

MAXIMILIAN'S RUPTARE VOCABULARY:
PHILOLOGICAL EVIDENCE AND MANDAN PHONOLOGY

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Prince Maximilian of Wied-Neuwied, while on his famed travels through the American West, spent the winter of 1833 at the Mandan village of Ft. Clark, in present-day North Dakota. Although plagued by illness, Maximilian was able to collect a reasonably extensive Mandan vocabulary (1906:234-250), and made an attempt at a grammar of the language (1906:250-259). Although his grammar is of little value by modern standards, it is clear from comparisons with modern phonetic recordings of the language that Maximilian had an excellent ear, and developed a good orthography. His Mandan vocabularies are thus eminently usable, and constitute the first reliable documentation of the language. Comparison with modern forms also shows that the Ft. Clark dialect of Mandan was essentially identical to the form spoken today.

Of perhaps greater value are Maximilian's records of Ruptare, a somewhat divergent dialect of Mandan, spoken in a single village of the same name. In a separate word list Maximilian (1906:259-261) recorded sixty-nine Ruptare forms, beside their equivalents in the Ft. Clark dialect.¹ Many of the word-pairs in this vocabulary are of minimal interest, in that they merely represent alternative lexical choices for Maximilian's (German) glosses. Other pairs, however, show that Ruptare was genuinely divergent, in that they reveal the existence of significant phonological differences between the Ruptare and Ft. Clark dialects. Following the great smallpox epidemic of 1837, the few remaining Mandan came to occupy a single village; the differences between the dialects were levelled, the dominant Ft. Clark dialect becoming the standard. With the exception of a very few words which modern Mandan speakers identify as being Ruptare in origin, Maximilian's Ruptare vocabulary thus constitutes the only record of that dialect.

A persistent problem in Mandan phonology concerns the status of [r] in what appears to be root-final position. In his grammar of Mandan, Kennard (1936) treated this [r] as epenthetic. In his unpublished Mandan Dictionary, Hollow (1965) treated this [r] as organic and root-final, an approach which was further pursued by Carter (1983). The purpose of the present paper is to investigate this problem yet again, utilizing both new data from contemporary Mandan speakers and philological evidence from Maximilian's Ruptare vocabulary. It will be shown that both types of

evidence argue in favor of the epenthesis analysis.²

A. Maximilian's Orthography.

Of particular interest for our purpose here is Maximilian's orthographic treatment of both vowel length and vowel constriction. His vocabularies of Plains languages are preceded by an introductory statement (1906:203-206) in which he describes his orthographic conventions in some detail. He clearly notes the presence of vowel length in various of the languages, and states the convention of using a trailing *h* to mark this length. Although not explicitly stated, it is clear from inspection of his Ft. Clark vocabulary that short vowels were occasionally marked by doubling the following consonant. Both conventions are shown in the examples of (1); a minimal pair for vowel length is shown in (1a) and (1b), while (1c) and (1d) show a near-minimal pair.

(1)	Maximilian	Modern Form	Gloss
a.	mánna	mána	wood
b.	máhna	má·na	winter
c.	kschíppo-sch	kšípoʔš	he dived
d.	síhpo-sch	sí·poʔš	it's wrinkled
e.	psíhkasch	psí·kaʔš	it's shallow
f.	há-sch	hěʔš	he sees it
g.	schihsch	šíʔš	it's good
h.	schíh-husch	ší·hoʔš	it's sharp
j.	míh-ihā	míʔhe	blanket, robe

Mandan possesses constricted vowels, which have been phonetically represented as [Vʔ] by all investigators in this century. Maximilian frequently heard the glottal closure, and chose to mark it with a hyphen. In the introduction to his vocabularies he castigates earlier recorders of Amerindian languages for their indiscriminate use of hyphens to "syllabify" words; we can thus be sure that Maximilian intended his hyphens to represent some phonetic fact. Unfortunately, he also used the hyphen as we see in (1h), where it serves to separate the trailing *h* that marks length from an [h] in syllable onset position. In modern Mandan the constricted vowels are intermediate in length between the long and short vowels; as we see in (1g), Maximilian occasionally heard these vowels as long. It is also the case in modern Mandan that constricted vowels may conclude with a voiceless echo vowel, particularly when they occur in an accented syllable. Maximilian also heard this on occasion, as we see in (1j). When he did hear this echo, he added a note to the effect that the vowel after the hyphen was "barely audible".

A few other points of Maximilian's orthography are also of interest. Although he often writes e to represent a short [e], this sound is more frequently rendered as ā; long [e·] is often written as āh. Unfortunately, e is also used occasionally to represent a short, epenthetic [i]. Of greatest concern here is his recording of the predicative suffix, [-oʔš] in modern Mandan. The vowel of this suffix is not consistently represented, being written as either u or o. Since it is this suffix which will be used here to probe the behavior of "root-final" [r], this inconsistency on Maximilian's part has an unfortunate consequence, to be detailed below.

B. The Problem.

All introductory linguistics students are exposed to morphological exercises in which they must learn to use the method of "recurrent partials" to segment words into their constituent morphs. The problem to be presented here is essentially one of this type, and different investigators have "solved" it in different ways. The examples in (2) contain Mandan verb forms of two sorts: those in the left column show a verb root plus a predicative suffix, used when the addressee is male. Those in the right column show the same constituents, but with an intervening suffix which marks a third person plural subject.

(2)	3rd Singular	3rd Plural	Gloss
a.	tíʔš	tíkereʔš	arrive here
b.	hēʔš	hēkereʔš	see
c.	šīʔš	šikéreʔš	good
d.	ksóʔš	ksókereʔš	spit
e.	hāškaʔš	hāškakereʔš	long
f.	ī·tuʔš	ī·tukereʔš	born

The form of the predicative suffix here seems to be [-ʔš], while the third person plural subject is marked by [-kere-]. The examples in (3) reveal a different pattern, however.

(3)	3rd Singular	3rd Plural	Gloss
a.	dépoʔš	dépkereʔš	fat
b.	xí·poʔš	xí·pkereʔš	wrinkled
c.	dutóʔš	dutkéreʔš	eat
d.	dé·hoʔš	dé·hkereʔš	go
e.	íxatoʔš	íxatkereʔš	watch
f.	pawéšoʔš	pawéškereʔš	cut

In these forms the predicative suffix exhibits a new allomorph, [-oʔš]. Comparison of the forms in (2) with those in (3) reveals the conditioning factor; the roots in (2) are vowel-final, while those in (3) are consonant-final. The predicative suffix is represented by [-ʔš] after vowels, and by [-oʔš] after consonants.

The examples in (4) and (5) are among those which exhibit the problem of "root-final" [r]. Such forms are very frequent in the language.

(4)	3rd Singular	3rd Plural	Gloss
a.	ní·roʔš	ní·kereʔš	walk
b.	té·roʔš	té·kereʔš	dead
c.	dáxu·roʔš	dáxu·kereʔš	burn
d.	kú·roʔš	kú·kereʔš	trap
e.	sí·roʔš	sí·kereʔš	yellow

(5)	3rd Singular	3rd Plural	Gloss
a.	níʔroʔš	níʔkereʔš	climb
b.	kéʔroʔš	kéʔkereʔš	dig
c.	kúʔroʔš	kúʔkereʔš	give
d.	hanáʔroʔš	hanáʔkereʔš	sleep
e.	kéʔmiʔroʔš	kéʔmiʔkereʔš	vomit

How are we to account for the "intrusive" [r] of the third person singular? As noted above, two distinct solutions to this problem have been offered.

The first modern description of Mandan was produced by Kennard in 1936. Kennard argued that this [r], along with a few other "problematic" [r], was produced by a general rule of epenthesis. The rule was stated thus: "Whenever a suffix beginning with a vowel is used with a stem ending in a vowel, an r is inserted between the two vowels." (Kennard 1936:6) Inspection of the forms in (2) shows that this rule is not entirely adequate, however. At a later point in the grammar, when discussing the specific behavior of the predicative suffix, Kennard (1936:17) expands the rule: roots ending in [i] or [e] suffix [-ʔš], roots ending in a consonant suffix [-oʔš], and roots ending in "any other vowel" suffix [-oʔš] with an epenthetic [r].³ While this version of epenthesis does correctly predict a majority of the forms in question, there are clearly exceptions; cf. examples (2d-f), (4a-b), and (4e).

Hollow's Mandan dictionary (1965) contains a very sizeable description of the phonology and morphology of the language. It

is clear from this work that Hollow was very much aware of the problems with Kennard's epenthesis solution, which led him to treat the problematic [r] as organic and root-final. With this solution, the form of the predicative suffix can be neatly predicted: after the vowel-final roots of (2) the form is [-ʔš], and after the consonant-final roots of (3), (4), and (5) the form is [-oʔš]. Unfortunately, this analysis also required Hollow to posit phonological rules whose sole function was to delete just this problematic, root-final [r].

However, inspection of the words in (2)-(5) reveals an obvious generalization, one that was missed by both Kennard and Hollow. The problematic [r] occurs only after vowels that are either long or constricted. The [-ʔš] allomorph occurs only after short vowels. Kennard could not see this generalization because he did not hear either length or constriction of vowels with any real consistency. Hollow did not record vowel length at all, and so missed the generalization for essentially the same reason.

A plausible analysis might begin with the assumption that the underlying form of the predicative suffix is /-oʔš/. The vowel of this suffix is removed by a deletion rule after a short vowel, but the deletion is blocked if a preceding vowel is long or constricted. The rule epenthesizing [r] would follow the deletion rule, and would simply fill the empty onset between adjacent vowels. Both rules would be lexical, as they are restricted to particular domains in the suffix morphology. Different rules operate to prevent adjacent vowels in the prefix morphology, for example, and the language has a distinct post-lexical rule which fills empty onsets with a default [ʔ].⁴

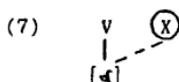
The vowel deletion rule can be formalized as follows:

$$(6) \quad v \quad \textcircled{V}^{\rightarrow}$$

This rule deletes a V-slot from the skeletal tier when it is immediately preceded by another V-slot. As a lexical rule it obeys the Strict Cyclicity Condition, and applies only in derived environments. To understand why this rule cannot apply when the preceding vowel is long or constricted, we must first examine Mandan syllable structure.

Following the model developed by Ito (1986), I propose that the Mandan syllable template is [CCVX]. Further, in terms of Goldsmith's (1990) theory of autosegmental licensing, the X-slot can only license the feature [CONSTRUCTED]. This constraint will produce two distinct rhyme structures, depending on whether the X-slot is is or is not associated. If the X-slot is not associated,

then it links to the features of the preceding V-slot by autosegmental spreading:

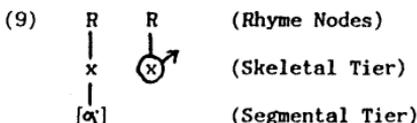


The result is, of course, a long vowel. If the X-slot is associated to the feature [CONSTRUCTED], then the remainder of its segmental content is also provided by autosegmental spreading, as in (8), and the resulting structure defines a constricted vowel.⁵



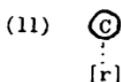
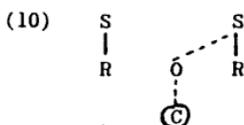
It is this double linkage of the vowel segment to the skeletal tier that produces the "extra" length noted above; the acoustic effect is that of a glottal closure "overlaid" on a long vowel, with progressive devoicing.⁶ It is also the linkage of the X-slot to vowel features which presumably blocks its association to a following empty onset; although Mandan post-lexically fills empty onsets with a default [?], the feature [CONSTRUCTED] can never serve this function when it is associated to an X-slot.

Let us now return to the question of what blocks the vowel deletion rule (6) when a root ends with a long or constricted vowel. The simplest account would hold that the structural description of (6) is not met in these two cases, since the V-slot to be deleted is preceded by an X-slot, not another V-slot. An alternative account, not depending on a "labelled" skeletal tier, would exploit the Linking Constraint (Hayes 1986:331): "Association lines in structural descriptions are interpreted as exhaustive." Suppose we reformulate (6) as (9):



Here the single association line between the skeletal and segmental tiers must be interpreted as a one-to-one linkage; multiple association blocks the rule.

To complete our analysis of the behavior of the predicative suffix, we need only account for the "root-final" [r]. At the phonetic level, at least, Mandan does not allow "naked" syllables; *i.e.*, syllables without an onset. If we posit a rule which builds onset nodes at the lexical level, then we need only provide segmental material to associate to that node. If the empty onset "survives" to the post-lexical phonology it is realized as [?], the "default consonant". In the case at issue, however, the empty onset is filled by a lexical rule which associates it to the consonant [r].⁷



Rule (10) builds an onset node, and a corresponding unassociated C-slot on the skeletal tier. Rule (11) associates an "empty" C-slot to the segment [r]. While rule (10) has wide applicability, (11) applies only in restricted domains of the suffix morphology. Note that rules (9), (10), and (11) must apply in that order.

C. The Ruptare Data.

Maximilian's Ruptare vocabulary contains a number of verb forms that terminate with the predicative suffix; that the number is not as high as we might expect is due only to the fact that Maximilian presented many verbs in the imperative, a form that does not reveal the problematic "root-final" [r]. Comparison of the predicative forms with their modern Mandan cognates allows us to identify the three root types that proved relevant in the above analysis: roots ending in short vowels, roots ending in consonants, and roots ending in long or constricted vowels. The examples in (12), on the following page, show roots ending in short vowels. The examples are presented in both Maximilian's orthography and a "best guess" phonetic transcription, followed by the modern Mandan equivalent. It is clear from (12) that Ruptare lacked the vowel deletion rule (9), and that the predicative suffix is represented by the allomorph [-oʔʂ]. Note also that there is no trace of an epenthetic [r]. Rule (10) is creating an empty onset position, as expected, but this onset is being filled by the default [?].

(12)	Maximilian	Phonetic?	Modern	Gloss
a.	chóppeni-osch	xópiníʔoʔš	xopiníʔš	it's medicine
b.	wäh-te-usch	wéʔtiʔoʔš	nutíʔš	we arrived
c.	waháusch	wahéʔoʔš	wahéʔš	I saw
d.	kahärre-usch	káʔhereʔoʔš	káʔhereʔš	give
e.	kiri-osch	kiriʔoʔš	kiriʔš	arrive there

The examples in (13) show roots that are consonant-final. The predicative suffix is realized as [-oʔš], just as in modern Mandan.

(13)	Maximilian	Phonetic?	Modern	Gloss
a.	chóppeni-hosch	xópiní·hoʔš	xopiníʔš	medicine
b.	-sinhusch	-sɪ·hoʔš	sɪ·hoʔš	beg
c.	wäh-ana-pohsch	wáʔnaʔpoʔš	wá·naʔpeʔš	dance
d.	näh-etosch	nāʔtoʔš	nā·teʔš	stand up
e.	-ewadehusch	-ewarehoʔš	éwarehoʔš	I think
f.	kikánakosch	kikánakoʔš	kixkánakoʔš	sit

Examples (12a) and (13a) show an interesting doublet: the root in (12a) is [xópiní-], while that in (13a) is [xópiní·h-]. Examples (13c) and (13d) are consonant-final in Ruptare, but end in short vowels in modern Mandan. This is best explained as a Ruptare reanalysis, in which the root-final [e] was interpreted as the stem-forming vowel [-e] in both Ruptare and modern Mandan).

The roots in (14) are those that end in either a long vowel or a constricted vowel.

(14)	Maximilian	Phonetic?	Modern	Gloss
a.	täh-isch	té·ʔiš	té·roʔš	dead
b.	hōh-usch	hó·ʔuš	hú·roʔš	come
c.	wachkannā-asch	waxkanā·ʔaš	waxkanā·roʔš	win
d.	kikára-asch	kikáraʔaš	kixkáraʔroʔš	seek
e.	wahána-asch	wahánaʔaš	wahánaʔroʔš	I sleep

These forms are particularly difficult to interpret. The predicative suffix in Ruptare appears to be realized as [-Vš], where V represents a copied or harmonized vowel. Alternatively, V might be an echo vowel; however, in none of these cases does Maximilian offer the "barely audible" comment that is observed with echo vowels in the Ft. Clark vocabulary. The nature of this vowel is made more obscure by (14b). As noted above, Maximilian inter-

changes [u] and [o] freely in this environment. Hence, there are four distinct possibilities (at least!) for a phonetic "reconstitution" of (14b): [hó·ʔuš], [hó·ʔoš], [hú·ʔuš], or [hú·ʔoš]. What is clear from all of these forms is that Ruptare shows no trace of the "root-final" [r].

Three verbs from the Ruptare vocabulary do exhibit [r] in the appropriate position, however:

(15)	Maximilian	Phonetic?	Gloss
	a. wáhko-haráhrusch	wá·koʔhara·roʔš	I talk with you
	b. dáhktun-wehdusch	dá·ktuwe·roʔš	it is sold
	c. schido-óchorusch	široʔóxoroʔš	pretty

The status of these words is obscure, as I am aware of no forms in modern Mandan with which to compare them. The first two examples show [r] just where we would expect it in the dominant Ft. Clark dialect: after a long vowel. Perhaps these are Ft. Clark forms that somehow "crept" into Maximilian's Ruptare word list. I am unable to account for them otherwise.

D. Conclusions.

Comparison of the forms of the male-addressed predicative suffix in Ruptare and modern Mandan has revealed some significant differences, summarized in (16).

(16)	Modern	Ruptare
After short vowel	-ʔš	-oʔš
After consonant	-oʔš	-oʔš
After long vowel	-(r)oʔš	-Vš ??

The Ruptare facts argue in favor of the epenthesis solution to the problem of "root-final" [r], as outlined in Section B, above. If Ruptare possessed organic, root-final [r], then that [r] would have to be deleted before the predicative suffix /-oʔš/. This deletion would have the effect of removing a segment that could potentially fill the following empty onset. In the model of syllable structure developed by Ito (1986), the loss of consonants is due solely to their unlicensed status; i.e., the only consonants that can be deleted are those that cannot be syllabified. That is clearly not the case here. A better account would hold that, in Ruptare, vowel deletion (9) and R-epenthesis (11) are not found on the lexical stratum where the predicative suffix is

added, if indeed those rules were part of Ruptare grammar at all. Since there is some evidence from nominal and adjectival forms that Ruptare did have the rule of R-epenthesis at some point in its history, if not synchronically, it seems best to assume that the rule was simply lost from the appropriate lexical stratum.

NOTES

¹It is clear from this list that Maximilian chose to record only Ruptare forms that were different from those used at Ft. Clark.

²I would like to express my deep gratitude to my Mandan consultants, Mrs. Otter Sage and Mr. Edwin Benson, for their kind assistance and unflagging patience. I would also like to thank my friend and colleague, A. Wesley Jones, for our many fruitful discussions of Mandan linguistic problems, conducted primarily at high speeds in a crowded Toyota while rushing across the Plains of America.

³In fact, Kennard did not hear the constricted vowel in the predicative suffix, which he thus recorded as either $-\underline{c}$ or $-\underline{oc}$ (where his symbol \underline{c} represents [š]).

⁴Details can be found in Carter (forthcoming).

⁵Although differing considerably in details, this analysis essentially follows Goldsmith's (1990:161-162) treatment of similar structures in Chimalapa Zoque.

⁶An independent argument which supports this analysis is motivated by the facts of accent placement. Mandan exhibits pitch accent; some morphemes bear lexical accents, but there is also a default accent rule for words with no lexically accented morphemes. The default rule is quantity sensitive, placing accent on the first syllable if it is heavy, otherwise on the second syllable. Only syllables with long or constricted vowels qualify as heavy. Thus we find [ptí-re] "bison" and [mí?he] "blanket", but [tapsák] "ash tree". Since the X-slot of the syllable template cannot license a point of articulation, the syllable structure of the latter form must be CV.CCVC (where the final C-slot has been preserved by extraprosodicity), and the initial syllable is light, at least at the point in the derivation where accent is assigned. (It is possible, of course, that the first consonant of the cluster may reassociate to a "coda position" in the post-lexical phonology, where Structure Preservation doesn't operate.)

⁷Diachronically it may well be the case that this [r] was originally a glide, as Mandan has merged Proto-Siouan *r and *y to /r/. A weak argument in support of this possibility is provided by the unique doublet [kohúre], [kohúwe] "his mother". That the [r] of the first form may have been an earlier *y is suggested by the [w] of the second form, which may have arisen by assimilation to the rounding of the preceding vowel. I know of no cases where a verb root shows an apparent "root-final" [w], however.

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