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Counting Systems in Engan and Proto-Engan

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Abstract: The Engan Family of languages consists of at least nine distinct languages, with Enga and Mendi having numerous dialects. In attempting to analyze and reconstruct basic number sets of the Proto-language, I draw data from Glendon Lean¹ (1988), my own research, and from additional sources. I examine generic numbers, decimal counting and the four-base and body tally systems. I note, in particular, how the four-base system is reflected in the Enga 60-cycle and Huli number classifier systems. Although the body tally system is widely diverse in other language groups of PNG, it is historically related to the four base system in Engan.

1. Introduction

Following G.A. Lean's (1986-1988) impressive series of monographs on the counting systems of Papua New Guinea, there has been a marked interest in what is called ethnosemantics (Kaleva 1995, 2001; Matang 1996, 2002; Matang and Owens 2004). One of Lean's monographs was about counting systems of the Southern Highlands Province (SHP), which includes materials we collected (Franklin and Franklin 1962, Franklin 1968, Franklin and Franklin 1978). Other volumes outlined additional counting information from most of the languages in PNG, as well those of the Engan language family.²

Proto-Engan (PE) refers to a hypothetical parent language that has descendants in the following modern day languages: Enga (E), Huli (H), Ipili (I), Kyaka (Y), Bisorio (B), Lembena (L), Mendi (M), Kewa (K), Sau (S), and perhaps others as well. Both E and M have a number of dialects and K has three.³ Wiru (W, to the east), to a major extent, and Fasu (F, to the southwest), to a lesser extent, show affinities with the family, so I include some examples from these languages as well.⁴

I begin with a few of the generic numbers that often correspond to or modify numbers in other systems (body tally and four base). Theoretically, they reflect part of Kerr's four number systems

in Wiru⁵, namely: (1) the four base system; (2) the body extremities system; (3) the body tally system; and (4) the generic number terms.

Following a summary of the general or generic numbers (some, many, all, etc.), I show how the body tally system is initiated in a number of languages before examining number systems in more detail. I examine the four base system in Kewa and Mendi in particular, because the number four is featured in the Enga 60-cycle and Huli numerical classifier system.

I suggest, as others have, that the hands and feet system (Kerr's body extremities system) is more recent, having developed due to the imported decimal system. Where possible, I postulate the proto-language number forms, although my analysis is incomplete.

2. Generic Counting in Enga and Kyaka

Because E is the largest language and has the most dialects, I begin with it and its closely related dialect neighbor, Y.⁶

Table 1: Some Generic Numbers in E and Y

| Enga dialects | Kyaka |
|--|---|
| each and every: <i>maá miní-ngí</i> ⁷ | each: <i>mende, menda-ki</i> |
| only: <i>íkí, áamá (tor)</i> ⁸ , <i>ámbá, mendá-i</i> | only: <i>iki, yapo, iyalyo, mee</i> |
| something, an, a, one: <i>méndé</i> | something: <i>asa bange mende</i> any: <i>mende</i> |
| very: <i>eteté (lai), eteté, páká</i> | very, greatly, exceedingly: <i>ama</i> |
| a, an, one, something: <i>méndé</i> | a, an: <i>mende, menda-re, meda-rele, menda-li, menda-sa</i> |
| first (eldest): <i>múpá, wambaó</i> | first, initial, chief, main, foremost: <i>mupwua</i> first (in a series): <i>wambo</i> |

There is considerable overlap in the glosses, so the following comments may help clarify their meanings and relationships:

- The basic proto form **menda-nge* ‘a, an’ specifies a general category that may be enumerated, while **mende-nge* ‘each’ specifies instances of a particular category already enumerated. Both are adjectives and follow the noun modified, as in *akáli kitú+mende* “four men” (Lang 1973:xxiii);⁹
- In Kewa, the corresponding forms are *menda* ‘another’ and *medaa* ‘another of the same,’ while the Mendi form is *mend* in both instances;
- PE **mende-nge/menda-nge* may refer to a specific item and also serve as a repeater for identical body tally parts, once the middle is reached and the count continues down the other side;
- The forms *ama* (Y) ‘exceedingly’ and *ámá* (E) ‘only’ refer to something that is distinguished as ‘one of a kind’; A similar form occurs in K, for example, *pandane ma* ‘just one of that kind’. The PE form may be **kama*;
- In PE **múpwá* generally refers to the first born child; Cf. K *mupa*, E *múpá*, and Y *mupwua*. On the other hand, **wambwo* is the first of a series of items and has correspondences with E *ámá* ‘only’ and K *amba* ‘before’;

3. Decimal Counting

Decimal systems use the word ‘man’ metaphorically to represent ‘twenty’ by enumerating, sequentially, the digits of the hands and feet. Draper and Draper (2001:659) and Lean (1986:27) give lists for Y and E, although Lean’s is somewhat abbreviated. The L data is from Heineman (2000:51); it confirms Lean’s hypothesis (Vol. 9:33) that the “Lembena system possesses a 10-cycle as is the case with the Kyaka Enga system.”

The first four numbers are basic and are used as cardinal numbers in Table 3 for K and E. However, units of four are not used in the decimal system.

Table 2: Decimal Counting in Kyaka, Enga and Lembena

| N | Kyaka | Enga | Lembena |
|-----------|---|--|--|
| 1 | <i>menda-ki</i> | <i>mendá-i/ méndé</i> | <i>wamee-na</i> |
| 2 | <i>lama</i> | <i>lápó/lapó-ma/lapó-tá</i> | <i>laama-na</i> |
| 3 | <i>rema</i> | <i>téma/tépo/tepó-ma</i> | <i>tepoma-na</i> |
| 4 | <i>kisuma</i> | <i>kitó-mende/kitú-mende</i> | <i>kituma/ki-paki-te</i> |
| 5 | <i>ki-ngi paki</i> ‘hand half’ | <i>yá-ngí púndu/yáu/yáu-nge/yuu-ngí</i> ‘thumb’ | <i>ki-ko paki/ki-meete</i> ‘hand half’ |
| 6 | <i>paki-na mange</i> ‘thumb and half’ | <i>tóka-nge</i> ¹⁰ ‘palm of hand’ | <i>osoko lalo wamee-na</i> ‘jump to one more’ |
| 7 | <i>yanda ipingi</i> ‘bowstring finger’ | <i>kala-nge/sakaita</i> ‘?’right hand’ | <i>osoko lalo laamana</i> ‘jump two more’ |
| 8 | <i>akali-sa mange lama</i> ‘ten less two’ | <i>tuku-lapo</i> ‘two units’ | <i>oso-ko lalo tepo-mana</i> ‘jump three more’ |
| 9 | <i>akali-sa ma-nge menda-ki</i> ‘showing another top part’, i.e. beginning another unit | <i>ma-nge menda-i wakitao</i> ¹¹ <i>ma-nge</i> ‘top part of something’ | <i>mage wamee-na</i> ‘one over the top part’ |
| 10 | <i>akali-sa</i> ‘a man’ = 10 | <i>akali-ta</i> ‘completive’ | <i>kali-sa</i> |
| 11 | <i>akali-sa ipisu menda-ki</i> PE * <i>menda-nge</i> | <i>akali-ta kisa menda-i kisa</i> ‘on top of a man another (finger)’ | <i>kalisa dee wamee-na</i> ‘a man with one’ |
| 12 | <i>akali-sa ipisu lama ipisu</i> ‘and,’ | TP <i>tuélo</i> | <i>kalisa dee laama-na</i> |

| | | | |
|----|--|-----------------------------------|---|
| | plus'; <i>lama</i> 'a pair, i.e. a man + two more | | 'a man with two' |
| 13 | <i>akali-sa ipisu rema</i> <i>rema</i> 'three' i.e. a man + three more | TP (?) | <i>kalisa dee tepo- ma-na</i> 'a man with three' |
| 14 | <i>akali-sa ipisu kisima</i> <i>kisima</i> 'four' i.e. a man '+ four | TP (?) | <i>kalisa dee kituma</i> 'a man with four |
| 15 | <i>akali-sa ipisu ki-ngi paki</i> <i>paki</i> 'side, half'; <i>konda-pe</i> , to add on', i.e. a man + a half | <i>akali-ta kisa konda-pe</i> | <i>kalisa dee ki-ko paki</i> 'a man and half that is a hand' |
| 16 | <i>akali-sa ipisu paki-na ma-nge</i> , i.e. a man and a half and another top part' | | <i>kalisa dee osoka lalo wamee-na</i> 'a man with five and jump one' |
| 17 | <i>akali-sa ipisu yanda</i> ¹² <i>ipingi</i> i.e. a man and seven | | <i>kalisa dee osoko lalo laamana</i> 'a man and jump two |
| 18 | <i>akali-sa lama mange lama</i> i.e. a man and a pair at the top of a unit' | | <i>kalisa dee osoko lalo tepo-ma-na</i> 'a man and jump three' |
| 19 | <i>akali-sa lama mange menda-ki</i> , i.e. a man and a pair at the top of a unit and another finger' | | <i>kalisa dee mage wamee-na</i> 'a man and one on top' |
| 20 | <i>akali-sa lama</i> 'two men' | <i>akali-ta lapo</i> 'two men' | <i>kalisa laama-na</i> 'two men' |

| | | | |
|------------|---|--|--|
| 21 | <i>akali-sa lama ipisu menda-ki</i> two men and at the top part another finger' | | <i>kalisa laama-na dee</i> <i>wamee-na</i> 'two men and one' |
| 100 | <i>akali-sa akali-sa</i> 'a man and 'a man' = ten times ten, i.e. 100 | | |

The focus element in the decimal system is a man and the digits of his hands and feet. Collectively, all of the digits (20) are simply referred to as 'man,' representing 'twenty'.

4. Initiating the Body Tally System

Table 2 gives the form for the little finger, which in each case initiates the body tally system.¹³ As the counting begins, the little finger of the left hand is folded over and enumerated before proceeding to the next number. (A left-handed person may begin with the right hand.)¹⁴

Table 2: Initiating the Body Tally System in Engan languages

| Language | Form | Gloss | Comments |
|--------------|---|-----------------|---|
| WKewa | <i>egaita</i> | 'little finger' | From Pre-Kewa * <i>kenga-nke</i> 'little' + <i>ta</i> 'hit' |
| EKewa | <i>kegali</i> ¹⁵ / <i>kali</i> ¹⁶ | 'little finger' | From Pre-Kewa * <i>kenga-nke</i> 'little' + <i>ali</i> 'man' |
| SKewa (Pole) | <i>engali</i> | 'little finger' | From Pre-Kewa * <i>kenga-nke</i> 'little' + <i>ali</i> 'man' |
| Sau | <i>kəŋle-ke</i> | 'little finger' | Where *-ng- is reflected by nasalized vowels |

| | | | |
|--------------------|------------------------------|----------------------|--|
| Kyaka | <i>menda-ki/meda-li</i> | ‘one/ little finger’ | PE * <i>menda-nge</i> ‘another’ |
| Enga | <i>menda-i</i> | ‘little finger’ | PE * <i>menda-nge</i> ‘another’ + ADJZ |
| Ipili | <i>mind</i> | ‘little finger’ | PE * <i>menda-nge</i> ‘another’ |
| Mendi | <i>mend/ pombor</i> | ‘little finger’ | PE * <i>menda-nge</i> ‘another’ + ‘one’ |
| Wapi ¹⁷ | <i>menda-i</i> | ‘one’ | PE * <i>menda-nge</i> , with loss of /k/ before -i |
| Lembena | <i>wa-mena</i> | ‘one’ | <i>wa</i> + PE * <i>menda-nge</i> ‘another’ = ‘just another’ |
| Wiru | <i>enge</i> | ‘little finger’ | PE * <i>kenke-nge</i> , but with loss of final syllable |
| Bosavi | <i>ange-l</i> | ‘one/ little finger’ | Perhaps related to PE * <i>menda</i> + suffix with loss of final vowel |
| Foe | <i>mena-ge</i> ¹⁸ | ‘little finger’ | Final *- <i>nge</i> is retained |
| Fasu | <i>kená-ke</i> | ‘one/ little finger’ | Final *- <i>nge</i> is retained |

The alternative forms for the cardinal number ‘one’ in W Kewa are *pamenda*, or *komea* (but usually *padane* in East Kewa) and *pombor* in Mendi.

5. Enga and Kyaka Cardinal and Ordinal Numbers

In table 3, the morphemes that are readily identifiable have also been separated. Rummsey (2002) consistently identifies *-nge* (and its allomorphs) as meaning “habitual” when attached to

verbs. I have suggested that it is a suffix with non-verbs that marks semantic notions related to possession, inalienability, and non-transferability.¹⁹ The PE form is **-NGV*, where *-NG* actualizes as *-ng*, *-nk*, *-k*, and *-n* in various languages, and the final vowel harmonizes with the vowel of the stem. The *-nV* forms occur mainly in Huli and Wiru; according to the suggested reconstruction of PE pronouns, they helped form the basis for dividing PE into two branches (Franklin 1997:204-206).

Table 3: Enga and Kyaka Cardinal Numbers 1-10

| Enga | Kyaka | Comments |
|---|--|---|
| one: <i>mendá-i</i> , <i>méndé</i> , <i>íkí</i> 'another one, another only' | one: <i>menda-ki</i> (<i>mende</i>), <i>menda-le</i> , <i>menda-re</i> , <i>waka-le</i> | PE <i>*menda</i> 'one/another/another one' <i>meda iki</i> > <i>meda-ki</i> > <i>meda-i</i> |
| two: <i>lápó</i> , <i>lapó-ma</i> , <i>lapó-tá</i> (<i>lai</i>), <i>kinji-pe</i> (<i>lai</i>) | two: <i>lama</i> , <i>lapo</i> , <i>lama do-lapo</i> , <i>lapa-rae</i> | PE <i>*lambo</i> 'two' <i>lapo ama</i> > <i>lapo-ma</i> |
| three: <i>téma</i> , <i>tépó</i> , <i>tepó-ma</i> | three: <i>rema</i> | PE <i>*trembo</i> 'three' |
| four: <i>kitó-mende</i> , <i>kitú-mende</i> | four: <i>kisu-ma</i> , <i>kisi-ma</i> , <i>kitu-ma</i> (<i>sau</i>) | <i>kito/kisu/kisi/kitu</i> Y 'A unit of four'/E 'Another unit of four' |
| five: <i>yá-ngí púndu</i> , <i>yáu</i> , <i>yáu-nge</i> , <i>yuu-ngí</i> | five: <i>ki-ngi paki</i> | PE <i>*syu-ngi</i> 'thumb' = 5 <i>paki</i> 'side/pair' |
| six: <i>tóka-nge</i> | six: <i>paki-na mange</i> | Y <i>mange</i> 'thumb/less' ²⁰ '(other) side's thumb' = 6 |
| seven: <i>kála-nge</i> , <i>sakáita</i> | seven: <i>yanda ipi-ngi</i> | Y 'the finger that draws the bowstring' (Draper and Draper 2002:435) = 7 |

| | | |
|------------------------------|-------------------------------------|-----------------------------|
| eight: <i>tuku-lápó</i> | eight: <i>akali-sa mage lama</i> | Y ‘man less two thumbs’ = 8 |
| nine: <i>tuku-tépó</i> | nine: <i>akali-sa mage menda-ki</i> | Y ‘man less a thumb’ = 9 |
| ten: <i>akali-tá mendá-i</i> | ten: <i>akali-sa</i> | Y ‘a man’ = 10 |

Note the following:

- PE had complex phonemes (affricates) such as /tř/ that became /t/ in languages such as E and H, but /r/ in K; /kx/ that became /k/, /x/, /h/, or /ø/. In addition, proto-consonants were prenasalized, palatalized, labialized, and perhaps, according to Rule (1965), aspirated (as found in present-day M). Present-day tone and nasalization in certain daughter languages may be historically related to the loss of these features.²¹
- The words for ‘two’ and ‘three’ in Engan are not the names of body parts, but are cardinal numbers that also serve in some languages as ordinal numbers.
- The words for ‘two’ and ‘three’ in present day Y and E represent PE **lampo* and **trempe*.
- The complex forms for ‘four’ in Y are built on *ki* ‘hand’ + ‘put/hit...’

6. The Enga 60 Cycle Count System

Lean (1986, volume 9:28-29) reports a 60 cycle count system in E that is built on units of four. The first three numbers replicate cardinal numbers; I analyze 4 as *ki tu mendai* ‘hand unit-four another’, 5 as *yu-ngi* ‘thumb’, 6 as *toka-ge* (**tro-ko* ‘bridge’ and **-nge*²²), and 7 as derived from **kala-nge*. In chart 4, I give Lean’s Enga term and his gloss for the prototypical representative of each unit of four after eight, followed by my own reconstruction of the unit names, which I find, in most cases, related to body tally parts.

Table 4: Enga Counting Cycles After the Number Eight

| | | |
|-------|---|---|
| 9-12 | <i>tuku-tepo</i> ‘three arrows’ ²³ | <i>tuku</i> ‘arrow’ + <i>tepo</i> ‘three’ |
| 13-16 | <i>mapu</i> ‘sweet potato’ ²⁴ | * <i>mala-pu</i> ‘four index finger units’ |
| 17-20 | <i>yu-pu</i> ‘ground’ | * <i>syu-pu</i> ‘four thumb units’ |
| 21-24 | <i>wataka-pu</i> ‘wild’ | * <i>waraka-pu</i> ‘four palm of hand units’ |
| 25-28 | <i>pai-pu</i> ‘come and go’ | * <i>paki-pu</i> ‘four doubled/joint units’ |
| 29-32 | <i>yana-pu</i> ‘dog’ | * <i>yana-pu</i> ‘four forearm units’ ²⁵ |
| 33-36 | <i>kama-pu</i> ‘open ground’ | * <i>kama-pu</i> ‘four elbow area units’ |
| 37-40 | <i>kuju-pu</i> ‘I cut’ | * <i>kyanga-pu</i> ‘four jaw area units’ |
| 41-44 | <i>kali-pu</i> ‘I retract my foreskin’ | * <i>kale-pu</i> ‘four ear area units’ |
| 45-48 | <i>lapa-lu</i> ‘being said’ | * <i>la-pa-lu</i> ‘just four nose tip extended’units ²⁶ |
| 49-52 | <i>menai-ni</i> ‘pig’ | * <i>mendai-ni</i> ‘another four extended’units’ |
| 53-56 | <i>aki-pu</i> ‘what can I say?’ | * <i>yangi-pu</i> ‘five unit areas’ ²⁷ |
| 57-60 | <i>kaea-pa-lu</i> ‘I stop’ | * <i>kae-nge pa-lu</i> ‘just four discontinued units’ ²⁸ |

Note that:

- The numbers 1-7 are the normal numbers (without units of 4);
- Eight (*tukulapo*) is two units of four (*tu-ku lapo*);
- What Lean (1986, Volume 9:28-29) glosses for the units of four, beginning after eight, I find to be references to body parts and not to the prototypical glosses that he suggests.

7. Some Kewa and Mendi Corresponding Numbers

Various dialects of K use a tally system, enumerating a series of body parts until a cycle is completed. The count begins with the little finger of the left hand and is completed, when the little finger of the right hand is reached. As already noted, the system varies in K areas (see Franklin and Franklin 1962, 1978 and Pumuge 1975).

When body parts are enumerated in K, they refer to particular ordinal or serial numbers and are, by cultural and cognitive criteria, words. As indicated, although the same or similar body parts are enumerated, they often vary in their sequence from one dialect to another. For example, both WK and EK cross over at the point between the eyes, but SK has an abbreviated system that crosses over at the jaw.

Table 5: Some Generic and Ordinal Numbers in Kewa and Mendi ²⁹

| Kewa | Mendi |
|---|-----------------------------|
| once: <i>rana pandane</i> | <i>ip ko pandane</i> |
| first (in a line, etc.): <i>riri-nane</i> | <i>riri-nane</i> |
| before (another): <i>amba</i> | <i>ambo-s</i> |
| both: <i>lapo</i> | <i>lap</i> |
| twice: <i>rana laapo</i> | <i>ip ko lap</i> |
| second: <i>laapo-pu</i> | <i>lapo-nane</i> |
| third: <i>repo-pu</i> | <i>repo-nane; ip ko rep</i> |
| three days hence: <i>apo numane</i> | |
| fourth: <i>mala-pu</i> | <i>malo-nane; ip ko mal</i> |

| | |
|---------------------------|-----------------------------------|
| four days hence: | <i>four days hence: tunda-ene</i> |
| hand: <i>ki</i> | <i>hand: iki</i> |
| man: <i>aa, ali</i> | <i>man: ael</i> |
| many: <i>anda-pu</i> | <i>ondo-p</i> |
| body cycle: <i>paa-pu</i> | |

- Mendi *ip* corresponds to *ipa* in K, as in *ipa lapo* ‘just both of them’;
- The clitic *-pu* may also be added to each body part as the count progresses, but is normally used in ordinal numbers to indicate a particular place in the count;
- The tally system may either begin by naming the little finger and commencing the count, or by calling the little finger by another name;
- The clitic *-nane* can generally be glossed ‘in the direction of’ and *-pu* (K) ~ *-p* (M) indicate a grouping or collection of something;
- The variations in M suggest that the body tally forms and the four base system have been combined.

8. The Four Base System in Kewa and Mendi

The body tally system in K has been accounted for in a number of publications (Franklin and Franklin 1962, 1978; Franklin 1968, 1971; Pumuge 1975; Lean 1986), so I will instead concentrate on the four base counting system. It also commences with the little finger of the left hand, and enumerates the next three fingers, before adding the thumb to each number enumerated by progressions of four. The forms used for the system in M are significant in understanding its relationship to the body tally system in PE.

Table 6: The Kewa and Mendi Four Base System

| English Gloss | East Kewa | Mendi/Dialects |
|---------------|--------------------------------|--------------------------|
| One | <i>pa-menda/ panda-ne</i> | <i>pondo-dl/mend</i> |
| Two | <i>laapo</i> | <i>lap/kaap</i> |
| Three | <i>repo</i> | <i>rep/tep</i> |
| Four | <i>mala</i> | <i>mall/mala</i> |
| Five | <i>ki-na konde</i> | <i>yu/su</i> |
| Six | <i>ki-na konde laapo</i> | <i>paro-ne</i> |
| Seven | <i>ki-na konde repo</i> | <i>seven: kerpo</i> |
| Eight | <i>ki laapo</i> | <i>ru lap</i> |
| Nine | <i>ki laapo-na konde</i> | <i>repo-n pandane</i> |
| Ten | <i>ki laapo-na konde laapo</i> | <i>repo-n lap</i> |
| Eleven | <i>ki laapo-na konde repo</i> | <i>repo-n rep</i> |
| Twelve | <i>ki repo</i> | <i>ru rep</i> |
| Thirteen | <i>ki repo-na konde</i> | <i>malo-pu-n pandane</i> |
| Fourteen | <i>ki repo-na konde laapo</i> | <i>malo-pu-n lap</i> |
| Fifteen | <i>ki repo-na konde repo</i> | <i>malo-pu-n rep</i> |
| Sixteen | <i>ki mala</i> | <i>ru malo-pu</i> |
| Seventeen | <i>ki mala-na konde</i> | <i>su-pu-n padane</i> |
| Eighteen | <i>ki mala-na konde laapo</i> | <i>su-pu-n lap</i> |

| | | |
|--------------|------------------------------|-------------------------|
| Nineteen | <i>ki mala-na konde repo</i> | <i>su-pu-n rep</i> |
| Twenty | <i>ki su</i> | <i>ru su-pu</i> |
| Twenty-one | <i>ki su-na konde</i> | <i>roa-pu-n pandane</i> |
| Twenty-two | <i>ki su-na konde laapo</i> | <i>roa-pu-n lap</i> |
| Twenty-three | <i>ki su-na konde repo</i> | <i>roa-pu-n rep</i> |
| Twenty-four | <i>ki wara</i> | <i>ru roa-pu</i> |

- The word *konde* ‘appendage’ is glossed in E as ‘little (?) finger’ (Lang 1973:145); In Y, *koda pilyu* means to ‘add, heap up, put together, participate’ (Draper and Draper 2002:187).
- The word for *ki* ‘hand/four’ is used throughout the system in K, modified by the cardinal number names specified by the fingers and thumb.
- *ru* in M marks units of four—note its use in units ending with 8, 12, 16, and 20 and its use in PE;
- K *-na* and M *-n* indicate possession.

9. Counting in Huli and Ipili

According to Lean (1986, Volume 10:17) and following Cheetham (1978), there are three suffixes used to mark numbers in Huli³⁰: (1) *-ria* ‘cardinal numbers’; (2) *-ru* ‘temporal suffix’; and (3) *-ni* ~ *-ne* ‘ordinals’. The first is used when referring to a number of objects; the second, when quantifying units of time, particularly days; and the third, with ordinal numbers. I would reconstruct *-ria* ~ *-ra* and *-ru* as possibly derived from PE **tru*. Further evidence may show that in present day K the verb *ria* ‘to carry’ becomes *ru* in verb phrases.

According to Lean (Vol. 10:17-20), both cardinal and ordinal numbers are used to count in H. Cardinal numbers are formed using the suffix *-ria* and ordinal numbers use *-ne* ~ *-ni*. I list only a few examples of the latter in H. On the other hand, according to Biersack (1982:814), all the body tally numbers after three may be suffixed with *-ne* ~ *-ni* and so are not repeated in Table 7. Biersack's numbers and their corresponding body parts continue until 28 is reached—'two clenched hands knocked together'.

Table 7: Counting in Huli

| N | Huli | Suggested Underlying Forms | Ipili | Suggested Underlying Forms |
|---|-------------------------|---|--------------------|---|
| 1 | <i>mbi-ria</i> | < <i>mbi</i> 'name' + 'carry' = 'little finger' | <i>mindī</i> | PE * <i>mindī-ngi</i> 'muscle of beginning area' |
| 2 | <i>ki-ria</i> | < <i>ki</i> 'hand' + 'carry' = 'ring finger' | <i>lapo</i> | PE * <i>lambo</i> 'two' |
| 3 | <i>tebi-ria/repo-ne</i> | PE * <i>trem-po-</i> 'middle/long finger' | <i>tepo</i> | PE * <i>trembo</i> 'three' |
| 4 | <i>ma-ria/ma-ne</i> | PE * <i>mala-</i> 'index finger' | <i>tuku mindī</i> | PE * <i>trukū mindī-ngi</i> 'muscle of hand area' |
| 5 | <i>du-ria/dau-ni</i> | PE * <i>syu-</i> 'thumb of hand' | <i>yau</i> | PE * <i>syu-ngi</i> 'thumb' |
| 6 | <i>waraga-ria</i> | PE * <i>waraka-</i> 'palm of hand' | <i>wata-ka</i> | PE * <i>wara-nge</i> 'palm' |
| 7 | <i>ka-ria</i> | | <i>yana-tsia</i> | ? |
| 8 | <i>hali-ria</i> | PE * <i>khali-</i> 'bone' | <i>kitupa-tsia</i> | * <i>kit rupa</i> 'like a hand' |
| 9 | <i>di-ria</i> | | <i>pili-tsia</i> | |

| | | | | |
|----|------------------|---------------------------|----------------------|-----------------------------|
| 10 | <i>pi-ria</i> | PE | <i>paya-tsia</i> | |
| 11 | <i>be-ria;</i> ' | PE * <i>phae-</i> 'cheek' | <i>ma-tsia</i> | PE * <i>ma-nge</i> 'neck' |
| 12 | <i>hombe-ria</i> | | <i>ale-tsia</i> | PE * <i>khale-nge</i> 'ear' |
| 13 | <i>hale-ria</i> | PE * <i>khale-</i> 'ear' | <i>lee-tsia</i> | PE * <i>lye-nge</i> 'eye' |
| 14 | <i>de-ria</i> | PE * <i>le-</i> 'eye' | <i>inga-tsia</i> | PE ? 'nose' |
| 15 | <i>ngu-ria;</i> | PE 'nose' (?) | <i>ambi lee-tsia</i> | PE 'other eye' |
| 16 | | <i>ngu-ria ni mbi-ria</i> | <i>ambi ale-tsia</i> | PE 'other ear' |

The forms given above for 'one' and 'two' in H do not seem to be part of the proto-system. Following is the list of fourteen classifiers Cheetam (1978:20-21) has analyzed that were used to classify objects (one example is given here after each classifier). I also note some tentative and potential K lexical resemblances.

Table 8: Huli Numerical Classifiers

| Huli forms and meanings | Exemplars (what can be counted with classifier) | Kewa Lexical Resemblances |
|--|---|--|
| <i>Tu</i> (an individual garden) | <i>mabu</i> 'garden' | <i>mapu</i> 'garden' <i>ru</i> 'a unit' |
| <i>Te</i> (3 runners in a single hole) | <i>hina</i> 'sweet potato' | <i>re</i> 'the base/basis of something' |
| <i>Pu</i> (3 runners pulled out with tubers; a pair of shells) | <i>dange</i> 'cowrie shells' | <i>-pu</i> 'a collection of items' |
| <i>Pe</i> (an individual house) | <i>wandia</i> 'woman's house' | <i>pe</i> 'nominalizer' |

| | | |
|--|-----------------------------|---|
| <i>Lu</i> (a single one) | <i>hina</i> ‘sweet potato’ | <i>-lu</i> ‘a lengthy collection’ |
| <i>Du</i> (a leaf) | <i>mundu</i> ‘bush tobacco’ | <i>mudupa</i> ‘special leaves from ancient tree’ |
| <i>E</i> (a single one) | <i>anga</i> ‘pandanus | <i>ee</i> ‘an old garden’ or “affirmative” |
| <i>Dara</i> (bunch broken off at stem) | <i>hai</i> ‘banana’ | <i>aai kara</i> ‘a hand of bananas’ |
| <i>Tigi</i> (section of a branch) | <i>ira</i> ‘wood, tree’ | <i>ira</i> ‘tree (NWK and M)’ <i>tiga</i> ‘softwood tree with many branches’ |
| <i>Huba</i> (a bundle) ‘asparagus’ | | <i>kupa</i> ‘bundle of stones in certain ceremonies’ |
| <i>Hondo</i> (a single one) | <i>tin-be</i> ‘tin can’ | <i>konde</i> an appendage/thumb <i>pe</i> ‘bamboo container’ |
| <i>Homa</i> (a whole one) | ‘all animals’ | <i>koma</i> ‘to die’ |
| <i>Tindi</i> (a line) | ‘men in line at a singsing’ | <i>mali</i> ‘singsing’ <i>ridu la</i> ‘to stretch out’ |
| <i>Halu</i> (a time) | used for ‘number of times’ | <i>aluaa</i> ‘ringbark a tree’ |

There is evidence that *tu* is a reflex of PE **tru*, found in Y and several other languages as *ru* and *tu*, meaning a unit of something. The following examples are from Cheetam (1978:21), who illustrates the use of *tu* in Huli where it is used to enumerate objects. Once the cycle of four is reached, *ru* follows the number, indicating its function as a cycle marker.

mabu tu mbira < **mampu tru mbira* ‘1 unit garden’

mabu tu ki < **mampu tru ki-ngi* ‘2 unit gardens’

mabu tu tebo < **mampu tru repo* ‘3 unit gardens’

mabu ma tu < **mampu mala tru* ‘4 unit gardens’

mabu dau tu < **mampu syu tru* ‘5 unit gardens’

10. Counting in Sau

Although I and others refer to the Samberigi language as Sau, it is actually the name of a village that L.A. Flint refers to in the Papua Annual Report of 1921-22. S is the Engan language furthest to the south and the people who speak the language live in the Gulf Province (although many are also in towns, e.g. Port Moresby). Flint tells how they were greeted by many men saying ‘*kamio, kamio*’, which seems to be a cognate with forms in Engan that mean ‘brother’ or ‘friend’, with the vocative ending *-o*.

Table 9: Counting in Sau

| N | Sau | Suggested Gloss | Suggested PE |
|---|-------------------------------|-----------------------------------|----------------------------------|
| 1 | <i>home-ke</i> | ‘one’ | * <i>khoma-nge</i> |
| 2 | <i>yaapo</i> | ‘two’ | * <i>lyampo</i> |
| 3 | <i>tepo</i> | ‘three’ | * <i>trempe</i> |
| 4 | <i>tonko-pu</i> | ‘a bound group/unit’ | * <i>tro-ngo-pu</i> |
| 5 | <i>yu-nki hara</i> | ‘at the thumb’ | * <i>syu-ngi</i> |
| 6 | <i>yu-ngi mindi-gi hara</i> | ‘at the muscle area of the thumb’ | * <i>syu-ngi mindi-ngi khara</i> |
| 7 | <i>wara-ki/waraha-ke hara</i> | ‘at the palm area’ | * <i>wara-nge-khara</i> |
| 8 | <i>kerepo hara/noe kerepo</i> | ‘at the wrist area’ | * <i>kherepo-nge-khara</i> |

| | | | |
|----|----------------------------|-------------------------------------|--------------------------|
| 9 | <i>noi hara/noe'i hare</i> | 'at the radius bone' | * <i>noi-khara</i> |
| 10 | <i>noe mande hare</i> | 'at the top of the radius location' | * <i>noi mande-khara</i> |
| 11 | <i>oko ma-ke</i> | 'where it bends' | * <i>okho ma-nge</i> |
| 12 | <i>noi ma-ke</i> | 'at the top of the radius bone' | * <i>noi ma-nge</i> |
| 13 | ? | | |
| 14 | <i>peyo-ko hara</i> | 'at the cheek area' | * <i>peyo-ngo-khara</i> |
| 15 | <i>halembe</i> | 'clavicle' | * <i>khalembe-nge</i> |
| 16 | <i>ipilo-lea</i> | 'middle lower neck depression' | |

The Sau counting system has unique features, but it fits into the PE system as follows:

- The word for 'one' is similar in some areas of SK and WK, which have the cognate *komea*;
- The S form *hara* is a clitic and a cognate to K *-para* and M *por*, specifying a location;
- Six is counted by pointing to the heel of the thumb ('where there is muscle');
- The relic suffixes *-ngi* and *-nke* vary according to the final vowels of the word to which they are attached;
- Eight is counted by pointing to the wrist or to the area of the small bone of the wrist.

11. Some Numbers in Two Other Engan Languages³¹

Bisorio, and Nete are to the far north of Enga area but have number cognates as follows (with the suggested PE form given in a number of cases). However, I do not have full details on the counting systems.

Table 10: Some Numbers in Bisorio and Nete

| Number | Bisorio | Nete | PE |
|---------|----------------------------|-------------------|-----------------------|
| One | <i>habila/hanana</i> | <i>mendai</i> | PE <i>*menda</i> |
| Two | <i>labo</i> | <i>rapo</i> | PE <i>*lyambo</i> |
| Three | <i>sebo</i> | <i>tepo</i> | PE <i>*tsembo</i> |
| Four: | <i>dubo/du-meda</i> | <i>tu-ku meda</i> | PE <i>*tru menda</i> |
| Five | <i>you/yisobu</i> | <i>yau</i> | PE <i>*syu-nki</i> |
| Ten | <i>gi labo/ganowa sobu</i> | | PE <i>*khi lyambo</i> |
| Many | | <i>efaga</i> | |
| Another | <i>meda</i> | | PE <i>*menda-nke</i> |

12. Hagen Languages

Lean (Vol.9: 46-49, after Bowers and Lepi, 1975) presents two tables that demonstrate how the Gawigl dialect of Mt. Hagen has a counting system that shows some lexical and cyclical resemblance to the Engan Family, which Bowers and Lepi attribute to borrowing from K. For example, after the number eight (*enggaki/ engaki*), units of four are marked by *ru* (9-12, i.e. a unit)³², *mala* (13-16), *su* (17-20), *toka* (21-24), *ala* (25-28), and *polang-gi* (29-32). Of the first eight primary numbers, three (*yepo-ko*), four (*ki-se/ ki-sa*), and eight (*engagaki*) are potential cognates with Engan.³³ However, the sets of four that follow are marked by the forms of *ru*,

mala, *su*, *toka*, *ala*, and *pola* and in each case there are cognates in Engan. For example, *ru* means ‘unit of four’ in K and M; *mala* means ‘four/forefinger’ in K and M; *su* means ‘five/thumb’ in K and M; and *toka* means ‘six’ in E. I would expect to find *ala* and *pola* or their derivatives to mean ‘seven’ and ‘eight,’ respectively, in other M dialects or Engan languages. M is the most likely, because the northern part of the language area borders Gawigl. Consequently, I believe it borrowed the forms from M and not K.

On the other hand, Medlpa (Vicedom and Tischner 1948) has a unit of four only for the numbers 12-15. These are followed by numbers (from 16-24) that refer to the hands of two men plus the numbers one to five (adding one and two for the numbers 22 and 23) for the remainder. The hands of three men are represented by the number 24.³⁴

I believe that the number similarities between Medlpa and K are due to borrowing. There is a long history of trade and marriage between the two groups and pig-kills were shared, so large numbers of pigs would have had to be counted in ways that both groups understood. We also observed (from 1958-1963) that many women from the EK married Medlpa men. Few K men could speak Medlpa but many Medlpa men were bilingual in K.

13. Summary and Conclusion

The body tally systems and the four base system are historically related, with the former deriving units of four from the latter. All number systems, whether cardinal, ordinal, body tally, cyclical, or classifying, have body parts that represent numbers.

The PE numbers for two (**tlampo*) and three (**trempe*) are related to the duality (**pV*) and plurality (**mV*) markers in verb suffixes. It follows that the free pronoun forms for dual and plural are often historically related by cross reference to the verb suffixes that also mark person and number.³⁵

Appendix A: Engan Language and Dialect Names

Wurm (1982:125-126) called Engan the West-Central Family and described it as follows:

Enga Sub-Family language: 1. Enga (with dialects of Kopona, Layapo or Laiapu, Sau, Kaina, Mai, Yandapo, Kandepe, Malamuni—including Inai or Bisorio—Tayato, and Kyaka), 2. Katinja,

3. Lembena, 4. Nete and 5. Ipili (with two dialects—Eastern and Western);

Enga Family languages: 6. Huli, 7. Angal, 8. Kewa, and 9. Sau;

Angal Sub-Family languages: Angal (Mendi) Kewa Subfamily: (with dialects of N Mendi, Megi, South Mendi, West Mendi—including Nipa, Wala and Augu), Kewa (with dialects of Eastern, Southern—also called Pole—and Western).

We refine Wurm's classification as follows: (1) The dialects of **Enga** [enq] are: Kandepe, Layapo, Tayato, Mae—also called Mai/Wabag, Maramuni, Kaina, Kapona, Sau—also called Wapi, Yadapo, Lapalama 1 and 2, Laiagam, and Sari; **Kyaka** [kye] should be considered one as well (Draper and Draper 2002:1); (2) **Ipili** [ipi] (Porgera, Paiela, and Tipinini)³⁶ and (3) **Huli** [hui] are also closely related; (4) **Lembena** [leq]³⁷; (5) **Mendi** (Angal [age], Angal Enen [aoe], Angal Heneng [akh], Nembi (Magi), Waola/ Wala, Augu, and Nipa);³⁸ (6) **Kewa** (East—also called Kewapi [kjs], South—also called Pole, and West [kew]); (7) **Sau** [ssx], the furthest language to the south and in the Gulf Province, is also called Samberigi; (8) **Bisorio** [bir], the furthest language to the north and in the East Sepik Province; according to Conrad and Lewis (1988:280), this dialect is also called Pikaru; (9) **Nete** [net] (Iniai, Malamauda, Malaumanda) in the East Sepik Province; Edmiston reported a 70% lexical similarity between Nete and Bisorio. According to http://www.forum-intl.net/find_a_bible/default.aspx?SysProductID=10826, the New Testament and Old Testament portions have been published in Bisorio by the New Tribes Mission.

All of the languages noted are part of the Trans-New guinea Phylum, as suggested by Wurm (1961, 1964, 1982), Capell (1969), and Ray (1907 and later). This hypothesis was further confirmed and extended by McElhanon and Voorhoeve (1970), and discussed most recently by Pawley (2005: 67-108) and Ross (2005: 15-66).

Appendix B: Legend

The primary language names for both Engan and nearby groups are now listed alphabetically, followed by their ISO 639-2 three letter code (from www.ethnologue.com), then other alternative names. For the sources for each language or dialect, see, in particular, Carrington (1996) and Lewis (2009).

ANGAL [age]: East Angal, Mendi.

ANGAL ENENG [aoe]: South Angal Heneng, South Mendi, Nembi.

ANGAL HENENG [akh]: Agarar, Augu, Katinja, Nipa, Ota, West Angal Heneng, Wage Waola (Wala), West Mendi.

BISORIO [bir]: Bisorio, Iniai, Inyai-Gadio.

BO-UNG [mux]: See UMBU-UNGU

IMBONGU [imo]: See UMBU-UNGU

ENGA [enq]: Baiyer River Enga, Enga, Enja, Ega, Kaina, Kandepe, Kapona, Kyaka Enga, Laiagam Enga, Lapalama 1, Lapalama 2, Enga, Layapo, Mae Enga, Mai Enga, Malamuni, Maramuni, Raiapu Enga, Sari, Sau Enga, Tayato, Taaga, Tchaga, Tsaga, Wabag, Wapi Enga, Yandapo.³⁹

ERAVE [kgy]: Erave, Pole. South Kewa

FASU [faa]: Faso, Fasu, Kaibu, Kaipu, Namo Mē, Namome, Namumi, Namuni, Some

FOI [foi]: Foi, Foe, Fimaga, Ifigi, Kafa, Kutubu, Mubi River

HULI [hui]: Huli, Huli-Hulidana, Huri

IMBONGU [imo]: Au, Aua, Au, Awa, Ibo Ugu, Imbo Ungo, Imbo Ungu, Imbonggo

IPILI [ipi]: Ipili, Ipili-Paiela, Ipili-Paiyala, Paelela, Porgera, Tipini

KEWA, EAST [kjs]: East Kewa, Kewa-pi, Kewapi

KEWA, WEST [kew]: Pasuma, Pole, South Kewa, West Kewa

KYAKA [kyc]: Baiyer River Enga, Enga-Kyaka

LEMBENA [leq]: Erem, Kopaipalu, Lembena, Lembena Pii, Maibi, Nanimba Pii, Olimolo, Yankisi, Yengis, Uyalipa Pii, Yambaidoko, Wapi Pii

MELPA [med]: Medlpa, Hagen

MENDI: Mendi, Det, Augu, Wage, Wela, Wola, Angal, Angal Heneng, Angal Enen, Nembi

NETE [net]: Iniai, Malamauda, Malaumanda Nete

PIKARU: Pikaru, Bikaru

POLE: Pole, South Kewa, Erawa, Erawe

SAU [sau]: Hatue, Sau, Samberigi, Sawai, Seleman, Okani, Waha

UMBU-UNGU [ubu]: Aua, Gawigl, Gawil, Kakoli, Kaugel, Kauil, Ubu Ugu, Umbongu, Umbu Ungu

WIRU [wiu]: Wiru, Witu

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¹ For a review of Lean's work on counting see Owens (2001). Geoffrey Smith (1988) published an extensive list of numbers in languages and 60% of them were Non-Austronesian, but none of them showed similarities with the Engan Family. A brief summary of counting and numbers is given by Wolfers (1972). See also Rauff (2003).

² However, nothing on Sau, which I have collected. There is also a dialect of E called Sau, but I always write it with lower case, e.g. E-sau. For Eugene Chan's collection on number systems, including Trans-New Guinea, see: <http://lingweb.eva.mpg.de/numeral/>.

³ For maps of the language areas, see http://www.sil.org/pacific/png/maps/SHP_Enga_large.jpg for the Southern Highlands and Enga Provinces and

http://www.sil.org/pacific/png/maps/GP_large.jpg for the Gulf Province. In Appendix A, I list members of the Engan Family of languages, as determined by Wurm (1982, followed by my comments on the names and groups. For some general observations on Proto-Engan, see Franklin (1975), on Engan deictics (Franklin 1994), on pronouns and their old endings (Franklin 1997), on Mendi vowels (Franklin 1974). on Engan and Kutubuan (Franklin 2001), and, on some wider relationships (Franklin and Voorhoeve 1973). The place of Engan (West Central Family) is not mentioned in the widespread Trans-New Guinea Phylum outlined by McElhanon and Voorhoeve (1970). Some aspects of early Mendi culture are described in Mawe (1985), but there is nothing on counting. On the other hand, Williams (1938-39) gives some counting information in his report on the “Grasslanders”, the southwestern dialect of Mendi.

⁴ Wiru (W) and Fasu (F) have cognates with Engan languages, particularly K. On Wiru and its wider relationships, see Kerr (1975); on Fasu, see May and Loweke (1981) and on languages near the border of the SHP, and the Western Province, see Franklin and Voorhoeve (1973). Blowers and Lepi (1975) report a system of counting among the Kaugel that seems to have borrowed certain features from the Kewa four base system—I return to this later. Worth noting also is the striking difference in counting system forms between the Hagen and Chimbu families, although they are part of an accepted language family (Wurm (1961, 1962, 1982); Pawley (2005); Ross (2005); and Foley(1986).

⁵ Kerr (unpublished), where “Witu Number Systems” is part of a much larger work tentatively called “The Witu Cognitive System.”

⁶ Lean 1986, Volume 9; Draper and Draper 2001; Lang 1973; Hintze 1962, are the primary sources for Y. Other accounts (Draper and Draper 2001; Bulmer 1965:132) consider Y to be a dialect of E, most closely related to the Enga-Laiapu dialect and clans.

⁷ Orthographically in this article /nk/ or /ng/ always refer to prenasalized velar stops.

⁸ The Torenama dialect (Lang 1973:xiv)--other dialects Lang notes are Laiapo (lai), Lyaimé (lya), Mai (mai), and Papayuku (pap).

⁹ Note that *ki-tu* represents what is historically **ki* ‘hand’ +suffix in many languages: *ki-se/ki-sa* (Hagen, Lean 9:13; *ki-to+mende* (Enga, Lean 9:24); *ki-tafa* in Fasu (May and Loeweke 1981:313); but also note the form **tV*, as in *tu-* + *mindini* in Ipili (Lean 9:17); *ta-ke+ndeka* (Wahgi, Lean 9:54); *tu-gubu* in Foe (Lean 10: 25); and *tu-kúpu* in Fasu.

¹⁰ Glossed by Lean (Vol. 9:28) as ‘here is the flat object, e.g. bridge’ but I believe this is incorrect. Bridge, which is the same word as ‘corpse’ (or sometimes ‘body’) in many Engan

languages, is *tó-ko* (Lang 1973:131) in E and *to-ko* in S, which in PE is **tro-nko*. However, in S, body is *lo-ke*.

¹¹ Probably from *wakyátae* ‘exposed top part’ (Lang 1973:111).

¹² *yada ipingi* ‘seven, i.e. the right forefinger that draws the bowstring’ (Draper and Draper 2002:435).

¹³ This is markedly different than Melpa (in the Hagen language family) where the counting begins with the left hand but counting is done in pairs, involving both hands (Lancy and Strathern 1981:781-82).

¹⁴ Biersack (1982:815) reports “considerable variation” in the way informants in Ipili counted—some, for example, went up the left side and down the right and some reversed the counting cycle in “rampant variation”. However, in each case at some point a unit of four was employed.

¹⁵ *kegali* > *egaita* in WK, where *k* > \emptyset ; *-li* > *ta*; *a* > *ai/_t*

¹⁶ As cited by Lean (1986:39), based on Strauss and Tischner (1962:8).

¹⁷ A dialect of E, also called Sau or Sau Enga (Ethnologue, p. 598).

¹⁸ Rule 1993:27.

¹⁹ Actually the marker seems to imply something or some action that is always a part of another, but it is not necessarily inalienably possessed, as some body parts are.

²⁰ Draper and Draper 2002:251 and 617 for the different meanings.

²¹ Tone is the most interesting and complex, but I have yet to account for it on a historical basis. Yaraepa (2003:35) believes that Kewapi is better characterized as an accentual than as a tonal system. Ross (2010:295) analyzes Kewa as a word tone language, although admitting that this is an oversimplification. Tone is differentiated, for example, in Huli between the 1st and 2nd personal pronouns: *ì* ‘I’ and *ĩ* ‘thou’; however the same pronouns in the Agentive case in K: *né-me* ‘I-AGN and *nè-me* ‘you-AGN’ have the tones reversed from those of H. S, which retains one set of the proto-forms most fully has *ni-ki* ‘1sg’ and *ne-ke* ‘2sg’ apparently does not have phonemic tone, nor does M, which has the most abbreviated forms.

²² **-NGV* has a number of reflexes: *-nke*, *-ge*, *-ke*, *-ko*, *-xo*, as well as *-ne* and *-ni*.

²³ It seems this should be 12, i.e. a unit of *tu-ku-* ‘four’ juxtaposed with *tepo* ‘three’ = 12. After 12 each four base unit is named by a body part plus an ordinal suffix (*-pu*, *-lu*, or *-ni*). Lang

1973:107) glosses *tukutéponya mendái* as ‘ten’, which I analyze as: *tu-ku-tépo-nya* ‘4x3’ plus *mendái-i* ‘another’. Elsewhere (1973:103) Lang glossed *tépó* as ‘three’ and *tepónge* as ‘third’.

²⁴ Not *ma-pu* unless ‘sweet potato’ is somehow historically related to *ma* ‘taro’.

²⁵ Demonstrated most clearly in I as *yana-ne* (Lean, Volume 9:17), which I gloss as ‘forearm’.

²⁶ Lang 1973:60 gives *lyáa* as a form for ‘nose tip’ from the Kakasa pii dialect (indicated as ‘Bush language’, xiv). However, this form and the next two are questionable reconstructions.

²⁷ This seems unlikely but is the only count unit that I can associate with the term (Lang 1973:118). The translation by Lean’s assistants give the impression that they did not know what to say at this point.

²⁸ From Lang 1973:28: *kaé-nge* ‘to discontinue, to stop’.

²⁹ Sources for M are: Tipton (1982); Hood (n.d.); Lean (1986). M and its dialects is the only language in the family with closed syllables although devoicing of final vowels occurs phonetically in E and L.

³⁰ Huli has been studied by a number of anthropologists--Golman (1973) gives many examples of how the people talk about their own language.

³¹ A note at <http://www.artomaton.net/blog/category/music/bass/> says that “Nete, also known as Bisorio, Malamauda, or Inai, is an Engan language spoken in Papua New Guinea. The Nete and Bisorio dialects have limited mutual intelligibility.” (Accessed April, 2012). Additional information about Bisorio can be found on New Tribes Mission websites.

³² The full form is *rureponga*, which I analyze as *ru* ‘fourth unit’ *-repo* ‘three’ and *-nga* ‘POSS’, meaning the third unit of four as building blocks for the numbers 9-12. A similar analysis holds for *mala* ‘four’ *-pu* ‘continuing’ and *-nga* for the numbers 13-16 and *su -pu -nga* building the numbers 17-20.

³³ The form *ki-se* is a cognate with Bikaru, which has the *-se* suffix on many body parts.

³⁴ However, Lean concludes (following Bowers and Lepi) that the Gawigl or Kaugel counting system is not a body-part tally system, but rather a 4-cycle system that is similar to the E 60-cycle system.

³⁵ Earlier I pointed out the derivational relationship between free and bound pronoun forms for a number of Papuan languages (Franklin 1979).

³⁶ According to the Ethnologue (2005:603) “The Paiela and Pogera dialects have minor lexical differences [and] The Tipinini dialect is more like Enga.”

³⁷ Mack Graham and Lynn Landweer reported on a sociolinguistic survey they did in the Lembena area (31 October-6 November 1989), with word lists collected at Yankisi, Olimolo, Kopaipalu and Yambaidoko. These villages and some others (Mengailim, Kolumba, Yarem) are located in the northeastern area of the Enga Province but the language group also crosses over to the southeastern border of the East Sepik Province. They estimated the population to be 3,000 speakers.

³⁸ There are numerous dialect names given for Mendi—see the Legend in Appendix B.

³⁹ See also Davies and Comrie (1985:280-282), who give additional information and names of Engan languages and dialect relationships. They include wordlists and lexicostatistical relationships for Bisorio, Iniai, Yariba, Maibi, Lembena, Wapi, Lapalama 1, Lapalama 2, Laiagam, Sari, and Kyaka.