

MUNDARI PHONOLOGY*

by

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[Note added August 2010: This is a rekeying of a manuscript I wrote in 1963. Some of the material was presented at the 1963 LSA Summer Meeting in Seattle. In this version, I have replaced the curly-brace notation in the rules with a linear format that explicitly shows the intended logical structure. I have made a few other editorial changes, such as putting glosses in single quotes; additions in the text are enclosed in angle brackets.]

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I. Distinctive features.

	b	p	g	k	d	t	<u>d</u>	<u>t</u>	s	j	c	l	r	<u>r</u>	m	n	a	e	i	o	u	
OBS	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	
CNS												+	+	+	+	+	-	-	-	-	-	
VOC												+	+	+	-	-						
GRV	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	+	+	
CMP	-	-	+	+					-	+	+						+			-	-	
DIF																			-	+	-	+
STR					-	-	-	-	+	+	+											
FLT					-	-	+	+				-	-	+								
VOI	+	-	+	-	+	-	+	-		+	-											
INT												-	+									

I suggest that Mundari lexical items be entered in the dictionary with the distinctive feature representation of their segments as given in the table above. We will also be using these features in our description of the phonological processes of the language, as below in §§ III - V.

II. Coexistent phonemic systems. Certain morphemes borrowed from neighboring languages, notably Sadani, a lingua franca of Chota Nagpur, exhibit segments which do not fit the system proposed in § I. Such morphemes may contain tense (aspirated) stops, like /k^hir^hkE/ 'window', /b^hains/ 'female buffalo'. Or they may contain clusters which are excluded by our morpheme structure rules in § III, such as geminate clusters as in /b^hatt^ha/ 'furnace'. Or, finally, they may violate certain phonological rules given in § V; thus /jogi/ 'yogi' violates the vowel harmony rule which we propose there. We may no longer wish to treat tense stops as exceptional since there are by now a considerable number of morphemes containing them in common use in, apparently, all

the dialects. To incorporate them, we will have to specify all the plus-obstruent segments for tenseness, and it will turn out that the number of specifications per segment will be considerably higher in this new system. Those morphemes which constitute exceptions to the morpheme structure rules or to the phonological rules will be suffixed with an asterisk; this asterisk may be interpreted to be a signal which prevents the application of the rules to the preceding morpheme. Thus, /jogi*/, /b^hatt^ha*/, etc.

III. The structure of morphemes. Not every vowel needs to be marked for diffuseness because certain rules about vowel harmony enable us to predict the diffuseness of all but the first non-compact vowel of all morphemes (except those marked with an *), and of all the vowels in the following classes of morphemes, because there is either no contrast, or the contrast is predictable: postposition, tense, number extension, demonstrative, and o.d. (The marker o.d. is attached to transitive verbs whose objects have been deleted under certain circumstances.) we will use the symbols E and O to represent the non-grave and grave non-compact morphophonemes respectively. We have in Mundari a number of rules which predict various things about the shape of morphemes. Before we can state them, we need a number of book-keeping rules to enable us to refer directly to the class of consonants and vowels and to various subclasses:

- 1a. [+obs] --> [+cns, -voc].
- 1b. [-cns] --> [+voc].
- 2a. [+obs, +grv] --> [-str].
- 2b. [+obs, -grv, -str] --> [-cmp].

3. [-obs, α voc] --> [$\sim\alpha$ nas], where α ranges over the values +, - and where if $\alpha = +$, $\sim\alpha = -$ and if $\alpha = -$, $\sim\alpha = +$.

The following are the morpheme structure rules themselves.

4. [+cns, +voc] --> [-f|t] / + ____.

Rule 4 states that /r/ is excluded from the morpheme-initial position.

5. [] --> [-cns] / + [+cns] ____.

Rule 5 excludes consonant clusters from morpheme-initial position.

6. [] --> [-cns] / ____ [+cns] [+cns] +.

7. [+cns] [+cns] --> [-obs] [+obs] / ____ +.

These rules permit at most two consonants morpheme-finally, the first being a resonant, the second an obstruent. This may be too weak a restriction: we may wish to strengthen rule 7 such that only a nasal followed by a voiced obstruent is permitted morpheme-finally. Depending on how we handle nasalized vowels, we may also wish to permit the cluster /nr/ morpheme-finally.

8. [-cns] --> [-cmp] / X [-cns] ____ [-cns] Y, where X, Y are segments, and X \neq the segment following it, and Y \neq the segment preceding it.

Rule 8 is intimately tied up with the phonetic rules which produce the glides [h], [w] and [y], and will be discussed further below in connection with those rules.

9. [+obs] [+obs] --> [-cmp, -grv] [+cmp, +grv] / [-cns] ____ [-cns].
10. [+cns] [-obs] --> [+voc] / [-cns] [+obs] ____ [-cns].

Rules 9 and 10 give the restrictions on possible medial consonant clusters. We will also require a rule which I do not state here which prevents us from having three or more consonants in a cluster. The following morphemes exemplify the possible medial clusters: /pudkE/

'gnat', /etka/ 'do evil', /lutk0m/ 'name of legendary couple referred to as ancestors of the Mundas', /esker/ 'alone', /cadlom/ 'tail', /munda/ 'village chief', /gomkE/ 'master', /talka/ 'palm of hand', /jargi/ 'rain', /k'irkE/ 'window', /sirna/ 'the heavens', /cenre/ 'bird', /saran/ 'roof'. To be sure, we should write the entries between '/.../' in strictly morphophonemic notation, but except for the vowel harmony, I will not bother to do so.

IV. Some morphophonemics. In the rules below, I underline grammatical symbols. These rules are mostly concerned with those morphemes which show "morpheme alternants" in the language.

1. Reflexive --> n
2. I + Sg --> ing
3. II + Sg --> m
4. III₁ + Sg --> IF / ___ + (Tense) Prd THEN i, ELSE e
5. III₂ + Sg --> nij
6. I --> IF ___ + Pronom THEN d, ELSE n
7. Pronom_{1nan1} --> IF Tense + ___ # THEN a, ELSE IF / Verb + ___ THEN e, ELSE Ø
8. Pronom_{1nan2} --> ag
9. V_{io} --> IF / ___ + a THEN met ELSE men
10. Neg + V_{cop} --> IF ___ + i THEN bangag, ELSE IF ___ + a THEN banog, ELSE bang
11. [-cns, αcmp] --> (X ___ Y)_{Demonstr. αAn}

The grammatical items in Rules 2-4 are subject and object pronominals in the predicate phrase of the respective persons [and numbers], and the item in Rule 5 is the third singular pronominal which appears outside the predicate phrase. The same distinction is made in the items in

Rules 7 and 8 with respect to the inanimate pronominals. The morpheme I is a constituent of Tense which is present in non-imperative constructions, and by Rule 6, its phonetic shape is determined by whether or not there is a following pronominal (possibly empty by Rule 7). The morpheme /men/ by Rule 9 undergoes a special change to /met/ whenever it is followed by an "indirect object" which precedes the Tense constituent. Rule 10 gives the allomorphs of the negative copula, and Rule 11 specifies the vowel quality of the animate and inanimate demonstratives, which are /ni/, /in/, /han/ and /ne/, /en/, /han/ respectively.

Now let INF be an abbreviation for the class of grammatical symbols Recip, Specif, Abstr, and Purpose. Then,

$$12. \text{INF} + C_0VX \rightarrow + C_0V + \text{INF} + X$$

where C_0 is zero or more consonants (limited by the M.S. rules to at most one), or in case the first two vowels of the word are identical, and there are no initial consonants, the first of these vowels. The complexity of this rule can be reduced if we allow this rule to follow the h-rules in the phonetics section <V> below.

$$13a. \text{Recip} \rightarrow pV_1 / V_1 + \text{---}$$

$$b. \text{Specif} \rightarrow pV_1 / V_1 + \text{---}$$

$$c. \text{Abstr} \rightarrow nV_1 / V_1 + \text{---}$$

$$d. \text{Purpose} \rightarrow (C)V_1 / (C)V_1 + \text{---}$$

$$14. \text{Redupl} \rightarrow [\quad]_1 [\quad]_2 \rightarrow \text{---} + [\quad]_1 [\quad]_2 Y$$

Rule 13d is to be read that Purpose is expanded as V_1 in case it follows just V_1 and either V_1 or CV_1 in case it follows CV_1 . Thus Purpose + jom may result either in /jo+jom/ or in /jo+om/. Redupl is added to numerals, and perhaps also to certain adverbs of quantity,

Specif to a certain class of adjectives (those having to do with measurement), and others to verbs.

V. Phonetic rules. <It would seem more appropriate to have introduced and discussed the rules in 1 below in the preceding section.> We require certain rules to predict the final shape of the morphemes /m/ and /n/ given by <rules> IV.1 and IV.3. Note that the parentheses in the rules to follow refer to constituent bracketing when the right parenthesis of the pair is labelled. We have already used this convention in our formulation of IV.11.

- 1a. [+cns] + (m)_{II+Sg} --> [+cns] + (mE)_{II+Sg} / ___ + a
- b. (m)_{II+Sg} --> (me)_{II+Sg} / {Verb, Pronom} + ___
- c. [+cns] + [-obs, -voc] + --> [+cns] + E[-obs, -voc] +

Thus, when II+Sg is used as an object (preceding the predicator /a/) we get /me/ following consonants and /m/ following vowels:

/nel+ta+d+me+a+e/ 'he saw you' vs. /nel+ta+m+a+e/ 'he will first see you'. When it occurs as an imperative subject, it has the form /me/ except when it directly follows Tense: /bage+i+me/ 'desert him', /landa+me/ 'make a joke', /bage+ta+i+me/ 'please desert him', /bage+ta+m/ 'please leave it behind'. Otherwise II+Sg behaves just like Reflexive by rule 1c, with a non-grave, non-compact vowel introduced before the consonant whenever it is preceded by a consonant.

- 2a. [-obs, -voc, -grv] --> [αcmp, βgrv, γflt] / [+obs, αcmp, βgrv, γflt]
- 2b. [-obs, -voc, +grv] --> [+cmp, αgrv, -flt] / [+obs, +voi, +cmp, αgrv, -flt]
- 3. [+obs, +grv, +cmp] --> ∅ / [-obs, -voc] ___ {+#, +)_{-Stem}}

Rule 2 states that /n/ is always homorganic with a following obstruent, and that /m/ is also, when followed by a voiced, compact obstruent. Morpheme-final /g/ also drops (we are supposing that we are able to write the strengthened form of Rule IV.7, so that we do not have to specify [+voi] on the left-hand side of Rule 3), unless that morpheme is a stem and is immediately followed by another morpheme without intervening word-boundary. These rules explain the occurrence of /m/ before non-homorganic stops except /j/ and /g/, and the non-occurrence of /n/ before non-homorganic stops. Further, the account for such alternations as /sing/ stem associated with a number of compounds, as /singbonga/, etc., phonetically [siŋ], and /sing+i/ 'day', phonetically [singi]; /leng/, stem in compounds, meaning 'left', phonetically /leŋ/, and /leng+a/ 'left', phonetically [leŋga]. We observe that if we were to place Rule 3 before the second part of Rule 2, we would drop a final /g/ before making a preceding /m/ homorganic to it, thus leaving us with a morpheme-final [m] wherever the order given above would give morpheme-final [ŋ] and the morpheme ends in /mg/. There are dialects of Mundari where such alternations occur, and in those words in which it appears, we may presuppose a spelling /...mg/, as in /tae0mg/ 'after'. An ordering where Rule 3 preceded both parts of Rule 2 would produce phonetically [n] where we now find [ŋ]. Such may have been the case at an earlier stage in the language, leaving behind "fossilized" alternations [kin], [kiŋ] for II+Dual. This may <also> help to explain the forms of the negative copula, expanded above in IV.10.

4. [-obs, -voc] --> [-grv, -cmp] / (i____)_{1+5g} except / #(+a) + ____ + #

This rule <4> gives the occurrence of [ñ], which, as has been pointed out by Hoffmann, occurs only in certain forms of the first-singular pronominal; namely, whenever the pronominal is part of a larger word.

The following four rules deal with "checked" vowels in Mundari.

- 5a. [-cns] --> [+int] / ___ [+obs, +cmp, + voi] + AND (optional) ___
+ [+obs] = [-cns]
- b. [-cns] --> [-int] / ___ [+obs] + [-cns, +int]
6. Ø --> [-cns, -cmp, -grv] / [-cns, +int] ___ [+obs, -grv, +cmp,
+voi]
7. [-cns, +int] --> [+grv, +cmp] / ___ + [+obs] + [-cns, +grv, +cmp]
8. [+obs] --> Ø / [-cns, +int] ___

What these rules do is produce checked vowels when, and only when, a following /d/, /j/, or /g/ has dropped; in particular, a morpheme-final /j/ or /g/ and the morpheme /d/ given by IV.6. However, by the second part of Rule 5, the stop is retained and the preceding vowel is unchecked whenever it is immediately followed by another checked vowel. By Rule 7, a checked vowel before the morpheme /d/ is assimilated with a following /a/. Thus we may get [nelkaʔae] alongside of [nelkedae] 'he saw it'. Rule 6 accounts for only one morpheme alternation in the language as far as I know, and so I include it in this statement of the phonology only because of its possible interest for comparative phonology, especially for comparing Mundari with Santali, and for reconstructing an earlier stage of Mundari phonology. What the rule does is insert a front vowel immediately before a morpheme-final /j/. I have a suspicion that at one time in Mundari, those morphemes which now end in /Eg/ were once represented as /...j/, and the vowel was inserted by a rule like our Rule 7. This rule now operates, as far as I know,

only on the verb /goj/ 'to kill', which for some reason has not been reinterpreted as /goEg/. We get from /goj+og+a+e/ 'he will die' [gojoʔwae]. the /j/ remaining phonetically because the following vowel is checked, by the second part of Rule 5, and the consequent non-application of Rule 8. From /goj+ke+n+a+e/ 'he died', we get [goʔekenae], with the front vowel inserted by Rule 7. (The "check" is heard between the vowels. This is always the case when either of two successive vowels is checked, and we may suppose that this "check-placement" is handled by a low-level phonetic rule.) This introduced front vowel may partake in vowel harmony (see below); from /goj+i+ta+n+a+e/ 'he is killing him', we get [goʔitanae], where the introduced vowel is raised by the following /i/, and assimilated with it. I have chosen to represent the third singular pronominal which stands outside the predicate phrase by /nij/, largely because the phonetic output from /in+nij+ag/ 'his' is generally [inijaʔa] and never [inigaʔa].

In Santali, when a morpheme-final /j/ does not drop, the preceding vowel is raised. (I.e., made diffuse; this rule also applies to compact vowels.) For example, the morpheme /hej/ 'come' appears as follows: [heʔakanae] from /hej+aka+n+a+e/ 'he has come'; [hijuʔwae] from /hej+og+a+e/ 'he will come'. The corresponding verb in Mundari is /hij0g/, which I take to be monomorphemic; however there is a "short form" in use, but which I think has to be represented as /hig/.

It would appear that Rules 5-8 are unordered with respect to Rule 1; that is, morphemes ending in /Vg/ may be interpreted either as ending in a vowel or a consonant for the application of Rule 1. Thus from

/menag+m+a/ 'you (sg) are', we may get either [menaʔma] or [menaʔmea]; from /mag+n+ta+n+a+e/ 'he cut himself', either [maʔentanae] or [maʔantanae], or possibly even [magentanae], which if allowed, would require us to change Rule 5 slightly.

The next rule is proposed tongue-in-cheek. It is intended to account for the fact that the numeral /miad/ 'one' has a corresponding "short form" /mid/, whereas the other numerals from two to ten have "long forms" which consist of the short numeral plus the suffix /Ea/. (Whether or not we get a long or short numeral in a given utterance follows from a syntactic rule which does not concern us here.) The rule also accounts for the fact that the inanimate pronominal /a/ is inserted between the two parts of the Tense constituent (cf. IV.7). It reads:

9. [+obs, -cmp, -grv, -str, +voi] + ([cns]) [-cns, +cmp] --> ([-cns])
[-cns, +cmp] + [+obs, -cmp, -grv, -str, +voi]

P. O. Bodding, in his phonological description of Santali, Materials for a Santal Grammar, Part I, recognized that a fundamental fact about the vowel structure of the language was that either all of the vowels of a morpheme were diffuse, or they were all non-diffuse, and that vowels in adjacent morphemes could affect the height of vowels in their neighboring morphemes. Essentially the same is true for Mundari, except that the compact vowel /a/ is apparently not affected. The rule is roughly as follows:

- 10a. [-cns, -cmp] --> [-dif] / [-cns, -cmp] X ____, in Postposition,
Number Extension, Tense, etc. OR where X ≠ Z + W

b. [-cns, -cmp, -dif] --> [αdif] / [αdif, -cmp] Y ___ Z,

where Y = T)_{-Pred} + C₀ or)_{Pred} + C₀, AND Z ≠ R + S + U or T ≠ P + Q

c. [-cns, -cmp, -dif] --> [+dif] / ___ T)_{-Pred} + C₀ [+dif] OR ___)_{Pred} + C₀ [+dif]

Recalling that our morpheme-structure rules specified diffuseness only on the first non-compact vowel of each morpheme, we see that Rule 10a makes all the other non-compact vowels non-diffuse. Rule 10b then makes all such vowels agree in diffuseness with the first vowel, and also with the diffuseness of the last vowel of a preceding morpheme, except when that morpheme is a predicate which does not end in a non-compact vowel. This is progressive vowel harmony in Mundari. Rule 10c then states that there is regressive harmony with diffuse vowels across morpheme boundary, but subject to the same restriction as pertained to progressive harmony in the 10b. A correct formulation of Rule 10 should collapse these environment statements into one, but at the moment I am unable to state it that way. The peculiar restriction noted in 10b, that the portion of the word following the affected vowel is not bi-morphemic accounts for the fact that progressive harmony is blocked just in case two or more morphemes do follow in the word.

Examples which use Rule 10b are /sons0r0d/, [sonsorod^o] 'locust'; /dipE1E/, [dipili] 'at a particular time'; /in+ko/, [inku] 'those ones', 'they'; /up0n+Ea/, [upunia] 'four'; /ge1+Ea/ [ge1ea] 'ten'; /bai+og+a/, [baiu?wa] 'it will be built', but /bai+og+ta+n+a/ [baio?tana/ 'it is being built'; and since /si0g/ is a predicate, we get from /si0g+og+a/, [siugo?wa] 'it will be plowed'. In the long forms of the numeral, we are thus able to predict the vowel quality of the first vowel in the extension morpheme /Ea/ on the basis of whether the root numeral has a

diffuse vowel or a non-diffuse one. However, the numeral /bar/ 'two' has the long form [baria]. We cannot handle this by writing the extension morpheme /ia/, since then by Rule 10c, the vowels of the root numeral would become diffuse in all cases. We must either handle it with a special rule, or by claiming that the underlying vowel in /bar/ is, in fact, diffuse as well as compact, and relaxing the restriction in Rule 10 that the vowel which precedes the vowel to be harmonized be non-compact. This latter alternative would force us to recognize two phonemically distinct a's, the first of which is diffuse and which corresponds to Santali a, and the second non-diffuse, and that a later rule collapses them into one vowel. Again, if Bodding's analysis of Santali phonology is essentially correct, Mundari and Santali would agree in having an underlying six-vowel system, but which really collapses to three vowels plus the feature diffuseness, which for all intents and purposes acts like a prosodic feature.

Examples showing the application of 10c are /kor+i/, [kuri] 'woman' (as opposed to /kor+a/, [kora] 'man'), /b^hed+i/, [b^hidi] 'female goat' (as opposed to /b^hed+a/, [b^heda] 'male goat'), /bage+i+a+e/, [bagiae] 'she will desert him' (as opposed to /bage+kE+d+i+a+e/, [bageki?iae] 'she deserted him'; note that in this example that the vowel of the Tense morpheme /kE/ has been regressively assimilated by the following /i/. We must suppose that when the /d/ dropped by Rule 8, the associated morpheme boundary was also deleted. When the vowel preceding the /d/ is not checked (since whether or not it is is optional by the first part of Rule 5), no assimilation takes place: [bagekediae], since the additional morpheme boundary supplied by the /d/ is present to block the assimilation). At the moment, I do not have evidence one way or the

other to tell me whether or not a vowel which precedes a morpheme-final /g/ in a predicate will assimilate with a following diffuse vowel. If it does, then the present ordering of the rules will do, since the /g/ will have dropped and the vowel in question will be morpheme-final. If it does not, then the reverse ordering of Rule 10 with respect to Rule 8 is required.

The next rule inserts a "euphonic" vowel between the predicator morpheme /a/ and any /a/ which may happen to immediately precede it:

11. $\emptyset \rightarrow [-cns, -grv, -cmp, -dif] / [-cns, +cmp] \text{ ___ } ([-cns, +cmp])_{Prd}$

Obviously, Rule 11 should precede Rule 10, since then we will not have to specify the inserted vowel for diffuseness. This rule results in an ambiguity, since the inserted vowel is homophonous with the inanimate pronominal given by IV.7 in this position. For example, we have /landa+e+m/, [landaeme] 'laugh!' /landa+m/, [landame] 'make a joke!'; but both /landa+e+a+e/ 'he will laugh' and /landa+a+e/ 'he will make a joke' both result in [landaeae].

The next five rules pertain to the formation of glides.

12. $[-cns, X] \rightarrow \emptyset / [-cns, X] + \text{ ___ } []$

13. $\emptyset \rightarrow [-cns, -voc, -voi] / [-cns, X] \text{ ___ } [-cns, X]$

14. $[-cns] \rightarrow \emptyset / + \text{ ___ } [-cns, -voc, -voi]$

15. $\emptyset \rightarrow [-cns, -voc, -voi] / [] [-cns, +voc] \text{ ___ } [-cns, +cmp] []$

16. $[-cns, -cmp] \rightarrow [-voc] / [-cns, +voc] \text{ ___ } [-cns, +voc]$

Rules 12-15 give us [h] from sequences of identical vowels within morphemes, or of the sequence vowel followed by /a/ when that sequence is either morpheme-initial or -final.* This gives the right results for those dialects which have /joar/, [johar] 'greet'; /saan/, [sahan]

* An [h] is never inserted between the vowels V'a when the sequence is morpheme-initial or -final. Thus /roa/, [roa] 'soul' in all dialects.

'firewood'; /bo0g/, [bohoʔo] 'head'; /o0E0/, [hoyo] 'wind'; etc. For some dialects, intervocalic [h] is excluded, and medial double-vowels are pronounced as long vowels: e.g., [sān] 'firewood'. When a morpheme boundary intervenes between two identical vowels, the second is deleted by Rule 12, unless another morpheme boundary immediately follows. Thus, from /laga+aka+n+a+e/ 'he is tired', we get [lagakanae], but from /o+o+l/ (derived from Purpose + ol) 'to write for some purpose', we get [ōl].

Rule 16 gives the glides [w] and [y] from an inter-vocalic non-compact vowel. Since IV.8 excludes compact vowels from this position, we might expect that we would not have to re-specify non-compactness on the left side of Rule 16, but since the rule also works across morpheme boundaries, the inter-vocalic /a/ in /landa+e+a+e/ would qualify for Rule 16, and hence has to be explicitly excluded.

The nature of Rules 12-16 explains why we wrote the environment of IV.8 the way we did. If we did not specify the X and Y as we did, we would then have excluded the strings /aai/ and /o0E0/ from the lexicon, but we require these underlying forms to give us [hai] 'fish' and [hoyo] 'wind', respectively.

The next set of rules derive stress patterns in Mundari; I shall use the feature ACC (accent) to mean stress. Numbers will refer to level of stress: [1acc] is main stress, and so on down.

17. [-cns, +voc] --> [+acc]

18. [+acc] --> [-acc] / [+acc] C₀ ____ C [+acc] ([+acc]) C₀ N, Verb, Adj, Adv

- 19a. [+acc] --> [1acc] / X ___ C₀ #
 b. [+acc] --> [2acc] / Y ___ D₀ [1acc]
 c. [+acc] --> [1acc] / Z ___ D₀ [1acc], where D₀ in 19b-c is a sequence of zero or more unaccented segments (all consonants and glides will be marked [-acc], presumably by a counterpart to Rule 17), and D₀ ≠ V # W.
20. [2acc] C₀ [1acc, +cmp] --> [1acc] C₀ [3acc, +cmp] / ___ #
21. [-cns, +voc, -acc, X] --> ÷ / [-cns, +voc, X'] C₀ ___ [-obs, +voc] [-cns, +voc, X''], where X = X' OR X = X''
- 21'. [-cns, +voc, -acc] --> [4acc]

Rule 18 removes the accent from certain penultimate vowels of certain constituents and in doing so ignores internal morpheme boundaries. It requires that this vowel be followed by exactly one consonant; a penultimate vowel followed by two consonants receives accent: /baranda/, [bárándà] 'younger brother of Singbonga', as does such a vowel followed by no consonants: /gel+Ea/, [gélèà] 'ten'. Rule 19 then assigns an alternating (2)1...21 stress pattern to vowels within words; i.e., those strings separated by #. The stress rules obviously must follow the glide and vowel-dropping rules given above. Checked vowels may affect this alternating pattern, but I am not certain if so and how. Then Rule 20 reduces stress on a final /a/, provided it is not preceded by an unaccented vowel, in which case it retains its full stress; cf.

[bárándà] and [gélèà] above with /manrana/, [mâríná] 'pole used for carrying'. Rule 21, which is limited to certain dialects, but which seems to cut across the usual Hasada-Naguri division, neutralizes those unaccented vowels which precede resonants and which are identical with either the preceding or following vowel. Note, for example, the pair

/dangir+a/, [dângĩrâ] 'young man' and /dangir+i/, [dângĩrí] 'young woman'. Unaccented vowels preceding an obstruent retain their quality; thus Recip + egEr, /e+pe+gEr/, [êpěgér] 'to quarrel'. Finally, we may suppose that all unaccented vowels receive minimal stress as given in Rule 21'.

I am still not in a position to formulate a rule which will predict nasalization of vowels in Mundari; however, it seems quite clear that they generally arise in the neighborhood of an underlying nasal segment. Monosyllabic open-syllable morphemes beginning in a nasal consonant have nasalized vowels (also the vowel is lengthened).^{*} Vowels are often nasalized in the environment of /r/, and at the moment it seems best to follow Hoffmann and write /nr/ in all such cases where nasal vowels co-occur with /r/. This leaves very few instances unexplained, but for morphemes <pronounced> like [kq̄] 'to beg' or [kq̄ɛ] 'a kind of mushroom', it is difficult to determine what the underlying form should be.

Finally, we are able to give the distribution of so-called post-nasalized and glottalized stops, by means of the following rule:

22a. [+obs, -cmp, -flt, +voi] --> [+nas] / ___ #

b. [+obs, -cmp, -flt, +voi] --> [+int, -voi] / ___ [+cns]

Thus, /udob/, [udubⁿ] 'to show'; /udOb+m+a+e/, [udup'meae] 'he will display you'; /udOb+a+m+a+e/, [udubameae] 'he will show it to you'; /pudki/, [put'ki] 'gnat', etc.

^{*} Thus /nu/, [nɯ:] 'to drink'; /muEg/, [mɯʔ] 'ant', etc.