	* k w e t 'one, other' (Hs)		
	*n e k w i t w i (Sb,Q)		

## TWO

F	n i i š w i	MI	t a p o
C	n i i s o	PA	*t a a p w-
M	n i i s		'alike, equal, identical'
O	n i i š		*t a a p a w i 'two'
Sh	n i i š w i		(Sb,D)
Pe	n i s		
D	n i i s a		
Mh	n í i s a		
Mi	n i i š w a		
Po	n i i n s		
PA	*n i i š w i (Bl)		
	*n y i i š w i (Sb,Q from PA root *nyi·šw 'couple, pair')		

## THREE

F n e s w i

C n i s t o

M n e ? n i w

O n i i s w i

Pe n a h s

D n á x ə

Po n a s s

Mh n a x ə

PA \*n e ? θ w i (B1)

\*n e ? θ w i (Sb,Q)

## FOUR

F	n	y	e	e	w	i	F	š	a	a	k	a	'nine'		
C	n		e	e	w	o	M	s	a	a	k	ε	ε	w	'nine'
M	n		i	i	w		D	š	a	a	n	k	'nine'		
O	n		i	i	w	i	PA	*š	a	a	k	a	'four' (Sb,Q)		
Mt	n		e	e	w										
Sh	n	i	y	e	e	w									
Pe			y		e	w									
D	n		é	e	w	a									
Po			y	e	e	w									
SNE			y	a		w									
Mh	n		á		w	a									
Mc	n		e		w										
Mi	n		i	i	w	i									
PA	*n		y	e	e	w	w	i					(Bl)		
	*n		y	e	e	w							(Hws)		
	*n		y	e	e	w	i						(M)		
	*n		y	e	e	w	i						(Sb,D)		

Proto-Algonquian \*ša·ka, which Siebert reconstructs as four in the quinary system, does not have direct reflexes in any Algonquian language. Siebert's reasoning is that nine in Fox, Menomini and some eastern Cree dialects should represent the original quinary four. Interestingly, it is precisely this unsystematic form for nine that several Siouan languages seem to share.

## FIVE

F n y a a n a n w i  
 C n i y a a n a n  
 M n i a n a n  
 O n a a n  
 Sh n y a a l a n w i  
 Pe n a n  
 D n a a l a n  
 Mi n a n  
 Ar y ó ó θ ó n

PA \*n y a a l a n w i (B1)  
 \*n y a a θ a n w i (Hws)  
 \*n y a a l a n w i (G)  
 \*n y a a θ a n w i (Sb,Q)  
 \*n y a a n a n w i (Sb,D)

## SIX

F n e k o t w a a š i k a  
 C n i k o t w a a s i k  
 M n e k u u t u a s a h  
 O n i n k o t w a s s o

PA \*n e k o t w a a š i k a (B1)  
 \*n e k w e t w a a š y e k a (Sb,Q)  
 \*n e k w e t w a a š i (G)

The linguists mentioned above reconstruct Proto-Algonquian six on the basis of the reconstructed Proto-Algonquian one which clearly shows a quinary system. However, linguists do not seem to agree on the suffix used in such a system to derive the higher numerals. Siebert reconstructs \*-a·šyeka as the 'Proto-Algonquian complex final' for the numerals six through nine. Bloomfield reconstructs \*-aašika, which is similar to Siebert's form, but assigns this suffix to six and eight only, and does not reconstruct seven and nine at all. Goddard reconstructs six and eight from the roots of one and three respectively; however, he assigns the suffix \*-a·ši to six and \*-a·šika to eight as a final. Thus, Goddard agrees with Bloomfield in reconstructing \*-a·šika as a final for eight, but argues that this final cannot entirely be reconstructed for six.

## SEVEN

Moose C n i i s w a a s i k

MD n i i š w á a s

Ms n i s a k

PS \*n y i i š w a a š y e k a (Sb,Q)

## EIGHT

F n e š w a a š i k a  
 Moose C n i i š w a a s i k  
 M s u a s e k  
 O n i š š w a s s w i  
 Sh n θ w a a š i k θ w i  
 Pe n s à s ə k  
 D x a a s  
 Po n a s s w a a s  
  
 PA \*n e ? š w a a š i k a (B1)  
 \*n e ? š w a a š y e k a (Sb,Q)  
 \*n e ? š w a a š i k a (G)

## NINE

F š a a k a  
 M s a a k ε w e  
 O š a a n k  
 Sh s a a k a t s w e  
  
 PA \*š a a k a a š y e k a (Sb,Q)

Siebert also reconstructs \*no·lyiwi, as nine in the decimal system, but he does not cite any reflexes.

## TEN

F	m e t a a	s	w i
C	m i t a a t a h	t	
M	m e t a a t a h		
Sh	m e t a	'	θ w i
D	t e l ə	n	
Ab,Pe	m ə t a	l a	
Mh	m t a	n i	t
Mc	m t ə	l ə	n
Ar	b e t e e t o x		
PA	*m e t a a t a h	θ e	(B1)
	*m e t a a t a	n θ w i	(Sb,Q)
	*m e t a	θ a n w i	(Sb)
	*m e t a a	h θ w i	(Sb,D)
	*m e t a a t a h	θ w i	(M)

Conclusion

We have reviewed the Proto-Algonquian numerals one through ten as reconstructed by a number of linguists. There is the clear relationship between the numerals one and six, two and seven, and three and eight which characterizes quinary systems. Noting these relationships, Bloomfield reconstructs the suffix \*-aašika in deriving six and eight from one and three respectively. He does not reconstruct seven and nine, so we do not know whether he thought Fox, Menomini, Cree, and Ojibwa had complete quinary systems. Siebert, on the other

hand, assigns a complete quinary system to Proto-Algonquian. He describes the derivation of the numerals six through nine from one through four respectively, with the Proto-Algonquian "complex final" \*-a·šyeka; analyzed as a "prefinal" \*-a·θ 'by the side, of the row of the second hand' plus an "abstract final" \*-ye·ka. Siebert's assigning a partial quinary system to Proto-Algonquian numerals is well-supported, but his \*ša·ka 'four' does not have direct reflexes in any Algonquian language. (See the reconstructed forms of four above.)

Siebert also reconstructs a decimal system for Proto-Algonquian, although he does not reconstruct the numerals three, six, seven, and eight of this system. He reconstructs \*-yekwi as "the decimal system abstract final", which he thinks may be related to or paired with the quinary system abstract final. According to Siebert, the decimal and quinary systems may have reflected a social stratification among the Proto-Algonquian people, in which each class had speech differences. He suggests that the quinary system may have represented women's speech, and that the decimal system men's. He does not provide any evidence for this however.

Siebert furthermore assigns a partial descriptive numeral system to Proto-Algonquian. The posited forms for this system are given below.

one	*pe·yakwi	'one or ten', 'little finger'
	*wi·mpatwi	'one or ten'
five	*pale·neθki	'full (?) hand' (probably from an earlier ** <u>pale·neθki</u> which is derived from *- <u>neθki</u> 'hand')

	*napaθe·θwi	'on one of two sides'
six	*ka·ma·cihcini	'opposite thumb' (from <u>*ka·ma·t-</u> 'contrary, opposite')
seven	*eθwahikani	'pointer, forefinger'

Siebert may be correct in reconstructing the individual words for the numerals above, but is open to question whether a complete descriptive system is reconstructible for Proto-Algonquian or any language family. Only four numerals in Algonquian are connected with words for fingers and hands, and this makes it unlikely that such numerals constitute a complete system.

## Chapter 7

### NUMERAL SYSTEMS AND DIFFUSION AREAS

In the preceding chapters, the various numeral systems encountered in languages of eastern North America have been analyzed, and the possible origins of the systems were determined to be genetic, due to diffusion, or due to parallel innovation. In this chapter, the various systems will be summarized in charts and mapped with the aim of pointing out the apparent diffusion areas.

In Chart I, the commonly occurring numeral systems are given, followed by the languages which employ them. The systems are symbolized with figures, and the signs (+), (-), (x) indicating the operations by which the numerals are derived. Notice that only a few languages employ completely consistent numeral systems. Most languages have evolved mixed systems, and most do not completely retain the original system. In the mixed systems, one of the systems often represents the original system, whereas the other system(s) are the result of diffusion or parallel innovations.

#### Chart I. Numeral systems of the languages of eastern North America

##### I. Quinary

###### 1. Complete

5, (+1), (+2), (+3), (+4), 10

Creek-Seminole, Hitchiti-Mikasuki

2. Partial\_Quinary

- a. 5, 6, (+2), (+3), (+4), 10

Caddo

- b. 5, (+1), (+2), (+3), 9, 10

Adai, Shawnee

- c. 5, (+1), 7, (+3), 9, 10

Cree, Fox, Menomini, Ojibwa

- d. 5, 6, (+2), (+3), 9, 10

Alabama, Biloxi, Choctaw, Dhegiha Siouan (Kansa,  
Osage, Omaha, Ponca, Quapaw), Delaware, Koasati,  
Moose Cree

- e. 5, 6, 7, (+3), 9, 10

Ioway-Oto, Ofo, Tutelo, Penobscot, Powhatan

3. Mixed

- a.
- Quinary + subtracting

5, (+1), (+2), (+3), (10-), 10

Pawnee

5, 6, (+2), (+3), (-1), 10

Osage (one variant)

5, (+1), (5+3-1), (+3), (10-), 10

Arikara

5, (+1), (+2), 8, (-1), 10

Plains Cree

- b.
- Quinary + subtracting + multiplying

1, 2, 3, (2x2), 4, 5, (+1), (+2), (+3), (-1), 10

Wichita

## II. Subtracting

### 1. Partial

a. 5, 6, (-3), (-2), (-1), 10

Catawba, Woccon

b. 5, 6, 7, (-2), (-1), 10

Crow, Hidatsa

c. 5, 6, 7, 8, (-1), 10

Dakota, Mandan, Winnebago

### 2. Mixed

a. Subtracting + multiplying + decimal

5, (2x3), 7, (2x4), (-1), 10

Atakapa

5, (2x3), 7, 8, (-1), 10

Tonkawa

b. Subtracting + decimal

5, 6, 7, (-2), (-1), 10

Natchez, Tunica, Yuchi

c. Subtracting + quinary

(See I.3.a above)

d. Subtracting + quinary + multiplying

(See I.3.a above)

## III. Multiplying

### 1. Mixed

a. Multiplying + quinary .

5, 6, (+2), (2x4), 9, 10

Kansa, Osage (one variant)

b. Multiplying + subtracting + decimal

(See II.2.a above)

c. Multiplying + subtracting + quinary

(See I.3.b above)

IV. Decimal1. Complete

Iroquoian languages

2. Mixeda. Decimal + multiplying + subtracting

(See II.2.a above)

Besides the patterns listed in Chart I above, we encountered descriptive numeral words which clearly refer to fingers, hands, and finger bending. Among the languages investigated, we found that the numerals five through ten tend to be more descriptive in nature. These numeral words describe the adding operation, characteristic of quinary systems, and the subtracting operations by referring to fingers, hands, and finger placement. However, such numerals do not form a complete system, as we stated in the preceding chapters. In Chart II, the languages which have clearly descriptive numerals are listed, with reference to the numerals themselves. Recall that certain Algonquian languages also have descriptive words for five, six, and seven, according to Siebert (1975:311). He does not list those languages in which the numeral words are descriptive. However, recall that he reconstructs \*ka·ma·cihi 'six', 'opposite thumb', and \*eθwahikani 'seven', 'pointer, forefinger'. If his reconstructions are correct,

then we see that certain Algonquian speakers used the same finger bending system as plains Siouan. Compare those Siouan words for six which are reanalyzed as 'thumb', and the words for seven which are reanalyzed as 'an extended (index) finger'. Also see plate 1 (page 54) in this connection.

Chart II. Descriptive numerals

FIVE	Arikara, Wichita, Pawnee
SIX	Dakota, Dhegiha Siouan, Ioway-Oto
SEVEN	Dakota, Ioway-Oto, Winnebago, Tutelo, Ofo
EIGHT	Dakota
NINE	Western dialect of Atakapa, Dakota
TEN	Western dialect of Atakapa, Wichita (?)

The next step is to map the features shown in Chart I and II, for a better illustration of the converging numeral systems.

In the concluding sections of the preceding chapters, we mentioned in passing the converging quinary systems which spread into the central plains languages from the southeast, the subtracting systems which spread in certain northern plains languages, and the multiplying systems which are seen in some southern languages. We also pointed out the probable influence of the plains sign language on the developments in Siouan. These were also indicated on Chart II. These features are illustrated on the maps below. The maps show the language boundaries in approximately the seventeenth and eighteenth centuries.

In maps 1, 2, and 3, the shaded areas indicate the languages that have innovated the systems. A key to the shadings is given on each map. The unshaded areas indicate those languages in which the systems are genetically inherited.

### Conclusion

The data presented in the charts and the maps of this chapter reveal the diffusion of the numeral systems of the languages east of the Rocky Mountains in North America. In the following, we summarize these diffusion areas.

(1) Quinary systems which are a family trait of Algonquian, Caddoan, and Muskogean languages seem to have spread into the languages of the upper Mississippi Valley and some lower Ohio Valley languages. Tutelo (Siouan), an eastern language, also has a partially quinary system.

(2) Subtracting systems are possibly the family trait of only Woccon and Catawba, located on the east coast (see map 2). The subtracting system does not appear to have spread along the east coast; however, Yuchi (a language isolate of the southeast) has a partial subtracting system. This can perhaps best be regarded as parallel innovation.

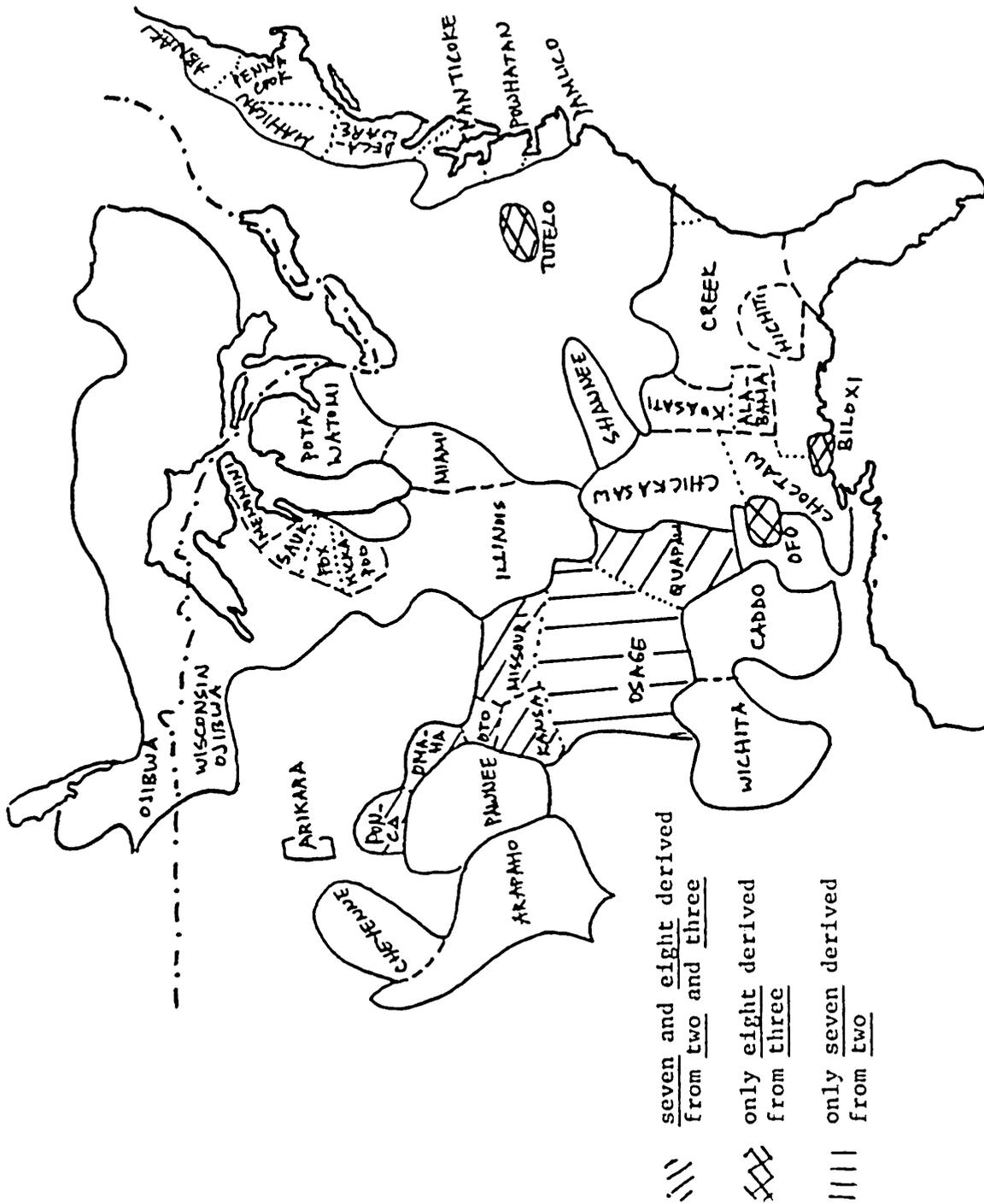
On the other hand, there are two apparent areas where the subtracting system seems to have diffused: (a) in the northern plains, and (b) in the southern languages.

(3) Multiplying systems appear to have spread in some central plains languages, extending from some of the southern languages (see

map 3).

(4) Finally, we see that the reanalysis by Siouan speakers of the signs for six and seven (in Dakota, Ioway-Oto, and Winnebago, and possibly in Ofo and Tutelo) may account for certain peculiarities in the make-up of those numerals. As in the plains sign language, six is based on fist, and seven is based on fist and one (see map 4).

Map 1. Quinary systems and diffusion areas





Map 3. Multiplying systems diffusion areas



Map 4. Diffusion of Siouan descriptive numerals six and seven



-  both six and seven innovated
-  only seven
-  only six (unshaded)

## Chapter 8

### A COMPARISON OF DIFFUSION AREAS WITH CULTURE AREAS

By mapping the various numeral systems of eastern North America, we were able to illustrate three distinct diffusion areas. The major isoglosses delineate quinary, subtracting, and multiplying numeral systems. The diffusion areas formed by the numeral systems appear more or less to be limited to particular culture areas as defined by anthropologists. These are areas in which specific culture traits cluster. Culture areas are determined without any reference to linguistic boundaries. Sherzer (1976) gives detailed information on the similarities of culture areas and linguistic areas. In comparing the diffusion areas formed by the numeral systems to the culture areas below, we refer to Sherzer (1976) often.

In this study of numerals, we covered three culture areas: the Plains, the Northeast, and the Southeast. In the Plains culture area, there are three linguistic families. These are Algonquian, represented by Cheyenne, Arapaho, Blackfoot, and some dialects of Cree and Ojibwa; Caddoan; and Siouan, represented by Crow, Hidatsa, Dakota, Dhegiha, Ioway-Oto, and Mandan (see map 5). The Plains culture area was constituted recently (in the eighteenth and nineteenth centuries) partly because the tribes were pushed westward by the whites. Mass bilingualism was rare, and the languages appear to be little influenced by genetically unrelated languages. Therefore, according to Sherzer (1976),

the languages share traits with genetically related languages in the Plains. This claim basically holds for the Siouan numeral systems: Crow, Hidatsa, and Mandan share a subtracting system, and Dhegiha, Ioway-Oto share a partial quinary system. Neither of these features is genetically associated with Siouan, however. The subtracting system of the Siouan languages cuts across the genetic boundaries and affects Arikara, Pawnee, and Wichita which are plains Caddoan languages.

On the other hand, the Siouan quinary systems seem to have spread from the quinary systems of neighboring Algonquian languages or possibly at an earlier time from Muskogean. Hence, the quinary systems also cut across genetic boundaries and form a diffusion area. Whereas quinary systems seem to have spread onto the plains with the migrations of Algonquian and Dhegiha Siouan speaking peoples from the eastern woodlands, subtracting for eight and nine seems to be a plains feature (see map 2 above). Moreover, Dhegiha, Dakota, and Ioway-Oto seem to have adopted peculiar descriptive numeral terms for six (and, for Dakota and Ioway-Oto, seven). These systems appear to have been reinforced by the extensive use of the plains sign language.

In the Northeast culture area, there are Algonquian, represented by Eastern and Western Abnaki, Delaware, Fox, Malecite-Passamaquoddy, Menomini, Miami, Potawatomi, and Shawnee; Iroquoian, represented by Huron, Mohawk, Onondaga, Oneida, Seneca; and Siouan, represented only by Winnebago (see map 6). Sherzer (1976) regards the Northeastern languages as forming several linguistic subareas, corresponding to genetic groupings. With regard to the numeral systems, this is

especially true for the Iroquoian languages, which all retain the decimal systems which they inherited genetically. Thus, Iroquoian languages form an isolated grouping of decimal features in the Northeast culture area, since Iroquoian decimal systems are apparently not influenced by neighboring systems. This also holds for the Algonquian decimal systems. On the other hand, Winnebago agrees with the subtracting and descriptive numeral systems of other Siouan languages outside of the Northeast culture area. In short, the Northeast is marked by a decimal feature which is a family trait of Iroquoian and Algonquian. This feature did not diffuse unless we assume that the minority decimal systems in Algonquian represent early Iroquoian influence.

In the Southeast culture area, there are Gulf languages, including Atakapa, Chitimacha, Natchez, Tunica, Muskogean; Iroquoian, represented by Cherokee and Tuscarora; Siouan, represented by Biloxi, Ofo, Tutelo, and Catawba; and Yuchi (see map 7). The Southeastern languages have a tendency towards homogeneity according to Sherzer (1976), although it is not as marked as in the Northeast. The people of the Southeast were multi-linguals however, hence the southeastern languages were influenced by unrelated languages. Influence from unrelated languages is also noticeable in the numeral systems. On the one hand, Atakapa, Tonkawa, Wichita, and Osage, which are members of different families, form a diffusion area characterized by multiplying numeral systems, extending northward into the plains from eastern Texas, while Atakapa, Natchez, and Tunica form portions of a subtractive diffusion area entirely within the Southeast, on the other. The

decimal and subtracting systems of Cherokee and Tuscarora, and Catawban respectively, do not form diffusion areas. They are isolated linguistic features. But the quinary systems of the Muskogean family, along with those of Shawnee and central Algonquian, seem to have influenced some Siouan languages of the Ohio and central Mississippi Valley, and thus form a diffusion area. To summarize, in the southern portions of the Southeastern culture area, there are subtracting and quinary features which diffused widely, while in the eastern portions of the area, there are decimal and subtracting systems which are family traits of Iroquoian and Catawban. These features did not spread.

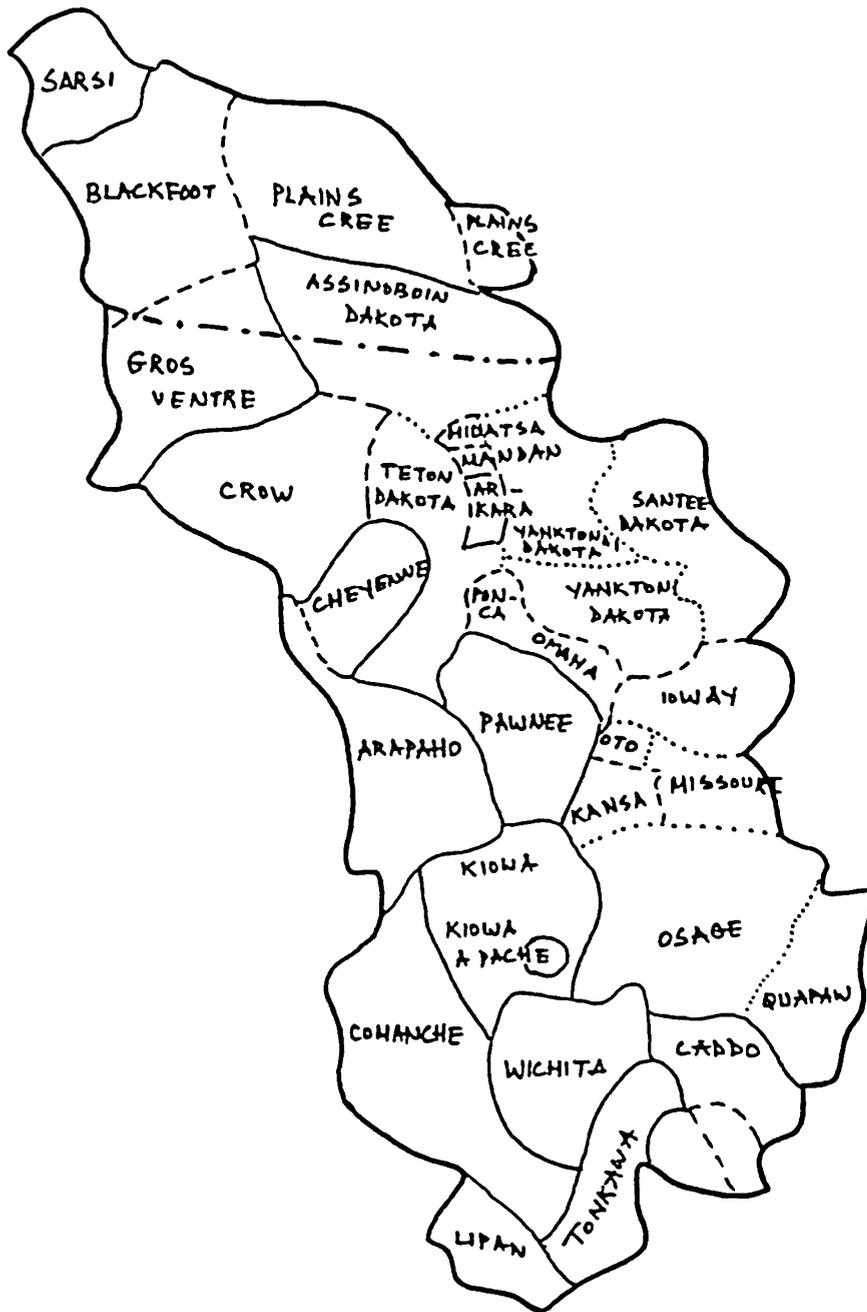
### Conclusion

Examination of the numerals and numeral systems presented in the preceding chapters, and comparison with the culture areas defined by anthropologists shows that these systems sometimes correspond to the culture areas. A comparison of the numeral systems and the culture areas also shows that within a culture area, there are diffusion areas formed by both related and unrelated languages. However, at least with regard to numeral systems, the culture area concept does not entirely correspond with the Sprachbund concept, since there are features which clearly crosscut the culture areas. These features which transcend the culture areas are summarized as follows:

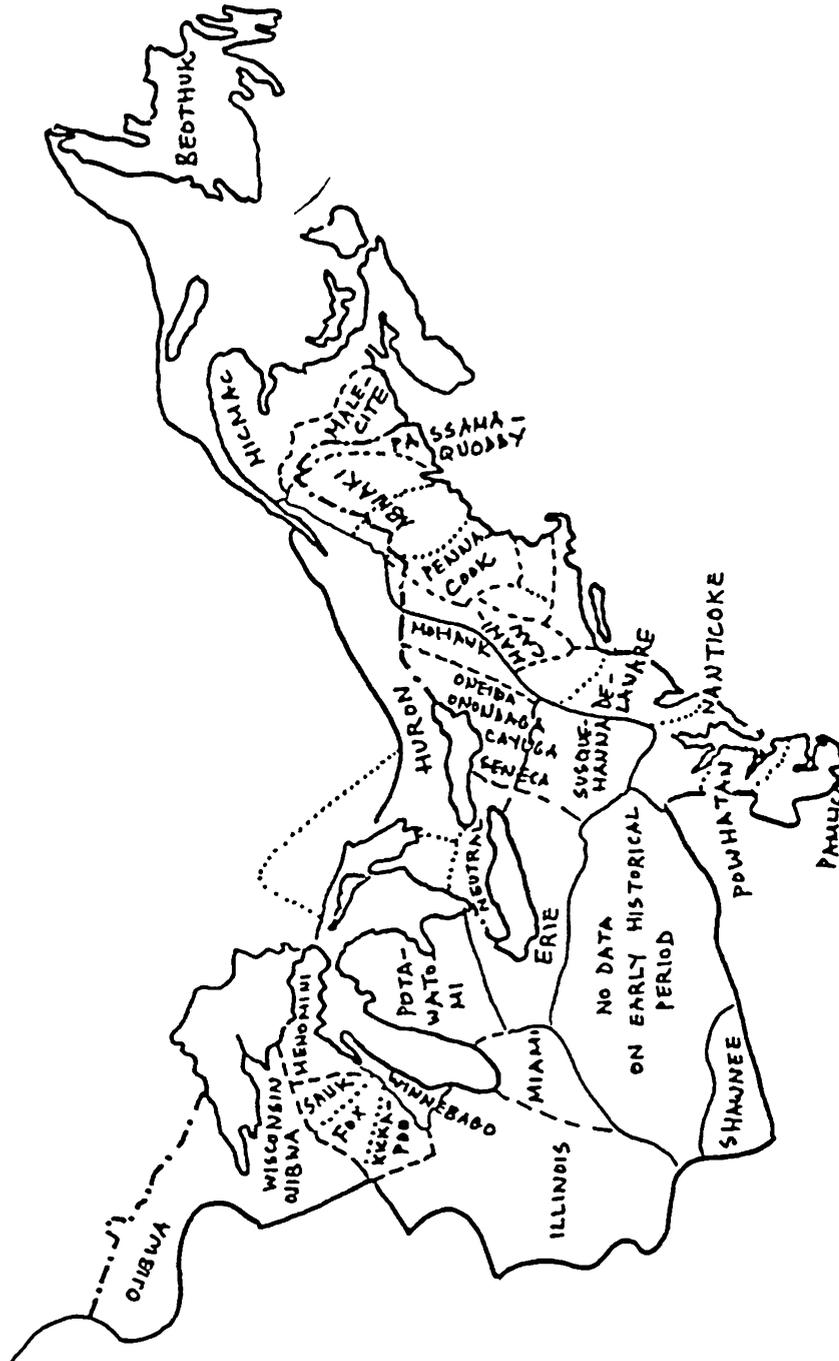
- (1) The southern subtracting feature, which includes Wichita (Plains), and Atakapa, Natchez, Tunica, and Tonkawa (Southeast)

- (2) The northern subtracting features, which cover Winnebago (Northeast), and Missouri Valley Siouan, Dakota, and Ioway-Oto (Plains)
- (3) The multiplying feature, which covers Osage, Wichita (Plains), and Atakapa, Tonkawa (Southeast)
- (4) Quinary systems, which apparently originated in the east and spread to the plains by migration of the tribes in question.

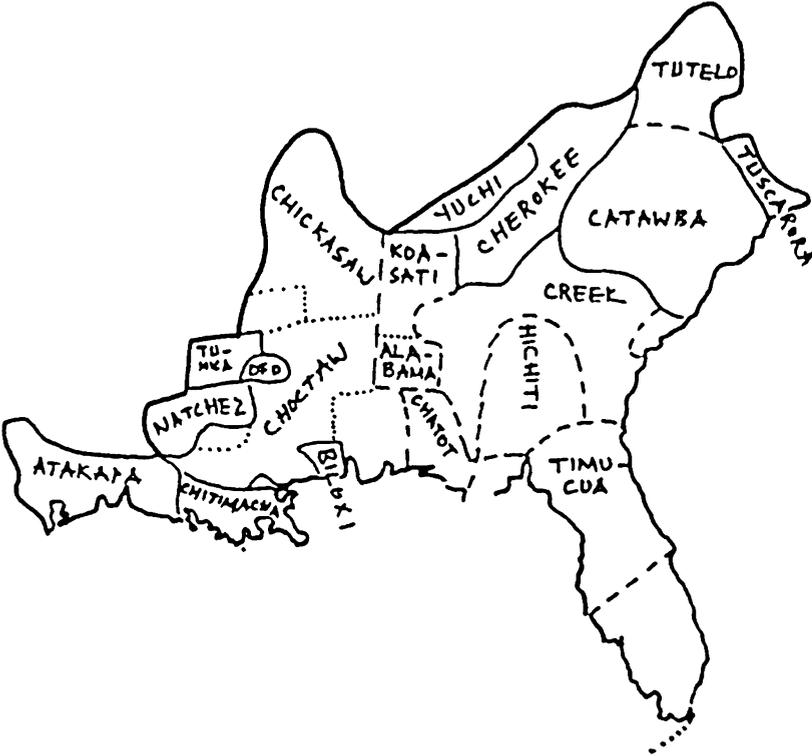
Map 5. Plains culture area



Map 6. Northeast culture area



Map 7. Southeast culture area



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