

SOME LANGUAGE RELATIONSHIPS IN THE UPPER SEPIK REGION OF PAPUA NEW GUINEA

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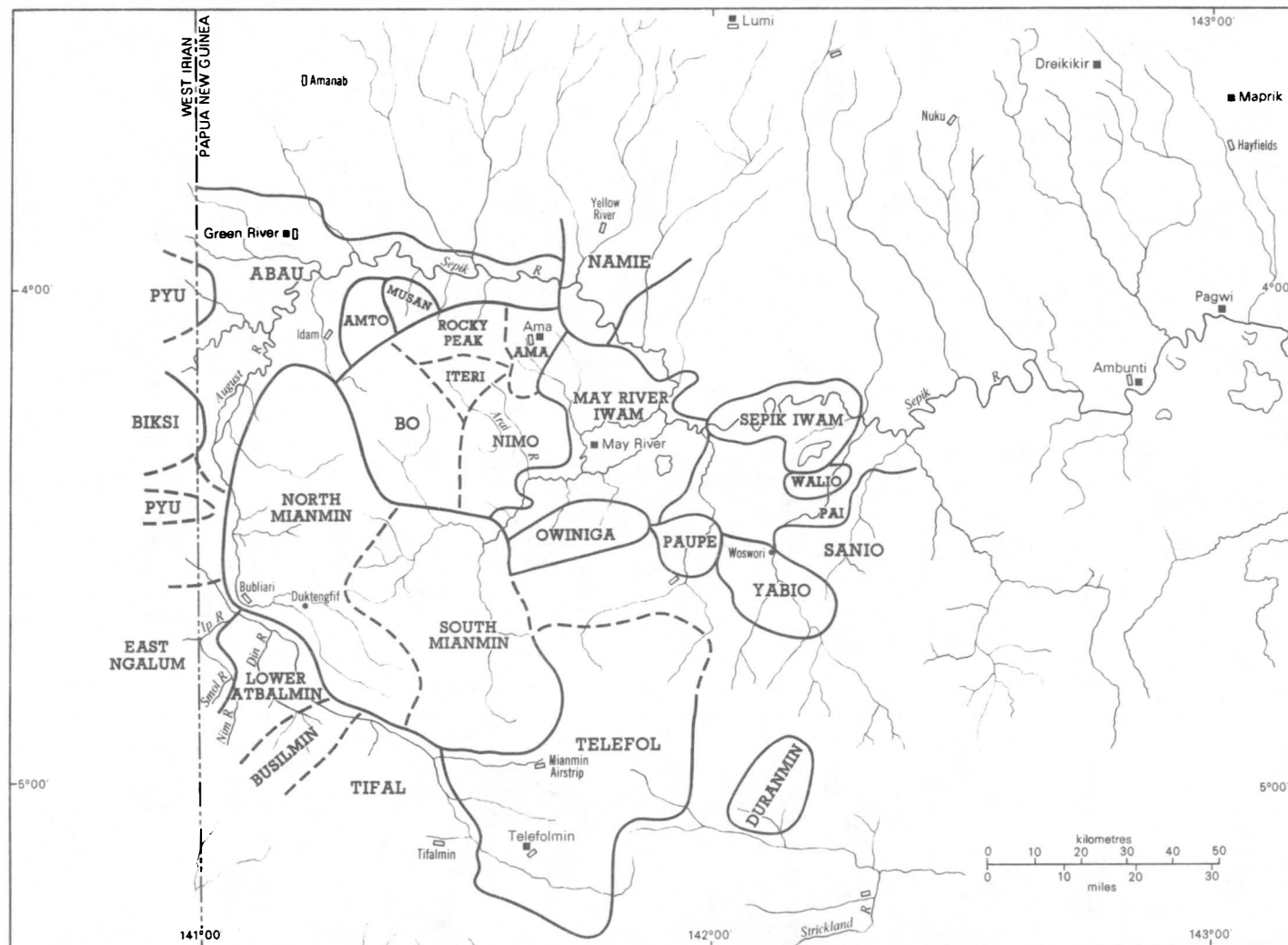
0. INTRODUCTION

Most of the languages in the upper Sepik have now been identified. Published surveys have covered the Amanab Sub-district, the "Sepik Hill" region between the Karawari and Leonard Schultze Rivers, the Telefomin area, and the region of the Upper Sepik River from the mouth of the Wogamus River to the West Irian border.¹ Recently the authors conducted a field survey to fill the gap between the areas previously surveyed and the West Irian border, and in particular to investigate linguistic relationships in the Upper Sepik (see map 1).²

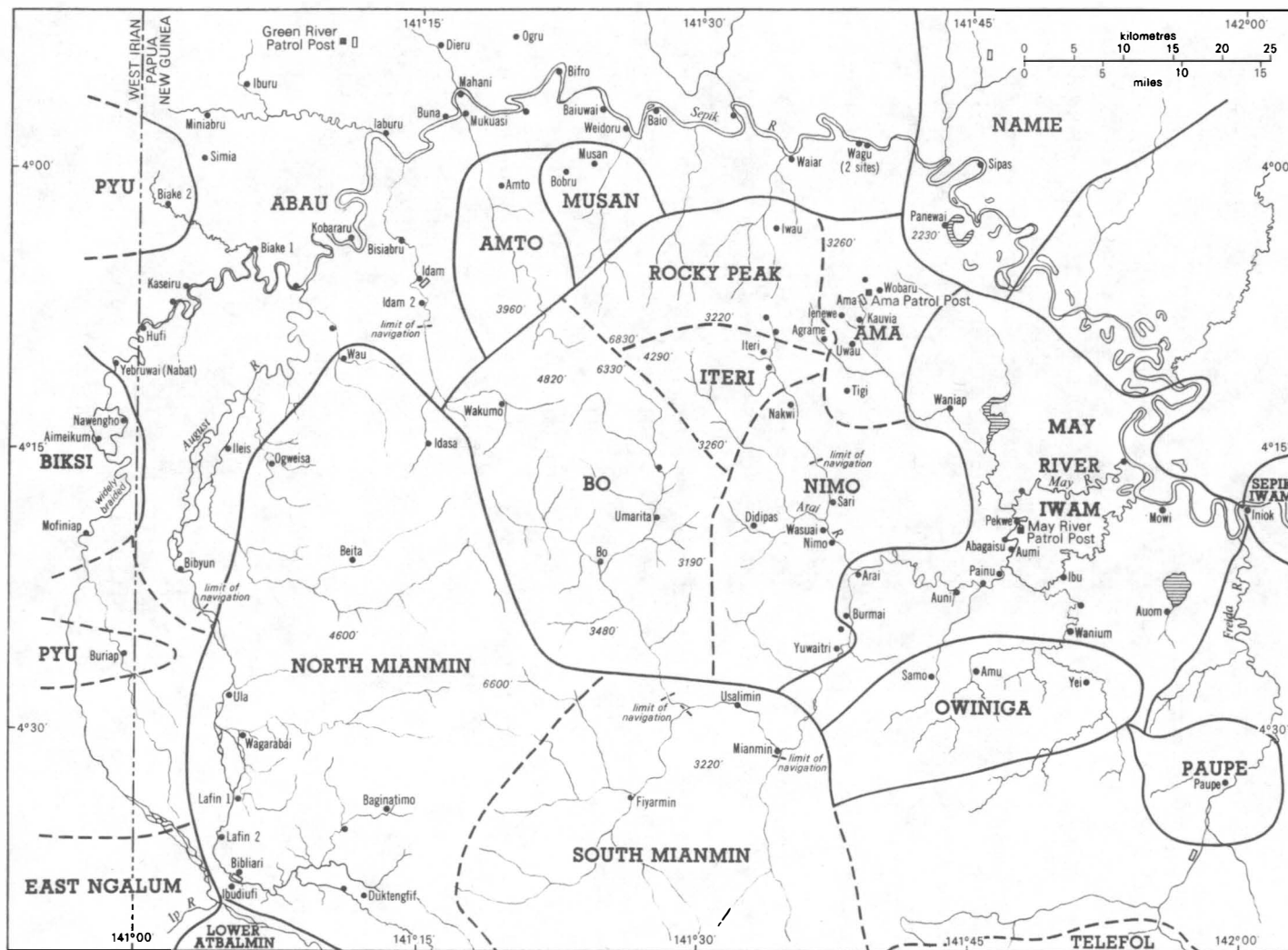
1. PROCEDURES

The usual procedures for gathering and analyzing the data were modified somewhat due to the field conditions in this remote part of Papua New Guinea. The wordlist used was a modification of the Summer Institute of Linguistics standard 190 word survey list, plus the 36 word Lowland Supplement. Items which Laycock and others have shown to be subject to rapid change were eliminated from this list.³ It was further shortened to 102 words to eliminate items which were found to be difficult to elicit reliably where informants' command of the lingua franca, Melanesian Pidgin, was poor. Unfortunately, most verbs had to be eliminated for this latter reason, even though they might well be the most conservative lexical items of all.

During the actual survey, most of the villages were visited by the authors. Wordlists were gathered or checked, and cultural and geographic data recorded.



MAP 1: LANGUAGES OF THE UPPER SEPIK



MAP 2: ARAI FAMILY LANGUAGES

Principles for cognate decisions have been adapted to be commensurate with the reliability of the data. Only about one third of the lists are the product of extensive fieldwork.⁴ Thus, it is not possible in all instances to insist on strict correspondences for each phoneme in a pair of words before considering the pair cognate. The sound correspondences in Tables 4 and 7 are therefore tentative. Two words with the same meaning are considered cognate if their phonemes are matched as follows:⁵

(a) The majority of the phonemes being compared involve the same or regularly corresponding sounds. Regularly corresponding sets of sounds are defined for this study as those sound correspondences involving a minimum of two examples for the pair of languages involved.

(b) The remaining phonemes being compared follow principles consistent with what is known about comparative linguistics in general. In some cases, information from other languages of the same family aided in establishing correspondences. In addition, we have assumed that the recorders sometimes made errors of various kinds, including imprecise phonetics, and have taken this into account in our comparisons.

2. INTERPRETATION

The list of 102 words obtained for the relatively little known languages of this survey are shown in Table 2. The approximate probable cognate percentages for these basic vocabulary items are shown in Tables 1 and 5. The interpretation of these results, however, brings special problems.

Lexicostatistics has been extensively discussed and it is not the intent of this study to add another lengthy critique.⁶ However, we do wish to discuss one problem. The traditional model of discrete language-sized communities assumes no social contact following socio-geographic splitting. This is not very satisfactory for the Upper Sepik and many other areas of Papua New Guinea, where many speech communities contain 500 people or less. Although each community maintains its own dialect, it is also aware of and often significantly influenced by the differing dialects or languages spoken in surrounding villages.

Several types of interaction can occur between these small speech communities. If relations are friendly, visits for trade, dance festivals, purchase of wives, and adoption of children may lead to frequent attempts to cross the linguistic boundary and result in considerable influence of each small community on its neighbors. In a very short time new words can replace old ones, since the communities are small and have no written literature.

Unfriendly villages have less linguistic influence on each other, due to less contact. In case of a village completely overrun and captured, however, wives are taken and the remaining males move into neighboring villages, resulting in some villages speaking two languages for a period of time.⁷

In summary, it is the authors' opinion that there is a significant degree of linguistic interaction between speech communities, whether or not they speak dialects of the same language. The traditional model accepts borrowing only from dialects of a single language, but borrowings between languages must also somehow be discovered and eliminated from cognate counts.

We acknowledge that the rate of differentiation between daughter languages is a variable. This rate depends on a number of factors, including the extent of social interaction and the size of speech communities.⁸ Two languages may even become more alike. The degree of similarity observed at a given time depends not only on how recently the parent dialects separated, but on the intensity and duration of interaction since separation. In contrast, the traditional model assumes a fixed rate of differentiation for all the languages in a phylum.

We believe that for small speech communities which have interacted extensively the question of genetic relationship versus borrowing cannot be answered from a comparison of the present languages. For this reason, a neat statement of relationships, especially distant ones, is impossible. Instead, the investigator must seek to answer other questions which are also relevant to historical reconstruction: "Relatively how old and how intensive was the interaction between these communities? How does this interaction compare with present socio-geographic relationships?"

It is the authors' opinion that because of very extensive borrowing between isolects, many of the language relationships observed in Papua New Guinea are more the result of borrowing than of genetic relationships. Though the traditional model might seem to yield much information, this is often illusive, because rapid linguistic change and extensive borrowing have invalidated the results.

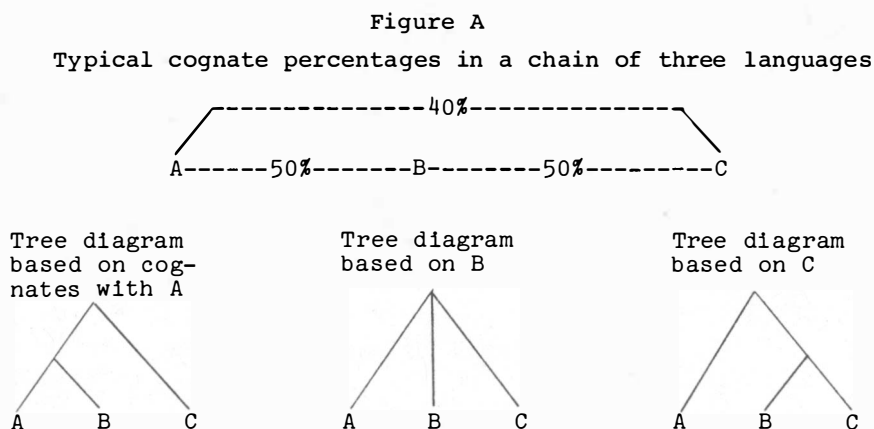
Though proof of this hypothesis is beyond the scope of this paper, cultural and linguistic observations by the authors and a number of colleagues support this view of sociolinguistic behavior.

One kind of evidence is the high rate of language change observed in certain areas of Papua New Guinea. For example, Lithgow found that the Muyuw language, as spoken in one centrally located village, changed 16% in two generations.⁹ That is, a standard S.I.L. wordlist taken from old

people was only 84% cognate with a similar list taken from their grandchildren. The "young people's" words were 8% more cognate with the dominant language of the sub-family, Kilivila, than were the old people's words.

This viewpoint is also corroborated by the common phenomenon of language and dialect chains, in which cognate percentages decrease with socio-geographic distance. The difficulty of interpreting such data with a traditional tree model can be seen by the analysis of a simple three language chain A-B-C.

Assume that B is 50% cognate with A and C, but A is only 40% cognate with C. Then three mutually contradictory patterns of divergence are implied by the traditional model. If one's conclusions are based on cognates with A, then C must have split off first. If based on cognates with B, all three diverged at once. Based on C, A must have split off first (see Figure A).



This phenomenon was explained by Johannes Schmidt in 1872 as resulting from "waves" of linguistic change spreading through a group of languages or dialects. However, Bloomfield¹⁰ implied that such waves occur only through dialects of a single language.

We believe that because there is linguistic influence across language boundaries, waves of change also cross them. Those groups which interact the most will eventually become least dissimilar. Dialect chains are therefore to be expected.

McElhanon's application of the traditional model to refined data from 40 related dialects in the Huon peninsula of Papua New Guinea shows its inability to handle complex chaining.¹¹ In order to show a pattern of discrete languages grouped into families McElhanon had to eliminate all lists from "border" villages, set language boundaries by sociolinguistic

(not lexical) methods, posit mixed "linking" languages, juggle the percentages to allow for assumed borrowing, and finally resort to typological features. Even then, he considered the classification to be inconclusive and questioned the ability of lexicostatistics to handle New Guinea data.¹²

In the Sepik area the Ndu language family and the Sepik Hill and Arafundi families also exhibit chaining.¹³ Several years ago R. Conrad attempted to make a sub-grouping of the Ndu family based on shared innovations, but no consistent tree diagram could be constructed.¹⁴ In this present survey the Arai family shows this pattern.

Wurm argues for resolving the ambiguities by the extensive use of typological features.¹⁵ However, in our opinion typology will show almost as complex a picture in Papua New Guinea as lexicostatistics does at present, because the present linguistic pattern is largely the result of extensive and repeated borrowing of words and even of grammatical and phonological features. Genetic relationship accounts for only a part of the observed similarities.

More study by other scholars would be most welcome, to confirm or deny this hypothesis. Meanwhile, the data from this survey has been interpreted according to it. The same cognate percentage is considered more significant if it occurs between geographically distant languages than adjacent ones, because it indicates that "interaction" occurred before the present geographical distribution of dialect groups came about.¹⁶ The term "cognate" as used here implies similarity of meaning and phonological form. It is not limited to reflexes of proto forms. The terms "family, stock, phylum" are still used, but the implication of them is that the language relationships involved were old and long continuing and/or were genetic. No differentiation between genetic and ancient "interaction" relationships is intended.

3. UPPER SEPIK LANGUAGES

Language names used in this study are based on administration usage and/or published reports. In a few cases we are suggesting new names to conform to present social groupings or to the names used by some of the speakers.

3.1 ARAI LANGUAGE FAMILY

The six languages of the Arai (Left May) family were first partially surveyed by R. Conrad in 1963 and reported by Healey and Laycock.¹⁷ This family was named after the Left May River which runs through the middle

of the region. As this river is now called the Arai, the family is here called the Arai family (see Map 2). The suggested names for these languages are given in Figure B along with other names sometimes applied to the same group.

Figure B
Arai Family Language Names and Population¹⁸

Suggested Name	Population	Other Names
Rocky Peak	275+	Laro, Iyo (L), Yinibu (L)
Iteri	90+	Asowi, Sorimin
Bo	175±	Po (L)
Ama	381	Apaka, Abi, Aboa, Boropa, Kauvia, Nasiap, Waniabu (L)
Nimo	413	Nimo dialect: Nimo-Wasuai (L) Nakwi dialect: Nakwi (L), Augot, Mumupra
Owiniga	222	Samo, Bero (L), Taina

The Arai peoples share a distinctive culture. They subsist on sago pudding, supplemented with game and wild greens but horticulture is unimportant.

In the swamp forest of Ama and Nimo, each village is situated on a different small hill, and utilizes the swamp around that hill. In the mountainous areas, hamlets are often on river banks, nearer to pockets of sago swamp.

Villages are small, usually from one to four houses. Traditional houses are rectangular with many supporting poles and with walls of bark, sago leaf stems, or occasionally sago thatch. Roofs are flat in pitch and of sewn sago thatch, with gable ends sometimes protected by supplementary "veranda" roofs. Floors are palm bark, raised three to eight feet. The larger houses are usually partitioned into rooms, one per family. No spears, shields, or defensive house features were observed.

Men wear penis sheaths made from straight or curved gourds. Women's skirts are of twisted fibre, different in style from Iwam-Abau and Mianmin skirts. This difference suggests that the Arai people have had a separate tradition with little contact with others. Palm sheath bowls, and woven baskets for smoking food are used.

No evidence of men's cults was reported or observed. The most important ceremonial event is all-night dancing by men and women in a specially constructed house. Two types of houses are used. One is rectangular,

about 30 x 40 feet, with a raised sleeping platform of smooth sago stems eight feet in width around the outside. The other is even larger, conical in shape, and on the ground.

Villages in many of these languages except Owiniga have some degree of contact. Families travel two or three villages away for dances. Intermarriage occurs between many of the villages, regardless of language boundaries.

Contacts with villagers speaking languages not in the family are quite different. Dance visits are only exchanged with Amto and Musan. Relationships with May River Iwam speakers involved both raid and trade until administration patrols in the 1960's ended raiding. Contacts with Mianmin speakers have been particularly aggressive; a no-man's-land several miles wide is still maintained. The first purchase of Left May brides by Mianmin speakers from Usalimin was reported in 1970.

Individual Arai language groups listed from northwest to southeast are as follows:

Rocky Peak comprises Iwau, Agrame, Uwau and at least two other villages (Benato?) in the Rocky Peak mountains. Acculturation is slight.

Iteri comprises one named group located geographically and linguistically between Rocky Peak and Bo. This area is seldom contacted by outsiders.

Bo comprises Bo, Kobaru, Kaumifi, Nigyama and Umarita in the heart of the West Range. This area is also seldom contacted by outsiders.

Ama comprises the villages of Ama (Wobaru, Blesiki, Yowiye site), Boropa, Ienewe (Hou), Kauvia (Lehei, Kabia), and Tigi, all on hills rising from the swamp. Some Ama speakers now reside at the new Ama airstrip and patrol post. There is evidence that dialect differences are being eclipsed for the sake of their new unity.

Nimo includes at least two dialects. Villages identified with the Nimo dialect, described here, are Nimo (Boyemo), Wasuai, Didipas (including Uburu site), Unani, and Yuwaitri (which has now moved from Aimi site to Wanawo site).

The Nakwi dialect contains 71% probable cognates with Nimo. Villages identified with this dialect are Nakwi-Amasu and Augot (Mumupra, Sari). Village locations change frequently in both dialects in apparent attempts to find sites which are accessible to Europeans but environmentally adequate. Acculturation is slight.

Owiniga comprises the villages of Yei, Amu, Inagri, and Samo. Acculturation is slight.

Relationships between Arai languages are confirmed by cognate percentages from 13 to 59, by sound correspondences, and by similar phonologies. (See Tables 3 and 4, and Figure C.)

Figure C
Summary of Arai Phonology

Consonants:

p	t	k
b	d (Rocky Peak only)	g (Owiniga only)
p/f	s	h (Rocky Peak, Nimo, Iteri)
m	n	
	l/ɭ/r/ʃ	
w	y	

Vowels:

i	u
e	ʌ
a	ɔ

An example of seven contrasting vowels in Nimo is evidenced by the following: *ti sago*, *te liver*, *imʌ nose*, *na arrow*, *nɔ breast*, *no meat*, *nu banana*.

Contrastive word stress was noted in Ama, and possibly in Rocky Peak, Bo, and Owiniga. Examples from Ama are:

i'wa water	a'mu moon	mʌ'ɭa path
'iwa leaf	'amu nose	'mʌɭa vine

Syllable types CV, V and VV were found, with closed syllables only in Bo and consonant clusters only in Nimo and Owiniga.

Cognate percentages decrease with geographic and social distance suggesting support for our view that borrowing is important. Owiniga, which has fewest cognates with the others, is almost completely isolated from them at present. Iteri shares more cognates with both Bo and Rocky Peak than they do with each other. Heavy borrowing by Iteri from Bo and Rocky Peak is also evidenced by the fact that of thirteen cognates which it shares with only one other Arai language, twelve are with Rocky Peak or Bo.

Sound correspondences show very little difference in pronunciation between languages. In comparison the Sepik Hill family, with a similar range of cognate percentages, includes a much greater variety of phones.

Further investigation of a larger corpus is needed to determine the extent of the influence of borrowing.

This linguistic data confirms that these languages form a single family and that contact with Owiniga was once important. However, in our opinion it is impossible from this data to suggest how long ago these languages separated.

No relationships between the Arai group and other languages in this survey can be firmly established from this data. Although the cognate percentages with May River Iwam vary from 3% to 8% these are probably a result of borrowing. The speakers of the Arai languages were traditional enemies and trading partners with those who speak May River Iwam. On the other hand, there is one language not in this report, Samo-Kubo,¹⁹ west of Nomad River, which is 8% cognate with Rocky Peak, and an average of 5% cognate with the others. A very old relationship may be indicated, because at present the entire Ok family, averaging 1% cognate with the Arai family, lies between the two regions.

3.2 AMTO-MUSAN FAMILY

Northwest of the Arai River area, Musan and Amto constitute a separate language family. Amto is spoken by 208 people in the villages of Amto and Habiyan (Sernion) on the Samaia River. Acculturation is proceeding rapidly.

Musan (Musian (L)) is spoken by approximately 150 people in an uncensused village east of Amto. In an attempt to encourage mission or government contacts they recently completed a 1500 foot airstrip at the new village. Interaction with Amto is frequent.

Amto and Musan have 29% probable cognates. Sound correspondences include several identities. In addition, Amto u, o/a, k, p, n/r, and h correspond with Musan u/o, o, k/kl, b, l, and h/s, respectively.

Culturally both groups appear similar to the Arai group except for their houses. Though these are constructed like Arai houses, they are very long and are partitioned into six or more rooms for as many families.

Linguistically, Amto and Musan are only 4% and 3% cognate with Busan (Busa (L)), eighteen miles to the north. From this data a Busa phylum²⁰ seems unlikely.

The only significant cognate percentages between Amto and Musan and other languages are an average of 7% with the Arai languages. Since Amto intermarries and shares dance festivals with Bo, and Musan with Rocky Peak, this percentage of cognates probably reflects borrowing.

3.3 UPPER SEPIK STOCK

The phonologies of three languages of the Upper Sepik stock, Wogamusin, Sepik Iwam, and Abau, were outlined by Laycock.²¹ Our data adds two more: Namie²² (Yellow River) with approximately 2800 speakers and May River Iwam with about 2000 speakers. The Namie wordlist used here is from Panewai village, but checked against other Namie lists. Cognate percentages are low - 13% with Abau and 12% with May River Iwam - but seem significant to the authors because the language groups concerned average more than 2500 speakers and because recent borrowing seems unlikely. Namie and May River Iwam are traditional enemies and a wide no-man's-land is still maintained between them. The linguistic relationship is therefore assumed to be very old.

In material culture, all but Namie are similar to other groups all along the Sepik River. On the other hand, May River Iwam houses are easily distinguished from Arai houses by their oval roof shape and the use of heavy house posts.

These languages average but 3% cognate with Arai languages. This is interpreted as borrowing and is based on observed contact. The position of this stock in the Upper Sepik phylum is described below.

3.4 OK FAMILY

All of the region west and south of the Arai family to the West Irian border is now occupied by Mianmin speakers. Three Mianmin lists were compared, from Duktengfif in the Upper August River area, from Usage, the northernmost Mianmin village on the upper May River, and from Mianmin airstrip at the southeast end of the language area. The August River and Mianmin airstrip lists were 75% cognate. The Usage list was 81% and 83% cognate with the other two. This indicates a single language with two dialects. The August River dialect, here called North Mianmin, has also been called Suganga, Blimo, and Wagarabai.²³

Mianmin speakers are organized in clan-villages which are continuing to expand northward, though expansion is now hindered by the cessation of warfare. Though Mianmins also visit between villages for dances, apparently these visits are only with the two or three nearest clans. Upper May River Mianmins seemed unaware of August River clans, and these in turn were unaware of upper Idam River clans, though all spoke the same language. Culturally, Mianmins are like other groups speaking languages of the Ok family, living in very small houses and subsisting primarily on taro. Gardening and pigs are important. In contrast with Arai speakers, neither sago nor areca palm are used.

Therefore, the large Mianmin area is interpreted as the result of recent rapid northward expansion from the southern half of their present range. The virtual lack of cognates with languages to the north implies expansion by vigorous warfare, without extensive intermarriage.

South and west of Mianmin further information can now be added to the description by Healey. A chain of three closely related languages, Tifalmin, Busilmin, and Lower Atbalmin, stretches northwest from Tifalmin. (see Table 5.) Interaction between them is implied by higher cognate percentages with the middle language of the three. Just across the West Irian border there is another Ok family language, the eastern dialect of Ngalum. Ok family languages were 0-4% cognate with all other languages in this survey.

3.5 WEST IRIAN BORDER

Two languages are spoken at the village of Blake No.2, on the October River just east of the West Irian border. The men of this village speak Pyu, but many of the women are Biksi speakers from West Irian.²⁴ (Some Abau speakers live there also.) Both languages are 0-3% cognate with all languages shown on the chart. They are 1% mutually cognate, an indication that obtaining wives from Biksi villages may be a recent innovation. Pyu is also spoken at Buriap village on the Sepik in West Irian. The Biksi language area is said to extend for six days walk west of the border.

3.6 LEONARD SCHULTZE AND FRIEDA RIVERS

Paupe,²⁵ the language spoken by 70 people at one village on the Frieda River, is 29% cognate with Duranmin, a language spoken in a few hamlets on the Kenu River, a tributary of the Om River, 35 miles to the south. The only other language more than 3% cognate with Paupe is Yabio, about ten miles to the east. The Woswori village islect of Yabio was 7% cognate with Paupe. However, only one of these cognates was also shared with Duranmin. The most likely sequence of events is that Paupe had a genetic and/or extensive interaction relationship with Duranmin in the distant past, followed by more recent interaction with Yabio.

Walio is 12% cognate with the Woswari village islect of Yabio,²⁶ suggesting that the languages in the Leonard Schultze River area are related at the phylum or stock level rather than belonging to a single family.

A complete lack of cognates with May River Iwam confirms our informants' reports that the present intensive interaction began since mining exploration started on the upper Frieda River in 1968.

4. WIDER RELATIONSHIPS

In order to place these languages with respect to other Sepik languages, seven other languages were also compared. Some previously undocumented relationships emerged. (See Table 6.)

Washkuk (Kwoma and Nukuma) and Yessan-Mayo (Mayo) are 38% cognate by this data, so are interpreted as a single family. Verb stems in the two languages, few of which were used in this cognate count, appear to be even more closely related. The two language groups occupy contiguous lands north of the Sepik and west of Ambunti, and exhibit many cultural similarities. However, the Yessan-Mayos believe that they came from Burui, some 50 miles down the Sepik, and wrested their present land from the Washkuks. North of the Sepik, Laycock has also tentatively placed the languages Pasi, Pahi, Mehek, and Kalou in this family, which he calls the Tama family.²⁷

By this data, Washkuk and Yessan-Mayo share 21% and 26% cognates, respectively, with Abelam, a geographically distant Ndu language. They are also 14% and 20% cognate with Bahinemo, a Sepik Hill language. Since the Sepik Hill languages tend to share 10% to 15% cognates with Ndu languages,²⁸ a Middle Sepik Stock comprising these three families is here confirmed.²⁹ This stock includes at least 36 languages,³⁰ spreading from Maprik to the central ranges and from Yangoru to the Leonard Schultze River.

The Middle Sepik Stock shares 7% to 15% cognates with Chenapian and from 3% to 10% with Namie, Abau, and May River Iwam. The large size of some of the languages and the distances between them indicate that at least some of these words must have been shared before the languages reached their present locations. Sound correspondences provide additional evidence that the relationship is ancient. (See Table 7.) Therefore a Middle Sepik Phylum comprising these languages is tentatively identified.

By our data, Yerakai³¹ is an average of 6% cognate with these languages, but it is tentatively left out of the phylum. Partly due to continuing extensive intermarriage with Iatmul speakers of Chambri Lake, Yerakai and Iatmul are 22% cognate. After removing from the count those words which, because of phonological similarity, seem to be recent loan words with Iatmul, the resulting percentages for Yerakai were 10% with Abelam and 1% to 4% with the other languages of the phylum. This data does not support an ancient relationship, though it does not rule it out.

5. CONCLUSIONS

This paper has linguistically mapped the Upper Sepik area and clarified the relationships of languages as much as is possible by present lexicostatistical methods. It has suggested a view of linguistic change for small interrelated villages which may result in a more realistic perspective of Upper Sepik prehistory. New lexicostatistical techniques must be developed before these and many other Papua New Guinea languages can be adequately compared on a lexical basis. Such comparisons, aided by grammatical comparisons and detailed application of the comparative method, are also needed to confirm or deny the relationships postulated here.

N O T E S

1. For the Amanab Sub-district, see Loving and Bass, 1964; for the "Sepik Hill" region see Dye, Townsend and Townsend, 1968; for the Telefolmin area, see Healey, 1964 or the summary given in Wurm 1965:378-82; for the Upper Sepik River area where the Upper Sepik Stock languages are spoken, see Laycock, 1965b and 1973. Dr Laycock also assisted in identifying a number of wordlists taken by others in this region.
2. Transportation for this survey was by helicopter and was supported by the Research Fund of the Papua New Guinea Branch of the Summer Institute of Linguistics. The authors wish to thank all those mission and administration personnel who cooperated in the project. Specifically we would mention patrol officers Charles Ari, Barry Fisher and Dennis Mahr, and CMMML missionaries David and Muriel Bailey and Bruce Macleay. Lexico-statistical calculations were made on a computer by the Mathematics Department of the University of Papua New Guinea, headed by Professor Max McKay. Special thanks are due to Mr Roger Dodson of S.I.L. whose helicopter piloting skill made the survey possible. The survey took place from March 4 to 20, 1972. Karl Franklin and Alan Healey of S.I.L. made helpful comments on earlier drafts of this paper.
3. Bee and Pence, 1962; Laycock, 1970; Oswaldt 1971.
4. Abelam, Bahinemo, May River Iwam, South Mianmin, Tifalmin, Washkuk, and Yessan-Mayo. In each of these the lists were recorded by S.I.L. personnel after more than a year of fieldwork.
5. Basically the principle followed is the same as in Healey, 1964:77; see also Gudschinsky 1956.
6. See, for example, Hymes 1960.

7. The Sanio language, spoken in the foothills of the Wogamus River drainage basin, took its name from such an event. Men from Sanio village captured Yarino village and settled there. The children of this union were frequently told by their mothers, "We are not speaking our language. We are speaking Sanio talk." A generation later William and Patricia Townsend were told, "We speak Sanio." (personal communication). The dialect in this village not surprisingly includes more "loan" words from Yabio, the mother's language, than does other Sanio dialects.

8. Pawley 1970:354 demonstrates for Polynesia that grammatical features change more rapidly in small speech communities than in large ones, but he is uncertain as to whether the same is true of basic vocabulary.

9. Lithgow, forthcoming.

10. Bloomfield 1933:317, in a discussion of Schmidt's work; Swadesh, 1959.

11. McElhanon, 1970.

12. McElhanon, 1971:121.

13. For Ndu see Laycock, 1965a:185-90; for the Sepik Hills see Dye, Townsend and Townsend, 1968.

14. 1967. The data was taken from Laycock 1965a.

15. 1972:30-3.

16. A similar hypothesis is explored in Franklin's introduction (forthcoming), with particular attention to assumed cultural words which are examined in more detail in Dutton, forthcoming.

17. Healey 1964:108; Laycock 1973:44-5.

18. Population figures are from 1971 census data obtained at May River and Green River Patrol Posts. The Namie population estimate is from Mr Cecil Parrish, CMML, Yellow River Patrol Post. See Laycock 1973:44-5. An (L) following a language name indicates the name used in the classification of Laycock 1973, where the Arai Family is referred to as the LEFT MAY PHYLUM/Left May Stock/Left May Family.

19. See Shaw, R.D., forthcoming.
20. As proposed by Loving and Bass, 1964:3.
21. Laycock, 1965b:113-7. A closer comparison of May River Iwam and Sepik Iwam indicates approximately 60% probable cognates in noun and verb stems but significantly different verb morphology. See Conrad, Laszlo, and Rehburg, 1970.
22. Laycock 1973:75, however, reports that Namie belongs to a Yellow River Stock/Family including Ak and Awun. He places this stock/family in the Middle Sepik Super Stock rather than in the Upper Sepik Stock, on the basis of shared typological features with certain languages in the Middle Sepik Super Stock.
23. Loving and Bass, 1964:3; Healey, 1964:42; Laycock, personal communication January 1972.
24. Laycock 1972:76-7 gives lists of 48 words for each of these two languages.
25. The Paupe language is also called Papi in Laycock 1973:33, where it is suggested that Paupe belongs to the Leonhard Schultze Sub-Phylum along with Walia, Pai, and Yabio.
26. Although Walio and Yabio were reported as 27% cognate in Dye, Townsend and Townsend, 1968:154, their Walio list was inaccurate.
27. Laycock, 1973:22-3.
28. Dye, Townsend and Townsend, 1968:153.
29. Laycock, 1968, based on preliminary data, showed lower percentages.
30. A partial survey of Hewa by L. Bruce and M. Lawrence of S.I.L. shows that it comprises a sub-family of at least eight languages. This brings the total of Sepik Hill languages to 22. Chenapien, seven Ndu languages, and six Tama languages bring the present total of Middle Sepik Stock languages to 36.
31. Described in Dye, Townsend and Townsend, 1968:154.

TABLE 1: PROBABLE COGNATE PERCENTAGES, UPPER SEPIK

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TABLE 2: WORD LISTS

English	Musan	Amto	Rocky Peak	Ama	Nimo	Bo	Iteri	Owiniga
<i>arrow</i>	Yamu	namu	lo	YamΛ?	na	lo	lou	tamo
<i>ashes</i>	sɪsΛmo	taʃau	tausu	tanΛpamu	tanɪsouk pɫyas i	taka	tawΛ	sakoni
<i>back</i>	bayame	foiyæ	bou ^u ti	namYi	ateyami	nΛniman(e)	nΛmΛ	abumΛʃi
<i>bad</i>	piowaʃe	supuwaʃe	mudu	kaya ^u	pesΛku	bʃomu	mutu	bai
<i>bamboo</i>	hebe ^{me}	tafʃu	ta ^{po}	kuki	kΛwiI	ta ^{ʃu}	-	-
<i>banana</i>	hapo	hapu	be	ako?	?nu	waki	wei	nu
<i>belly</i>	haYie	nowiye	nime ^{lo}	nΛmΛYi?	panΛ	nipan	neminau	nibamu
<i>betel nut</i>	pΛse	fati	haYi	haYi	pɔ	papo	-	fΛʃi
<i>big</i>	?ai	ifiya	se ^{li}	seYiaki?	huauh	wΛnima?	syΛʃi	pinawe
<i>bird</i>	?ai	ai	wo	o	wΛ	wɔ	wΛʃi	be
<i>black</i>	tɛwane	towan	se ^{po}	sΛlinamu?	pʃi	sΛkakiye	-	to kakame
<i>blood</i>	haʃe?	nΛkei	wo	nakΛ?	iwΛ	kwo	wo?	ke
<i>bone</i>	haʃe?	hae	moto	mi:	mi	mutuk	pumoto	miʃi
<i>breast</i>	ne	ne	nU	nΛnΛ	nɔ	nɔ	no ^u	nano
<i>cassowary</i>	kepiɔ	kΛpiya	wΛpiya	?aipie	awani	aiyu	sakyu	egu
<i>chin</i>	itaYie	ɛmyatiye	?oso	kɔ	ami	kɔmi	oso ^u	ɛʃimeʃi
<i>cloud</i>	nebe	ukako	ma	kumaki	kakʃi	maka	ma?	bau
<i>come</i>	po	ahumune	wamu	natuma	nɔ momowamo	samo?	sapuum	tasum ^w i
<i>crocodile</i>	lobu	nɔpu	haYΛka ⁱ	pΛYΛka ⁱ	siʃapiI	dobu	-	sinapi
<i>dog</i>	so:	hɔ	so	aYuo ^u	?au	naʃi	so?	beʃi
<i>ear</i>	e?	ye	?o	?ia	ɔ	kɔ	æ ^u	iso
<i>earth</i>	ya	hæpe	?Λsi	asi?	isiI	kisi	asi	ya
<i>eat</i>	pe	me:ne	wɛno	napΛna	pano	sano?	tΛposinæ	epepeki
<i>eel</i>	awaYi	(w)uʃu	Yinda	YæpΛni	uʃapu	(w)uʃu	-	tameʃi

Table 2 (cont'd)

English	Musan	Amto	Rocky Peak	Ama	Nimo	Bo	Iteri	Owiniga
<i>egg</i>	iʔo	ai:	ʔabotino bio	ʔui	i	wɔi	wɔi	bene
<i>elbow</i>	katumu	netomwæ	naʔi	natoku	nɛtu	natoku	natu	nɛmukwabu
<i>eye</i>	mene	mo	ɸogwa	mɛʔa	mo	mɛʔo	-	moʔo
<i>father</i>	ayoʔ	aiya	iba	ʔapoʊʔ	apɔuk	epa	ipa	baba
<i>fire</i>	maʔi	maʔi	yeyu	tah	ta	ta	-	sa
<i>fish</i>	bɛʔi	ʔapai	kwaʔi	ʔa	le ʔe	lie	ʔwaʔi	ta
<i>fish spear</i>	ʔaʔwo	kave	ʔo	takani	sɛnɛnɛ	itei	-	baka
<i>flying fox</i>	bakɛʔu	bukou	-	bɛsɛʔa	kouwɔ	syu	syu	fonai
<i>foot, lower leg</i>	gɛʔaʔi	hae ikei	ɸesali	fɛto	ɸɛʔi	ɸesɛʔi	ɸwisɛʔi	feʔæ
<i>forehead</i>	ɸekaʔe	fokai	nɛmi	nɛnami	nɔmi	nɛmi	nɛmi	kɛmwame
<i>four</i>	katukwiɛʔo	kiyapei	nɛneso	titati	eyɛ	aisɛ	nɛnaisæ	sunekame
<i>frog</i>	sɛkɛ	huno	naʊ	sɛliʊ	yɔ:meik	nau nɛmei	nau	nekwa
<i>garden</i>	kaneno	naʔɛne	ano	ʔisiʔ	anɛ	kano	-	foko
<i>good</i>	yaʔtiʊʔo	suwɛkʔina	onɛni	tonimɛʔ	wɛresɛi	pa	uʔai	tɛgɛmɛ
<i>grass skirt</i>	kaʔowai	hɛmɔ	ya	yanɛ	ɸaʔei	ya	-	ena
<i>hair</i>	nanigi	(twæ) iwo	ʔemisɛ	kamusowa	ʔamiso	kɛmsiya	ami	kɛmo
<i>hand, arm</i>	ka	næ	nai	nainɛ	inɛ	nai	nai	nɛmutibu
<i>head</i>	nani	twæ	ʔemi	kamu	ʔami	kɛmi	-	kɛmɛ
<i>heart</i>	wɛʔ	bukai	maʔimo	muʔu	mɛʔi	mɛʔi	ɛpei	muʔini
<i>house</i>	ʔi	ya	nu	nu:	nuna	nuku	nu	nuku
<i>knee</i>	ʔawɛʔaʊ	tumwæʔe	ɸami	æʔikamu	imɛbuwo	ɸɛsa	ɸaemi	fɛgabu
<i>laugh</i>	wɛʔ	owine	sɛliɛmo	ʔɛtesɛʔani	-	sɛʔuwa	-	i

Table 2 (cont'd)

English	Musan	Amto	Rocky Peak	Ama	Nimo	Bo	Iteri	Owiniga
<i>leaf</i>	sɛʔ	he	ʔasi	ʔiwa	asɔ	kasia	au	iba
<i>lime</i>	sɛ	hae	sama	sali	aiyɔ	ma	-	ɛʔe
<i>liver</i>	teʔ	te:	biyatlano	aɣuma	te	masi	imesi	swakane
<i>louse</i>	nani	nanu	ʔɔ	ʔani	amiɔ	ka	æ	eni
<i>man</i>	yɛnokono	kyu	no	naɬa	no:	naɬa	naʊ	naɬa naɬaina
<i>meat</i>	hɔ	me	nosu	kaʔanisimu	no	nusu	lasu	nolo
<i>mosquito</i>	metani	meitan	ba	wamɬ	wɔ	kwa	-	bame
<i>mother</i>	inaʔ	ena	ina	ʔanaʔ	anɔuk	ina	ina	aiya
<i>mountain</i>	ʔɛɣiyɔ	kai	yoʊpa	yu	you	ɔɔ	pwɛsæ	tema
<i>mouth</i>	isemiako	nobʔone	ʔomi	ko	itabo	kom	omi	imeʔi
<i>neck (nape)</i>	tibiaʔe	tipiyaʔi	tibusu	tɛna	naɬaʔɬaba	naɬami	tyapusu	negamɬi
<i>net bag</i>	ikei	ye	ʔi	ʔi	i	itabo	itapo	i
<i>new</i>	tutuʔ	ten	ɣuaita	tanuɔoa	tamɬ	takoma	taɬamɬ	taɬame
<i>night</i>	ʔanɛkɔʔ	bumyæ	bimɔ	ʔamɬɬakiʔ	pimi	safatiaka	samɬ	uʔatoumi
<i>no</i>	nabio	hamyɔk	mɛ	wuɔpaʔ	pa	same	muyɛʔ	nabuʔu
<i>nose</i>	ɣimɬ	ni	ʔimodu	amu	ʔimɬ	ki	imuʔ	tɛmɛʔi
<i>old (house)</i>	tutuʔ hɔmbo	tomau	o	taɬkumi	waiɪ	taɬakowo	emyaiyi	ɛmɛ
<i>older brother</i>	aboʔ	apo	wayo	ʔauwaʔ	auwa	maʔɬaka	waiyou	apalea:ʔo
<i>older sister</i>	laton	taʔa	wɬiɣi	ʔinaʔi	nawajɪ wɔɣɪ	owa	wai	aie
<i>one</i>	samo	ohu	suso	siasa	siasa	sɔsɔ	susæsæ	ɣaʔu
<i>pig</i>	kinadiʔ	ma	pu	pu	pu	pu	hwusu	kebaʔe
<i>rain</i>	ʔuri	wi	sa	sa:	sɬ	sa	saʔ	a
<i>road/path</i>	mono	mo	ʔæliwi	maʔa	aʔiɪ	kaʔi keʔi	ʔi	meʔebi

Table 2 (cont'd)

English	Musan	Amto	Rocky Peak	Ama	Nimo	Bo	Iteri	Owiniga
<i>root</i>	nekʲi	amnaki	ʔate	ʔatati	atiti	katiʃa	ətʃi	meʃaiya
<i>sago</i>	tawe	tɔ	ta ^u	tuʔ	ti	tau	-	neve
<i>sago thatch</i>	iɸonu	eiye	nɬɸu	iɸanaʔ	wei	nɬɸ	-	nugumuʃi
<i>sand</i>	nebei	hɬbwan	kʷi	upe ⁱ	upweiI	ukei	-	yakoʃpane
<i>shoulder</i>	kɬiti	neyæ nɬʃiaʃe	nɬma	nɬma	nɬmami	nɬmami	nɬma ^u	baʃu
<i>sit</i>	mltikəɬm	nɬte	wosonawo	teosa:kanaʔ	sɬsiau pɬsiau	wɬsiyako	-	kepeinɬ
<i>skin</i>	ʔaoko	ka	dɛbo	au	abu	tɬɔ	na ^e	sepe
<i>small</i>	noɰwana	kakon	ɬɬboli	ka ^u pa	tɬpontai	kepikiye	-	pɬʃena
<i>smoke</i>	taɸu	taɸu tafu	neniʔ	tauku	monita tawouk	tanini	ɸinabi	saipi
<i>snake</i>	wiyemi	wisɬɔ	namaʃiso	noaʔ	nɔu	nonaʃi	ubeʃi	nɔ
<i>stand</i>	hegetaemi	fi te	ʔeto ^u natu	tɬtɬɬau	pɬtɬʃatu	wɔtʃisi	satiʃi	takas ^u i
<i>star</i>	imosuwa	mɔ	tɬmomo	ʔamaʃakuʔ	amɔ	mota	tamomo	bouwe
<i>stone</i>	tɬɛki	tipeki	tɬbe	tɛmakiʔ	tɬpei	tɬpaki	masi	sia sya
<i>sugar cane</i>	naʃe	pai	ɣɬo	ʔikɬo	kouʃɔ	yako ^u	yau	pounu
<i>tail</i>	-	fai	nedu	apo	nikou	nitiku	-	sukuti
<i>taro</i>	na:bo	napu	nu	waitoʔ	unakia	no	noʔ	nou
<i>three</i>	ʃuweʃo	kʃi:ya	to ^u so	ta ^u we	tɔ:tɔ	tousɬ	tausæʔ	sogumɬbi
<i>thumb</i>	kamɬni	nemoʔ	namuʃu	nainɬtu	inɬmɔ	nainat	namuʃu	nomumaʃu
<i>tongue</i>	hane	hɬne hæne	ʃɬse	isauna	isa:pe	ɬese	ɬete	ise
<i>tooth</i>	ʔi	i	ʔe	ʔi:	i	ki	ɬ	imeʃi
<i>tree</i>	ameʔ	amɬ	ʔa	ʔə	a	ka	əʔ	a

Table 2 (cont'd)

English	Musan	Amto	Rocky Peak	Ama	Nimo	Bo	Iteri	Owiniga
<i>turtle</i>	lowiaře	kwapu	nalbo ^u	nalbo ^u	nalbouk	kwabo	-	nouū
<i>two</i>	himolo	kiyaA	tiso	tiwe	ti:	tisA	lisæ?	simabi
<i>vine</i>	wenA	ken peře	mallo	mal'a	mo	mal'a	mutu	me'a
<i>walk</i>	palɛme	hɛnene	pa ^u	yasai	sanA	wona?	wɛpei	-
<i>wallaby</i>	besi	nal'au	buguna ^u	ʔasinima	paki	pai	pæti	abaiga
<i>water</i>	wi	wi:	ʔu	ʔiwa	wi	ʔu	u	bi
<i>white</i>	ʔp'owɔ	wɔ	o ^u ye	pam ^u	pomuwɔ	koune	-	-
<i>wind</i>	ʔemisi	iwami	pali	imɛnu?	umani	wati	pi'rei pi'rei	bye
<i>wing</i>	kɛtiti:	pɛ:mɛne	dɛpiono	nataki	nounA	sofiyatu	nal	ma'rei
<i>woman</i>	ʔe'lo	hama	ba	nal'la'la mwi	niɛ	kwɛ	u wa ʔwa	nini
<i>yam</i>	ya're	l're e're	wo	wiwo?	ubeise	kwo	wo?	moko
<i>yesterday</i>	weli	me'a	hwe	pai	pwe	pwe	hwe	amæ

Table 2 (cont'd)

English	Woswari	Walio	Paupe	Nagatiman	Busan	Pyu	Biksi
<i>arrow</i>	sane	mitapo	aʔameo	sipa	paʔe	ɸwi:ɛ?	siaA
<i>ashes</i>	tiyami sapu	inaʔaʔi	ʔi sabu	sumaliɸa	tuʔao	kame samilo?	yota:
<i>back</i>	tainaso	ibo	abaio	amaʔebu	wiba	misiʔi?	naʔan
<i>bad</i>	yaiye	miakʔasaiwata	pauwi saboge	tebu	buʔiaebu	mogaguliæ?	dwaʔ
<i>bamboo</i>	-	kʔyo	titobugu	aʔakʔ?	-	sibwe?	sia
<i>banana</i>	yane	owo?	abepa	nu	bia	kia?	ma ^u ɸ
<i>belly</i>	tifaʔawe	la ^u sapiawo	pumuʔisa	aʔʒɸ	ʔlenʔ	aʔʔi?	nan
<i>betel nut</i>	-	amuwe	eʔo enei	kuʔuʒɸ	-	ɸati ɸadi	ɸiʔi
<i>big</i>	fʔʔi	puʔʔi	yabi	taku	tamaʔa kari	ole	ʔʔbutʔgoɸ
<i>bird</i>	auma	-	ɔ:sani ɔbo	ɸule?	wana	maʔuʔi?	ʔo ^u
<i>black</i>	tʔsiʔʔʔe	telepuago	auyomaʔake	niɸtulogu	baʔo	ʔeʔi?	ʔis
<i>blood</i>	teyuowa	li?	taneke	wi:nu?	aɸ	emi?	ndweʔ
<i>bone</i>	ihuwa	ipalibo	naikʔmio	eʔe:bu	abuwiʔa	biʔi?	biʔi?
<i>breast</i>	mama	matʔpulo	abiyaio	ma:ba	nɸ	iʔi?	num
<i>cassowary</i>	aumʔsi	apokwasɪ	u:sibo	buʔame?	wʔuwa	legi?	kʔaʔ
<i>chin</i>	tanoʔi	taʔobibo	maʔukome	iɸeʔu?	ʔkʔiba	ʔuʔumagu?	naʔʔʔan
<i>cloud</i>	sʔʔi hewa	wuʔulasupe	wabʔsʔʔine	matapa	bari bari	sʔʔaʔe?	kos
<i>come</i>	aiya	nga?	namo	esi	ariæ	motie? mʔdie?	ti:
<i>crocodile</i>	-	sebakwei	sinapi	mamʔʔi?	-	ʔobu?	ʔʔadubuneʔ
<i>dog</i>	i fau i vaʔ	kauwaɸo	agabu	kali?	inaʔri	nagu?	sai
<i>ear</i>	afe	aɸoɸo	maʔʔnaba	ɸuʔu?	dina	kwee	kʔaʔ
<i>earth</i>	susaʔe	sipo	maʔkaiyo	tibe	to	ɸugi?	baʔʔamaʔ

Table 2 (cont'd)

English	Woswari	Walio	Paupe	Nagatiman	Busan	Pyu	Biksi
<i>eat</i>	afa?unaŕu	kanabo	opo akepo	hieŕe	muniaŕen	wange?	nteŕpɪ
<i>eel</i>	-	ŕapuaŕe	pŕi apuk	tita:zɸ?	-	umasi?	soŕam
<i>egg</i>	aumufu	naŕu	usouyo	kah	mliya	ŕio ta? ta?	ŕonŕa
<i>elbow</i>	yanipa?aŕu	nanpakuŕu	nubogio	taŕaskapɸ?	etiba	kabimioɸu?	paŕsu paŕsu
<i>eye</i>	nimau	nogubane	sunweyo	na:ba	dena	peme?e	?i?
<i>father</i>	ape abe	taita?	auwase	?aya?	aiya	?ape	?awaA
<i>fire</i>	tiyami tanuwa	linati	ŕiku	ahuɰi?	eba	kame	ya ^u
<i>fish</i>	afitano	awe	auwabo	mu?	rabe	tubu	ndam
<i>fish spear</i>	-	i pa ^u paŕa	su:ke	maŕaki	-	budia?	ŕeŕop
<i>flying fox</i>	aumwifiya	abokopiya	wibibo	na:nʒu?	raŕba	?oliame?	baŕanaA
<i>foot, lower leg</i>	eŕiaŕiyai	takupo	naipumuai	eŕebu	tirimi	huli duhene	(yop) paŕe
<i>forehead</i>	ti?au	nakikwaŕawo tipo	aukome	eŕi?	eniba	mabaŕi?	niŕpan
<i>four</i>	ŕi?iyawa	sagobabo	buyapai	niŕina?	aite	asubwi?	undai undai
<i>frog</i>	aŕoma emene	sosikaŕa	siyaubo	gi?	ai	paŕasu?	bidu
<i>garden</i>	-	wasisi	aŕuŕeai	niʒɸ?	-	abaŕi?	yoŕiI
<i>good</i>	ai?are hewa	miakla ^u	pesage	taŕe?	wuræro	ninaŕaŕae?	ŕopaŕo ^u
<i>grass skirt</i>	-	pe ⁱ hasi	kaseke	yah	-	beŕi	waŕ
<i>hair</i>	yei	tiŕe?	aŕupisi	saŕaŕahupa	etete	ŕisi?	paŕama ⁱ
<i>hand, arm</i>	yanineŕu	nanapo	nusame	tuba	nɸ	kabi duhane?	paŕlam
<i>head</i>	tipafu	tiŕo	auwiyu	asu	owuna	uŕi?	paŕan
<i>heart</i>	namau	?e ⁱ labina	sosaio	yaku?	dati	semeŕi?	kŕeŕan

Table 2 (cont'd)

English	Woswari	Walio	Paupe	Nagatiman	Busan	Pyu	Biksi
<i>house</i>	osapu	osapo	noumi	toh	te	mæ?	nam
<i>knee</i>	eʔepaʔaʔu	ɛlɛpakusɛʔɛ	na:pukupi	sklɔpu	domanɔ	humabiʔ	yopso
<i>laugh</i>	ɣɪsuya	tiagiʔ	sumomokɔʔibo	susuʔ	totoe	ʔoneʔ	maAputito
<i>leaf</i>	nwai	nɔwapo	sɔnipa	ta:baʔ	iri	ʔangiʔ	yemɛ
<i>lime</i>	-	osɔgei	mununu	patingɛʔ	-	dimeʔ	tɛɹ
<i>liver</i>	umɔne	tebo	mumɔ	manibu	munɔ	sɛpiɛʔ	nuɔwa
<i>louse</i>	dibafuyei	natapi	aʔupɪsɪ	mibaʔ	amo	niʔ	yim
<i>man</i>	to i:wa to	ɛlɛgobuwo	sanopo	hoH	nutu	taliʔ	nam
<i>meat</i>	amiyamiʔ	awai	tɔmabumuɔ	apaubu	muni	wɛʔ	mbadnim
<i>mosquito</i>	-	wa ⁱ	aibo	kaʔipaʔ	-	ʔajʔ	bidumsu
<i>mother</i>	ama	papaʔA	auwame	beʔ	mɛ	miʔ	ndaA
<i>mountain</i>	Wwaʔu	nɔpɔnapu	mɔkaiyam bɔka	patiniʔ	abɔ	aweʔ	lɛɛ
<i>mouth</i>	tano tano inau	taʔowei	maʔukome	ipaʔupu	ɔtɔɔɔ	pɔʔɔmaguʔ	nɔnapan
<i>neck (nape)</i>	ɪsɪʔi	nabwiɔ	isɔkɔmiyok	uguʔʒɔ	onɔibɔ	tɔboguʔ	ʔɛʔɛpan
<i>net bag</i>	tasuya	ʔigu	meimi	musuʔ	eta	iʔnɔʔ	ʔam
<i>new</i>	usane	miakɔʔa ^u	usanimi usaniyɔ	tihɔʔ	titiyɔu	amiʔ	ʔaʔam
<i>night</i>	tatufiya	tɔʔɔpuwaʔ	wabeo ɔɔʔiaso	kuʔapi	de	moisiɛʔ	tɛɹ
<i>no</i>	yasɔ safiye	kɔkɔʔa	wariyage	wɛ:ɛ	noko	mamɔniʔ	tona
<i>nose</i>	tɔmɔsi	tɔpɛpɔʔ	tɔnipoku	ɣɛlu	wati	tɛpɔʔi	ndor
<i>old (house)</i>	woʔiyai	tɔsiɔ	uʔiyaimi uʔiyaiyai	hɛ:nu	tem	nuwa(inuʔ)	anosam
<i>older brother</i>	manefa	awanabɔ	waiyabɔ	apaʔ	aba	waeʔ	wan
<i>older sister</i>	auwa	anatɔnabɔɛ	auwa	mɪsɛnbɔʔ	dowɔɛ	kwawaʔiʔ	nɪmɔɹ

Table 2 (cont'd)

English	Woswari	Walio	Paupe	Nagatiman	Busan	Pyu	Biksi
<i>one</i>	aʃasabau	aʃia gaʃaʃila ^u	sunuboku	ʒuwa?	otutu	teɸie?	kesa
<i>pig</i>	ami ami	taʃibo	taʃmaubo	gʃeʃi?	waru	wɛ?	mbaʃ
<i>rain</i>	omo hewa omo	bogwaibu	aʃu:yo	tu	bani	ogaʃi?	keʃ
<i>road, path</i>	efamowa	ʔɛɸobu	paʃɸiyaio	aʃaɸe?	ti	ʔone ʔonə	mlaA
<i>root</i>	yanuso:	binapo	na:sumunu	tilkaɸu?	duwanda	kanagaʃi?	ɣonan
<i>sago</i>	-	po ^u	siai	na:ge?	-	ma?	yaA
<i>sago thatch</i>	-	ɸi	kʃisiapa	ʌnɸaʃbaʃi	-	gi?	yamai
<i>sand</i>	uʔau	pasinasi	susu	ɣenemba?	obariə	sigʌʃi gaʃiɣə	kaʃaʃian
<i>shoulder</i>	yaniso	naɸasi	ʃipumu same	peʒu?	bumana	abaʃi?	wap
<i>sit</i>	anu sita	sita?	akauwiɣə	tupa	mimabə	huʃi	ʔamaʃoO
<i>skin</i>	toefahewa	aɸayo	paɸiɣə	ʒibu?	tati	kaʃkaʃe?	toʃ
<i>small</i>	isi isi	ɸukeʃeɸe	sauyu	tokwɛɸu?	naʃaɸreɣə	saɸami	naʌmatʌɸɔp
<i>smoke</i>	tiyam nise	luwapulo	ʃiku yu	ahiyaʃipa?	titibi	kaʌɸsiya moliya?	yagos
<i>snake</i>	efaʃea	naɸinaɸie	nasumobo	ta:ʒu?	nibaro	sihmiə?	siɸaʃ
<i>stand</i>	twafita	tiyaʃito	asapai	eʃiɸe?	amuram	gaɸdam	tawe aʃ
<i>star</i>	saʃifaʃiya	paseto	nuweiku	sikaɸuba?	tetibi	gi:bi	ʃeʃa
<i>stone</i>	tabiya	ɸubo?	tabiyaio	anɸzi?	bito	suli?	tikaɸ
<i>sugar cane</i>	au	uʃaɸgu	opuku	ʒikaɸa?	emiyo	ʔamu?	ɣgaA
<i>tail</i>	-	-	taʌmaʃauʃio	ke:bu?	ʌɸaita	-	-
<i>taro</i>	paʃe	paɸapo	me:nawa	toɸe?	mawa	ʃi?	maA
<i>three</i>	wanapu	guʃabuʃo?	amukaʌnobe	ʔa ^u na?	onaʌa	naga gasi teɸie?	indaɸisaʃ

Table 2 (cont'd)

English	Woswari	Walio	Paupe	Nagatiman	Busan	Pyu	Biksi
<i>thumb</i>	tyami	nanti tawopu	numesio	tabagodz'u?	iyubana	kabindamo?	paĩnaA
<i>tongue</i>	tanotai	nagaya	sakeyo	aĩži?	dagala	asagu?	moĩ
<i>tooth</i>	nafe	napapala	sumunu	eninu?	wuti	lanne?	oĩa
<i>tree</i>	yanu	bipo?	na:baKa	ti:	nda	ga ka	yo yo
<i>turtle</i>	-	ẽĩeboto	oweimene	ka:ĩe?	-	kyisu?	gĩut
<i>two</i>	aĩafĩi	guĩaĩa?	suwabiyaio	teĩe?	tinana	kasi	tes'ensaĩ
<i>vine</i>	yani yini	oĩi:	mukuyo	ta:ba?	ei	b'ẽ?	la
<i>walk</i>	anosita	ĩainau	ubunabu	agužĩ?	mĩimi	humupia?	seĩpume
<i>wallaby</i>	awaĩuso	sebakusili	tumusinamo	watike?	boe	?i suwe?	naĩ naĩ
<i>water</i>	utlauwe	gwe ⁱ	aĩukowa	tu?	ani	?i?	keĩ
<i>white</i>	wabu'oĩe	wapuĩa ^u	sawaĩe	tatiwa?	tibiĩte	ga:	ĩoi
<i>wind</i>	nanaĩi	nabuabo	tiĩimweo	pĩeĩu?	parotu	?ibumj?	ĩebĩnyo
<i>wing</i>	tautanaĩu tei	kape	opeisa	h'akulu?	tunuiba	?ambalĩe?	paĩ
<i>woman</i>	sauto	tokotabisia	su:bu	mĩe?	to	ĩomẽ?	namiyaA
<i>yam</i>	-	kobuesibu	upuĩu	tamakũ	bai	wapi	ngai
<i>yesterday</i>	auwa	au	amo	ya:mẽ?	dinamo	?aĩu?	mede

TABLE 3
COGNATE PERCENTAGES, MAY RIVER REGION

	Musan	Amto	Rocky Peak	Iteri	Bo	Ama	Nimo	Owiniga
Amto	29							
Rocky Peak	8	8						
Iteri	5	4	57					
Bo	6	8	47	59				
Ama	9	8	37	29	33			
Nimo	7	10	32	35	36	41		
Owiniga	4	4	14	13	16	18	21	
South Mianmin	1	1	1	1	2	3	4	3

indicates family

TABLE 4
ARAI FAMILY SOUND CORRESPONDENCES

Rocky Peak	Ø	b/p	s	m/b	n	ɿ	i	e/a	ʌ/o	o/ou	u
Iteri	Ø		s/t	m/p	n	ʃ	i/e	a	a/ʌ/au	o/ou	u
Bo	k	p	s	m/p	n	ʃ	i/e	e/a/ʌ	ʌ/ɔ	o	u
Ama	Ø/k	p	s	m	n	ɿ	i	a	ʌ/o	ou/ɔ	u
Nimo	Ø	b/p	s	m/p	n	ʃ	i	e/a/ʌ	ʌ	a/o/ɔ	u
Owiniga	k	b/p	s	m	n	ʃ	i	e/a	ʌ	a/ou/ɔ	u

TABLE 5
OK FAMILY COGNATE PERCENTAGES

	South Mianmin	North Mianmin	Tifalmin	Busilmin	Lower Atbalmin
North Mianmin	78				
Tifalmin	26	33			
Busilmin	24	28	68		
Lower Atbalmin	18	23	57	67	
East Ngalum	10	11	16	19	32

TABLE 6
MIDDLE SEPIK COGNATE PERCENTAGES

	Yerakai	Chenapian	Bahinemo	Washkuk	Yessan-Mayo	Abelam	Iwam (May R.)	Abau	Namie	Nimo
Chenapian	4									
Bahinemo	8	13								
Washkuk	6	7	14							
Yessan-Mayo	6	15	20	38						
Abelam	18	8	15	21	26					
Iwam (May R.)	1	6	6	6	8	6				
Abau	5	5	7	6	6	7	24			
Namie	3	2	3	4	7	10	12	13		
Nimo	2	0	3	2	2	5	5	4	2	
South Mianmin	0	4	0	1	1	1	2	3	2	4

indicates Stock

indicates Phylum

Yerakai, Nimo and South Mianmin included for comparison.

TABLE 7
MIDDLE SEPIK PHYLUM SOUND CORRESPONDENCES

Bahinemo	e		u	i	i	ʌ	a/ʌ	b/f		g	m	n	y				
Washkuk	+	o/u	u	o	i	e	a	a/o	p	b	t	k	m	ñ/n	y	w	
Yessan-Mayo	ʌ	∅		+/ʌ	+/∅	ʌ/+	ʌ	a	f	b	t	k/g	m	n	y	w	
Abelam	u		u	ʌ/a	i		ʌ	a	p/b	b	t	k/g	m	n	y	w	
Iwam (May R.)	∅	u			i		a	p					m	n		n	
Abau					i/e		a							n	y	n	
Namie					e/i/e ⁱ		a	b					m	n		w	l/r

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