The Stress of Tri-syllabic Roots in Proto-Austronesian

John U. Wolff

Cornell University

Little research has been done heretofore on the reconstruction of stress in Proto-Austronesian (PAn) roots of more than two syllables. PAn had roots of one, two, or three syllables. The disyllabic and tri-syllabic roots had contrastive stress—the accent could fall on the final syllable, on the penult, or (in the case of the tri-syllabic roots) on the antepenult. This paper has two parts: part one deals with the establishment of tri-syllabic roots—that is, the evidence that allows us to determine that a given root had three syllables, even in cases where all attested reflexes manifest only two syllables. Part two examines the reflexes in the Formosan and Malayo-Polynesian languages that provide the evidence for stress placement. The results of this research are crucially dependent on data, published as well as unpublished, provided by Professor Li in his years of fruitful study of the Formosan languages, which he has shared with me and other colleagues with unfailing generosity. It is in recognition of Professor Li for his role in enabling this study that I dedicate it to him.

Key words: Proto-Austronesian stress, reconstruction of Proto-Austronesian phonology, tri-syllabic roots in Proto-Austronesian

I would like to dedicate this paper to Professor Paul Jen-kuei Li, whose lifetime of research in all branches of the Formosan languages, living and dead, has laid the groundwork on the basis of which all future study must rest. Without Paul’s crucially important research, I could not have written this paper. The Formosan languages have provided basic evidence for the reconstruction of the Proto-Austronesian (PAn) phonology in many different areas, including information on where they originated and how they spread. One area in which little research has been done heretofore is the reconstruction of stress in PAn roots of more than two syllables. Formosan languages provide crucial evidence for this. PAn had roots of one, two or three syllables. The disyllabic and tri-syllabic roots had contrastive stress—the accent could fall on the final syllable, on the penult, or (in the case of the tri-syllabic roots) on the antepenult. This paper deals with the establishment of tri-syllabic roots and their stress patterns in the proto-language.¹

¹ I would like to acknowledge the incisive comments of Cornell PhD candidate Pittayawat
1. The crucial role of stress in the reconstruction of PAn phonology

The reconstruction of stress is fundamental to the establishment of PAn phonology and for determining the shape of the PAn vocabulary, particularly stress in the tri-syllabic roots. It turns out that reconstructing tri-syllabic roots provides the key for solving the riddles posed by hundreds of exceptions in the attestations that mark the data when stress is not taken into consideration. Without the reconstruction of tri-syllabic roots these attestations give the appearance of irregular correspondences. Let us get ahead of the picture and give an example: the word for ‘nose’ is reflected as hidung in Ml with an h- and as ilúng in Tg with an initial i-, a correspondence that normally reflects PAn initial *q-. However, Oceanic languages that reflect *q with ʔ or k have an initial vowel in the reflexes that are clearly cognate, e.g. Tongan ihu ‘nose’ with vowel and not ʔ initial. There are further puzzles in other reflexes of these proto-forms. But all of these puzzles are resolved by the reconstruction of a tri-syllabic root and its stress pattern. For example, the Tina Sambal reflex is aʔlung: how is the initial a and the glottal stop to be explained? The answer to this question, like to the others, comes from the reconstruction of a tri-syllabic root with stress on the final syllable: *iségûŋ.

Pittayaporn, who has researched the An tri-syllabic roots and shared innumerable insights with me.

The following list gives the symbols and abbreviations in this paper:

- * marks a form reconstructed for PAn. In a running text ‘*’ marks a form that is not attested but has been reconstructed for some proto-language.
- † marks a form reconstructed for PMP.
- †† marks a form reconstructed for a proto-language later than PMP.
- CC: Consonant Cluster (C= Consonant, V= Vowel)
- MP: Malayo-Polynesian languages
- PMP: Proto-Malayo-Polynesian
- An: Austronesian languages
- PAn: Proto-Austronesian

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To explain how the reconstruction of *isegúŋ solves these problems: Ml hidung developed when the vowels of the first two syllables metathesized and the *e was lost: *ise- > *esi > *si- — i.e., *isegúŋ > *siguŋ. This in turn produced Ml hidung by well-established sound changes. The change of *ise- > *si- is attested in the reflexes of literally dozens of reconstructed roots in languages ranging over the entire An area. This metathesis did not take place in PAn times, but rather it was a process that took place independently many times in the daughter languages. Many of the An languages attest forms that do not reflect metathesis. Some of the Philippine languages are among those that did not undergo the metathesis *ise > *esi- > *si-. Sambal a’ilung is an example: *i in the antepenult is weakened to a under the force of the final stress, *s is lost and ? develops in the ensuing hiatus, and finally the penult is syncopated — i.e., *isegúŋ > *asegúŋ > *aegúŋ > *a?guŋ > a’ilung. Note that we refer to the accentual patterns as ‘stress’ and not ‘length’, even though in many of the languages that have preserved PAn stress contrasts the defining phonetic feature is vowel length and not necessarily force of articulation. Because PAn stress had the effect of weakening vowels and consonants in many of the daughter languages (causing neutralization of vowel and consonant contrasts in syllables to the left of the accent), we conclude that stress (force of articulation) was the defining feature of the phenomenon.

Stress is also relevant in explaining the syllabic structure of PAn. Although the daughter languages for the most part exhibit root medial consonant clusters, — i.e., a root structure of (C)VCCV(C), PAn did not have closed first syllables. We reconstruct (C)VCVCV(C) in all cases. It is stress that provides the evidence. An example is *binesíq ‘seed for next planting’ Thao finsiq ‘seed rice’ Bun finsiq ‘seed grain’: why is this not reconstructible as **binsiq? The answer comes from reflexes like Ml benih, Bkl bansi ‘seed’, that reflect *e in the first syllable. The explanation is that *binesiq was in fact a tri-syllabic root with end stress, in which Thao and Bun (and in fact all of the Formosan languages that attest reflexes of this form) reflect syncopation of the penult prior to weakening of the antepenult, whereas the extra-Formosan (the MP) languages attest weakening of the antepenult prior to syncopation of the penult. The MP weakening of the antepenult of *binesiq and subsequent syncopation is parallel to the development of Sambal a’ilung ‘nose’ < *isegúŋ, described above, which also reflects weakening of the first syllable and subsequent syncopation of the penult. That is why the proto-

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2 This does not explain all of the irregularities of the attestations of this root. Many languages, for example Tsou ngici and Fi ngieu, reflect a nasal initial *ŋ. These forms are a ‘nasal grade’ of the root. A small number of roots (not more than 20) have attestations with nasal initial in some languages and with non-nasal initial in others. In those cases two alternants of the proto-morpheme must be reconstructed, one with nasal initial and one with a non-nasal consonant or initial vowel.
morpheme is reconstructed *iségůŋ and not **isgůŋ just as we reconstruct the tri-
syllabic *binesiq and not **binsiq. The same argument can be made for dozens of roots
reflected as disyllabic roots with a closed penult in the daughter languages, when some
languages reflect a weakened or lost first syllable. In some cases where some daughter
languages reflect a disyllabic root with a closed penult there is no attestation with a
weakened first syllable. In such cases we nevertheless reconstruct a tri-syllabic root
with a vowel separating the medial consonant cluster reflected in the daughter languages.
For example, we reconstruct *buŋebuŋ ‘broken into pieces’ (and in fact all roots
consisting of doubled single syllables) with a medial *e even though no reflex in any
language in the data base manifests vowel weakening. Another example is *sáweni (or
possibly *sáwuni), where we reconstruct a tri-syllabic root for consistency although the
attestations reflect a disyllabic root with a diphthong in the penult:

sáweni ‘short while (ago, later)’ At sawni Knn sauni ‘today’ Paz sa-saun-an
‘morning’ Am amu-sauni ‘later’ Pa ka-sawni ‘a short while ago’ Bont awni ‘soon’

Finally, stress contrast determined two important phonemic splits in the history of
the An languages: (1) the split of *t into an affricate and a stop in some of the Formosan
languages (Wolff 1991) and (2) *ñ into /l/ and /ñ/ or /n/ in the MP languages (Wolff 1993).

2. Establishment of tri-syllabic roots and their stress patterns

It is not always obvious that a given root was tri-syllabic rather than disyllabic. A
number of PAn tri-syllabic roots have been assumed to be disyllabic in the literature, for
these are reflected as disyllabic in the daughter languages. In most cases these leave a
trace in the form of a consonant cluster or of vowel weakening in the first syllable in
one or more of the daughter languages. An example of this is *binesiq, discussed above,
which manifests consonant clusters in the reflexes in the Formosan and Philippine
languages as well as initial weakening of the vowel of the first syllable in the MP
languages. In a fair number of cases there is no language that reflects vowel weakening
or CC. In those cases the only trace of the tri-syllabic nature of the PAn root is in irregular
correspondences. That is, the tri-syllabic character of the PAn root accounts for the
correspondences that would appear to be irregular if the proto-morpheme were to be
reconstructed as a disyllabic root. These are the forms we will look at in this section. A
large number of them contained *s, *h or *q which were lost in the attested reflexes or

3 We assume consistency in PAn. If some proto-morphemes consisting of doubled single
syllables must be reconstructed as tri-syllabic roots because of vowel weakening (or because of
tri-syllabic reflexes) then all such reconstructed morphemes must have been tri-syllabic.
had *c as the onset of the penult. (For the reconstruction of their stress patterns see §3.2, below.)

A number of these cases are roots beginning in *ice-, *iqe-, and *ise- that metathesized the *i and the *e in some languages but not in others. This is reflected in that some of the daughter languages have reflexes with *i in the penult and others have reflexes of *e in the penult. (These processes of metathesis occurred independently, for the occurrence or non-occurrence of metathesis is irrespective of group appurtenance.) The following examples from selected attestations show both metathesized and unmetathesized reflexes:

*icebú ‘urine’ with metathesis: Ts sifu; with loss of *i- and *e: St kæ-hbu Thao tubu; with loss of *e: Ilk isbu Tbw siibu ‘urine’

*iceyáb ‘yesterday’ with metathesis: At co-yisa Thao tila Kav sirab ‘yesterday’ Pa tiaw ‘day before or after’ Chamorro nigab4 Kadazan ko-niab; with loss of *i-: Gaddang am-nuwab ‘supper’ Rat ka-neaf Sa’a no-nola ‘yesterday’

††iceyéd ‘shift position, budge, scoot over’ loss of *e: Samar-Leyte isdag; with loss of *e and CC simplification: Cb irúg, isúg WBM isex Ml ingisut Jv ingser Numfor iser; loss of *i-: Tond soro? ‘shift position, move’

††icegét ‘sharp, stinging’ with metathesis: Dumagat singet ‘bee stinger’ Bali singet ‘sting, bite (insects)’ with loss of *i-: Tond senget ‘ant’ Ml sengat ‘sting of venomous insects’

*iqetáh ‘rice husk’ with loss of *i-: Thao qca St kæ-seq Ruk eca Am ?iah Pu ?etha Tond eta ‘rice husk’ Bar ota ‘chaff’; with loss of penult Ruk (Maga) icaa ‘rice husk’

*iqebéd ‘fly’ loss of *i-: Am 2fer Arosi lovo; with metathesis: Ojv hiber ‘fly’

*iseci ‘contents, flesh’ loss of *i-: Kav ĭsi, Pa seti, Sel assi Rat si Mgg ci ‘flesh’; loss of *e and CC simplification: Knn ?a-isí ‘exist’ Pu isi Bontoc isi ND isi ‘flesh’ Mlg ĭsy ‘exist’ Ml isi ‘contents’ Buru ĭsi-n ‘contents, meat’

*isekám ‘weave a mat’ with metathesis: Knn sikama ‘mat woven with wild ginger leaves’; with loss of *i-: Pa sekam ‘mat woven from rushes’; loss of *e and CC simplification: Ilk ikamén ‘sleeping mat’

*isepí ‘dream’ loss of *i-: At (Squliq) spi Pa sepi Mlg5 nofi; metathesis: Paz sipi Maga Ruk u-sipi Rat ipi Tond ipi Muna mo-nifi Ml mimpi (< *um- + *hipi) Buru em-nipi Motu nihi ‘dream’

*iseyúp ‘blow’ loss of *e and CC simplification: Sed iyup Thao iyup Ruk ipi Bun

4 MP languages reflect nasalization of root initial (symbolized N): N + c = *ñ > n in many An languages.

5 Reflexes in Mlg, and in languages of southern Sulawesi and areas to the east reflect nasalization of the root initial *s-.
ma?iup Pu iyup with subsequent loss of *u: Tong if-i ‘blow’; metathesis: St hiop Kav smiuup Kel ng-iup; loss of *i- Cb huyúp; loss of the first two syllables: Buru opi⁶ Sá’a uhi ‘blow’

In some cases the tri-syllabic root is reflected by irregular correspondences in the root initial: some languages seem to reflect *s- or *q- and others, vowel or *h- initial.⁷

*sehapúy ‘fire’ reflecting loss of the initial syllable: At hapuy Thao apuy Ruk apóy and probably all MP attestations Tg apóy Ml api Tong afi ‘fire’; reflecting loss of *h and vowel contraction: Bun sapudh Pa sapuy ‘fire’

In some cases the non-corresponding vowels of the first syllable reflect a tri-syllabic root with syncopation of different syllables taking place in the daughter languages.

*siyuñúq ‘beads’ reflecting syncopation of the penult: Knn sinuʔu Thao fízuq ‘necklace’ Ruk sílo Kayan inu ‘beads’; reflecting loss of the first syllable: Am odoʔ ‘precious stones’ Pu ulu ‘beads’ Hanonoo unuíʔ ‘necklace beads’

*paheyáw ‘hoarse’ reflecting vowel metathesis of the first two syllables, subsequent syncopation of the penult and CC simplification to /h/: Paz puhaw ‘hoarse’; reflecting loss of *h and contraction of the vowel sequence: Kav mpalaw Tg pagáw Ml paraw ‘hoarse’; reflecting weakening of the antepenult and subsequent syncopation of the penult and CC simplification: ND pehaw Bug perro TB poro ‘hoarse’

In some cases it is non-corresponding vowels of the final syllable that enables us to recognize tri-syllabic roots. In the following forms the final vowels in some languages reflect *e and other languages reflect *u. The discrepancy is resolved if we reconstruct *uwen reflected as a single syllable in the daughter languages.

†dásuwen ‘leaf’ Tg dáhon Bug raung Mgg saung TB daon⁸ Ojv rwan Tong lau ‘leaf’

††lahuwén⁹ ‘long time’ Cb laʔûn ‘old and hard (of fruits)’ Muna lao ‘long (of dry

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⁶ -i in Buru and Oceanic languages is a petrification of the transitive suffix (originally the local passive dependent suffix) *-i.
⁷ For example, *isegun ‘nose’, cited in §1, above, is reflected in Ml with initial /h-/ hidung and in Tg with vowel intial ilóng.
⁸ In all the roots in this section the TB reflex proves that the final syllable contained an *e: TB o < *e.
⁹ *h is reconstructed on the basis of /h/ in Cb and Ø in Muna.
season’) MI laun ‘last long’ TB laon ‘last long’ (where /o/ reflects *e)
††lasuwék ‘mix food with staple’ Tg lahók ‘add as mixture’ MI lauk ‘food eaten
with staple’ Mgg lawok ‘mix rice and vegetables’ Mlg laoka ‘food eaten with
staple’; TB laok ‘mixed in’
*taquwén ‘year’ reflecting loss of *q and assimilation of *e > i: Sar caili
Ruk (Tona) cavili Pa tsavili ‘year’ Bun ka-tavin ‘last year’; reflecting loss of
*q: Ilk tawen TB taon ‘year’; reflecting loss of *e Tg taʔón Muna taʔu MI
tahun ‘year’ Tong taʔu ‘yam cycle’.

Other tri-syllabic roots are reflected as a tri-syllabic root in at least one daughter
language or reflect a medial consonant cluster at least in one daughter language, where the
CC resulted from syncopation of the intervening vowel. (See examples in §§3.1 and 3.2.)

3. Reconstructing stress

PAn and the proto-languages of the primary subgroups had a large number of tri-
syllabic roots. In this paper we only treat a sufficient number and provide enough
attestations to exemplify the developments that characterized each pattern and show that
these developments proceeded in accordance with regular sound laws. Stress is largely
reconstructed on the basis of what we term here as ‘vowel weakening’ in the antepenult
or penult caused by the force of the stress to the right of the weakened vowel. In the
antepenult weakening has various different effects, depending on the language. It
invariably involves a shortening and centralization of the vowel (a change to [ə]). This
vowel in many cases is lost, resulting in a CC, which is subsequently simplified. The
rules of CC simplification are different from language to language. In some cases the
onset of the penult is a consonant that became lost prior to antepenultimate weakening.
If the vowel of the antepenult was i or u, the weakening in some cases resulted in a y- or
w-glide which in some languages reestablished syllabicity. The following sections
exemplify these various developments.

3.1 Reconstruction of penultimate stress

Tri-syllabic roots are reconstructed with penultimate stress when the stress falls on
the penult in the daughter languages that retain stress contrasts (most of the languages
of the Philippines) or when the vowel of the penult of the original tri-syllabic root was
not lost by syncopation. In most cases both conditions hold. In many languages the
antepenult is weakened. Here we quote only a few of the large number of tri-syllabic
PAn or PMP roots that are reconstructed with penultimate stress:
*betíhec ‘calf’ Cb bati?is BM bosi?qot Tond weti?is; with contraction of the vowels of the penult and the final syllables after the *h was lost: Thao vuntuc ‘lower leg’ Kav bitis Rat bitis Mgg weitis Kel be?i Mi betis ‘calf’ Leti pis-an (< *ptis-an)
†buqáya ‘crocodile’ Cb bu?áya Mgg waja Mlg voay Mi bhaya Mok kaya: Bu? buaa Sa’a haasa ‘crocodile’
*daqáñi ‘daytime’ At qali-yen Thao sa-gazi ‘noon’ Paz dali Kav ?dan Bun (south) hani-an ‘day’ Ru ko-dali ‘lunch’ Pu ka?a-?ali-an ‘noon’ Pa raqáti in rmaqáti-ali-an ‘mid morning’ Ifugao huwáni ‘today’ Lampung xani ‘today’ Sa’a dani ‘day’
*qalíma ‘hand’ Thao rima St lima Paz rima Ruk alima Bun ima Cb (Surigao) alima Bug lima Mgg limé Leti lima Fi lima ‘hand’
*sináwa ‘breath’ Ts ru-noum Thao fnaw Pa nasi10 Cb g-inháwa BM nyawa11 (<*ina?wa) Bug ñawa Kei naa-n E. Futuna maa-nava ‘breath’ Am mi-nasi ‘breathe’ Muna inawa ‘life sustaining force’ Mi ñawa ‘soul’ Wogeo (Oceania) mañawa ‘rest’
*tañila ‘ear’ At cangiya? Sar calinga Paz sangira Ruk calinga Ruk (Maga) cngira Bun tainga Am tangila Pa tsalinga Pu (dialect) thangira Samar-Leyte talinga Bar talinga Mi telinga Fi talinga ‘ear’

However, in a few cases in which the languages of the Philippines manifest penultimate stress, the proto-form had stress on the antepenult. In those examples an original antepenultimate stress (that shifted to penultimate stress in the Philippine languages) is assumed on the basis of syncopation of the medial syllable or maintenance of *a in the antepenult (see the examples §3.3.1).

### 3.2 Reconstruction of final stress

Stress is reconstructed on the final syllable of tri-syllabic roots when stress falls on the final syllable in languages that retain stress contrast (most of the Philippine languages). In such cases many of the MP languages and Pai-Pu manifest loss or weakening of the antepenult. This is the case of the most of the forms cited in §2, above. In cases where the penult in the Philippine languages is closed (in which case there is no length contrast)

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10 Pa and Am show metathesis: *sinawa > *sina > nasi.
11 BM, MI, ND and some Oceanic languages reflect a metathesis: *in > ny.
or there is no attestation in in those languages, it is only the weakening of the antepenult that enables us to reconstruct final stress.\(^{12}\)

\[\text{†bahe\text{\textbar}at ‘heavy’ with weakening of the first syllable and subsequent syncopation of the penult: Cb bug\text{\textbar}at Kel berat Buru beha ‘heavy’ ND behat ‘weight’, with syncopation prior to weakening of the first syllable: Rat b\text{\textbar}aa? Mok ba\text{\textbar}a:t Nggela ma-va Tong mama-fa ‘heavy’ T\text{\textbar}at wa\text{\textbar}at ‘pregnant’}\]

*be\text{\textbar}ek\text{\textbar}eg ‘tie into a bundle’ with loss of the first syllable: Bun -lukuc (in malukuc and lukucun) ‘tie into bundle’; with syncope of the penult: Tond wa\text{\textbar}kes; with weakening of the antepenultimate vowel and subsequent syncope T\text{\textbar} g bigkis TB borhos ‘bundle’

*bi\text{\textbar}e\text{\textbar}i ‘night’ with syncope of the penult and CC simplification: At bingi? ‘let s.t. spoil by leaving it overnight’; with metathesis of the vowels of the penult and antepenult and subsequent loss of the antepenult: Paz xini-an; with weakening of the antepenult: Pa vengin\(^{13}\) Kpp bengi Tond wengi Bar wengi Sel bangngi Ojv wengi Fi bogi ‘night’

*binesiq\(^{14}\) ‘seed for next planting’ with weakening of the first syllable and subsequent syncopation: Bkl banhi? Mi benih ‘seed (usually for planting), seedling’; with syncopation of penult prior to weakening of the antepenult: Thao fin\text{\textbar}iq ‘seed rice’ St binsiq ‘seed’ Bun binsiq ‘millet seed’ Pu vini ‘seed’ Rat bine ‘rice seed’ Bug binee ‘seed’ Muna wine ‘seed, seedling’ Mgg wini ‘seed’ ND bi\text{\textbar}ni ‘seed rice’

*cahe\text{\textbar}ay ‘shine (sun)’ Am cahdal ‘come out (sun between showers)’ Cb san\text{\textbar}ag ‘bright, cheerful (countenance)’; with weakening of the antepenult prior to syncopation: Tond sena? ‘shining like a star’

*leqa\text{\textbar}em ‘sour’ with loss of antepenult: ND m-asem Mi m-asam (dial hasam) ‘sour’ Ojv hasem ‘tamarind’ Mok kasam ‘pickle’; with metathesis of the vowels of the antepenult and the penult and subsequent loss of the antepenult: Tond esem Tae’ essun ‘sour’; with syncopation of the penult: Rat licing

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\(^{12}\) Languages from an area covering parts of Kalimantan and N and Central Sulawesi do not provide evidence for the reconstruction of antepenultimate stress as opposed to final stress because these languages shifted the initial stress of tri-syllabic roots to the end and weakened the antepenult.

\(^{13}\) Pa and other languages reflect a variant with final *-n: *bi\text{\textbar}e\text{\textbar}in

\(^{14}\) It could be argued that this root in fact originally had antepenultimate stress and that the Mi and Philippine forms evince stress shift to the final syllable (as is the case of the forms discussed in the middle and final paragraphs of §3.3). This is indeed assumed for a number of tri-syllabic roots in languages of the Philippines, but not so for Mi. It would be the only example of a Mi form reflecting a tri-syllabic root that underwent stress shift to the final syllable.
vinegar’; with penult syncopation, subsequent *c loss and vowel assimilation: Kel laam ‘sour’; with metathesis of the first two syllables and syncopation of the penult: Pu 'aysem Cb aslum (< *qalecem) ‘sour’
*qitelú ‘egg’ Am f-ita?ol Knn itsuru; with metathesis of the vowels of the penult and the antepenult: St asizol Pa qetsilu; with syncopation of the penult: Tg itlog; with weakening or loss of the antepenult: Tond atelu Rat tu?u Bug tello Mgg telo Ojv hantelu Mok kelu:n (< *qelu < *qtelu); with weakening of the antepenult and subsequent syncope of the final syllable: Label (Oceania) kotol ‘egg’
*upiyá ‘good’ WBM upiya ‘do good’ Ilonggot upiya ‘good’; with loss of the antepenult: Siraya smimia ‘cure’ Itbayatan ma-piya? ‘heal’ BM pia ‘goodness’; with metathesis of the vowels of the penult and final syllables: Samar-Leyte ma-úpay ‘good’

3.3 Reconstruction of stress on the antepenult

Stress is reconstructed in the antepenult if the antepenult *a or *e is not reflected as weakened in those languages that weaken the antepenult when the stress falls on the end. That is, failure to weaken the antepenult in those languages is an indication that stress originally fell on the antepenult. Additionally, stress on the first syllable of the root in the Philippine languages reflects stress on the antepenult in the proto-language (just as stress on the final syllable in the Philippines indicates stress on the final in the proto-language). However, if the Philippine languages reflect a medial CC, stress placement is automatic. Therefore, the Philippine reflexes in those cases provide no evidence. We list some of the examples:

*bánèsis ‘fragrant in smell’ Kav bangsis ‘fragrant’ Ilk bang?i ‘smell of burnt toast’
Tg bangí ‘roast over coals’ Sang bengi ‘fragrance’ Ojv wangi ‘fragrance’
Mgg bengé ‘smell good’
†bánùwa ‘land, place where there is something’ Cb banwa ‘town, thicket’ Rat bänúa ‘village’ Bar banua ‘house, dwelling’ Bug wanua ‘village’ Ml benua

However, since some languages of Kalimantan and those of northern and central Sulawesi shifted the stress of tri-syllabic roots to the end at a point before antepenultimate vowel weakening took place, these languages do not reflect a contrast between antepenultimate and final syllable stress in tri-syllabic roots: the antepenultimate syllable is weakened whether the PAn and PMP stress was on the antepenult or was on the final syllable.

Tg bangí < *bangé?i. In words that underwent penult syncopation and the final syllable began with a laryngeal, stress automatically falls on the final syllable.
‘expanse of land’ \textsuperscript{17} Ojv wanua ‘inhabited place, village’ Fi vanua ‘land, region, community’

*jáqewis ‘far’ Ruk Maga me-dávili (l not explained) Bun daqvis-an Am raay Bont a-dawwi Tg maláyo?, Rat raw MI jauh Ojv dwah ‘far’ Fi e-sau ‘outside’

*qáselu ‘pestle’ At qaselu? Thao qàsuru Paz suru\textsuperscript{18} St æselo? Kav salu Ru asólo Bun qusau Am asolo Pu (dial) ?ules Pa qaselù Cb alhu Tond alu Bug alu Kel aluh MI Banjar halu Mok ka’øyoy Buru alu ‘pestle’

There was a tendency toward shift of stress to the final syllable in roots with a stressed antepenult. Languages of northern and central Sulawesi and parts of Kalimantan have shifted the stress from the antepenult to the final syllable almost universally.\textsuperscript{19} Some individual items evince a shift to the final syllable in languages outside of these areas, but they are not all the same languages that evince the shift. Some languages show shift in some items but not in others.\textsuperscript{20}

*báqeγuh ‘new’ At bah (Squiliq) Sar varuʔa Thao faγlu Ruk baav-an Bun baqlu Am faʔloh Pa vaq-an Bkl buʔgu MI baharu Sa’a haalu Tong foʔou ‘new’;\textsuperscript{21} with shift of stress to end and weakening of antepenult:Rat ßuú Tond weru Muna bhuyow Mgg weru Kel berah Mok keloy Buru fehu-t ‘new’

*bítuqan ‘star’ Paz bintul St bintæʔen Bun bintuqan\textsuperscript{22} Pu vituʔen\textsuperscript{23} Pa vitjuan

\textsuperscript{17} Many languages developed automatic penultimate stress. In MI and other languages this caused the antepenult to weaken. Thus in some forms MI reflects PAn antepenultimate stress with a weakened first syllable and stress on the penult. This same phenomenon accounts for the the Buru reflex fena ‘village, including fields’ where e reflects a weakening of the earlier *a.

\textsuperscript{18} The rules of loss of the antepenult in Paz and Kav are not explained. Possibly there was a shift of stress in these forms.

\textsuperscript{19} The shift to the final syllable is a late development and occurred independently in many languages. This is proven by the reflexes of *paqegu ‘gall’ in closely related languages. Tond reflects loss of the first syllable peru ‘gall’ but closely related Tonsea reflects its retention:aperu ‘gall’. I assume that failure to weaken the antepenult invariably indicates that the stress has remained on the penult. This is not necessarily true. It is possible that the stress shifted and the antepenult sporadically failed to weaken.

\textsuperscript{20} Cf. the immediately preceding note. It may be the case that the stress shifted in all these languages and that antepenult weakening was a sporadic process.

\textsuperscript{21} The antepenult has o because of accent shift to the penult. /o/ < *e ([ɾ]).

\textsuperscript{22} The reflexes in Paz, St, and Bun have an intercalated n coda in the antepenult. This is the result of a stress on the i of the antepenult. It is independent of the nasal insert in the MI reflex.

\textsuperscript{23} Pu and most MP languages reflect /e/ in the final syllable. There is no explanation. Perhaps it is because the final syllable has the shape of the affix *-an and this was replaced by the affix *-en by some unknown analogy. Further in Bar and Oceanic languages the final *-an is
Sangir bituing Bug wittoeng Ml bintang Mok bituek ‘star’; reflecting shift of stress: Cb bitú?un Tg bituwin Tong fetu?u ‘star’
†láqeya ‘ginger’ Sel laiyya ND lai MI halia (<*laihya) Adzera (Oceania) lakia ‘ginger’; reflecting shift of stress to the final syllable and weakening of the antepenult: Cb lay?a (<*le?eyá) Rat lia Muna loyia ‘ginger’
*páqegu ‘gall’ Sed paxu-ng Ts pau Thao qazpu24 Paz apuzu St pé?zu? Ruk pqo Bun paqav Pu ?apedu Pa qapedu Bontok apgu Bar apoju Mlg afero Ml hampedu Mok kapa:w Tong ?ahu ‘gall’; reflecting stress shift to the final syllable: Rat purú Tond peru Mgg pesu ND peru TB pogu Kei firu-n Buru peu-n ‘gall (bladder)’
*qáyicam ‘plant with reed-like stem’ Sar ariame ‘miscanthus stalks’ Bun (southern) xaslam Mansaka aqisam TB arsam ‘Gleichenia sp.’ Fi (Bau) caca ‘kind of fern’; with stress shift to final syllable and loss of weakening of earlier syllables: Kav isam ‘Miscanthus sinensis’ Rat husam ‘a creeping fern’ Mgg cera ‘kind of fern’ MI resam ‘Gleichenia sp.’
††qájelai ‘Coix lachryma jobi’ Cb adlay Ojv jaheli ‘Coix’ with stress shift to the final syllable and loss or weakening of earlier syllables: Bar jole Muna sole Mok jelay ‘Coix’
*qáñegaw ‘day, sun’ Pu kadaw Pa qadaw Ibanag anggaw Bkl aldaw Mlg andro Tong ?aho ‘day’ Sa’a sato ‘day’ Ojv ando-n ‘daily’; with stress shifted to final syllable and loss or weakening of antepenult: Rat law Tond edo Bar eo Mgg leso Buru lea ‘day’

In one example languages of Formosa reflect a stress shift to the final syllable:

*pálisi ‘taboo’ with weakening of the antepenult reflecting stress shift to the end: St pishian Kav plisin Ruk lisyan ‘taboo’; reflecting no stress shift: Thao parshian Am paysin Pa parisi Muna fali-a ND fali ‘taboo’ Wolei (Oceania) fali ‘be restricted to stay away from impure things’

In the following example only Mok reflects a shift to the final syllable:

*túqelañ ‘bone’ reflecting stress on the antepenult and syncope of the penult: Sar tsula Cb tul?an Mlg tolana MI tulang; no syncope: Pa tsuqelaly Ojv tahulang (vocalic metathesis); reflecting loss of the antepenult: Mok kela:n ‘bone’

replaced by -un There is no explanation.

24 Thao, Paz, Puy and Pa as well as the MP languages metathesize *p and *q.
In the following example only the Philippine languages reflect a shift to the final syllable:

*liceqes ‘louse egg’ Ruk alisòosa ‘louse egg’ (a- secondary); with syncopation of the penult: Thao riqni St li?fif Kav risis Bun icqus ‘louse egg’ MP languages all reflect metathesis of *s and *q and loss of *s. with syncopation of penult: BM lita? Baree lioso (with change of *ce > *ce > os and addition of echo vowel) Bug lissa ND lies (late metathesis of penult and final syllable as in Baree) TB lisa Tong liha ‘louse egg’; Phil languages manifest weakening of the antepenult and subsequent syncopation of the penult *liceqés > Cb lusá? ‘nit’

3.3.1 Shift to the penult from the antepenult

A few languages reflect a shift of stress to the penult from the antepenult.  

††búsanjín ‘sand spit’ with syncopation of penult: BM bungin ‘sandbank’ Tae’ bungin ‘sand’ Ml pasir bungin ‘sand mixed with mud’ Sunda bungin ‘sandbank’ Wolio bungi ‘sandbank exposed at low tide’; with shift to the penult: Tg buhángin ‘sand’  
*γábihi ‘night’ At γabi-yan ‘evening’ Sar kua-ravi ‘supper’ Kav rabi ‘evening’ Bun labian ‘night’ Am lafii ‘midnight’ Pu ma-yavi ‘supper’ Samar-Leyte gab?i ‘night’ Tond kaawi?-i-n ‘yesterday’ Bug ka-rawi-an ‘late afternoon’ Leti o-rawi ‘yesterday evening’ Fi eí avi ‘in the evening’ Tong eí-afi ‘afternoon’; reflecting a shift to the penult: Cb gabí?i Rat iwi ‘night, evening’ Bar owi ‘earlier’  
*káwayan ‘k.o bamboo’ Ruk kavadónó Pu kawayan Pa kawayan Mok ka?u:n Buru kawaan ‘(kind of) bamboo’ With shift of stress to the penult: Tg kawáyan ‘bamboo’  
*qáñitu ‘evil spirit’ Ruk adicu ‘the sacred “octopus” tree’ Bun qanitu ‘ghost’ Am ?anito ‘evil spirit’ Pu ?altu ‘owl’ Bar anitu ‘spirit of the lobo’ Ml hantu ‘ghost’ Mok katóy ‘evil spirit’ Ojv hanitu ‘evil spirit’ Fi anitu ‘spirit, supernatural being’ Tong lau-?aitu ‘from the spirit’; with shift to the penult: Ts hicu Sar ititsu Cb gānitu ‘benevolent spirit’ Ngada nitu ‘earth spirit’ Leti nitu ‘ghost’

25 We assume original stress on the antepenult because the antepenult is not weakened anywhere.
3.4 Tri-syllabic roots for which stress pattern cannot be reconstructed

There are cases in which stress patterns cannot be reconstructed because no form is attested that reflects stress.

*laheyu ‘wither’ St lay-layu? Cb lay?u Tae’ ma-layu Ml layu Motu ma-lai ‘wither(ed)’
†beγecay ‘oar’ Cb bugsay BM botoy Bug bisee ND besey Mlg fivoi Mok becay Leti vesi Fi voce Tong.fohe ‘paddle’

4. Conclusions

PAn had contrastive stress, and this can be reconstructed on the basis of vowel weakening and syllable loss, for force was a component of the articulation of stress in PAn. It is possible to reconstruct the stress of tri-syllabic roots based on occurrence or non-occurrence of syllable weakening or loss in the daughter languages. The phonemes *q and *s developed into laryngeals in the MP languages, and these together with *h tended to become lost with contraction of the vowels that came to abut on each other after the loss of laryngeals. For this reason many of the tri-syllabic roots are nowhere attested as tri-syllabics and can only be recognized by the reflexes evinced by the attested forms that would be irregular if the proto-morphemes had not been tri-syllabic.

References