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TONIC SOLFA IS THE FOUNDATION OF TONAL LINGUISTICS

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**TONIC SOLFA IS THE FOUNDATION OF
TONAL LINGUISTICS**

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ABSTRACT

My Mother Tongue, Krobo/Dangme-Gã of south-east Ghana was first written by the Swiss-German Basel Missionaries who not only translated the Bible for us, but also wrote hymns for us with the help of local experts born in the Gold Coast. They did a remarkable job, but as the Ghanaian vowel imparts no less than 6 meanings to any consonant my parents and grandparents had to look at the context in which a written word appeared before pronouncing the word correctly. For example, the word written 'ta' can mean chew, war, giant ant, to fish out of a bowl, palm tree, or narrate in Krobo/Dangme. My parents were adept at quickly scanning a sentence mentally before deciding what the 'ta' they had just read stood for. Their children and grandchildren do not have the patience to decipher the meaning of biblical sentences and hymns, to our great loss. None of the attempts made by experts in Linguistics at home and abroad to make it easy for me to read my Mother Tongue has proven acceptable to me. I have devised a fail-proof method to identify the tone of every vowel in my Mother Tongue so precisely that a non-native, following my rules, can phonate a word exactly and as accurately as a native. I have employed Tonic Solfa and sound colouring as the fail-proof methods of achieving my objective. No vowel should ever be written

in Tonal Linguistics without 'pitch' and 'quality'. Pitch is, normally, high, mid, lower-mid, and low, while quality is nasal or non nasal. Most of the time high, mid, and low pitches operate, but sometimes lower mid-pitch is called for to impart the correct meaning. That the phenomenon of 'mid pitch arrest' in Krobo/Dangme, and 'lower mid-pitch arrest' in Gã has not been described before in the leading textbooks of Linguistics is probably because experts have been unable to pinpoint exactly (that is mathematically) where these arrests occur between high pitch and low pitch. I have established that normal human speaking voice spans an octave, and that mid pitch is exactly 3 semi tones below high pitch, while lower mid pitch is 2 semi tones below mid pitch not only in my Mother Tongue, but also in English as demonstrated below. These precise pitches can be arrested and assigned to consonants to mean just what the speaker intends. Tribes that display this phenomenon may be related genetically, allowing research in Glossogenetics aided by the present global genome sequencing exercise. Scientists denying that there is design in the universe are simply wrong.

INTRODUCTION

One Assignment that I have given more than once in the Annual Kwegyir Aggrey Prize Exam at the University of Cape Coast over the past 9 years is this:

“Describe a problem whose solution has hitherto been unsatisfactory year after year, decade after decade, and perhaps century after century. Indicate in detail the way you think you can improve on what has been presented as satisfactory.”

This Assignment enabled me to choose which candidates were capable of original thinking. They produced information not found in any textbook, thus qualifying them to be worthy recipients of the first three prizes 100 Guineas (£105 Sterling), 75 Guineas (£78.75), and 50 Guineas (£52.50). Giving myself the same ‘assignment’ I had no difficulty in identifying “a problem whose solution has hitherto been unsatisfactory year after year, decade after decade and, perhaps century after century”. With no less than 6 ways a vowel is pronounced in my Mother Tongue (Konotey-Ahulu 1999, 2000, 2001, 2007a&b, 2008a&b, 2009a&b&c), I find it very difficult to read passages where vowels are neither *pitched* nor *qualified*.

On Saturday 30th October 1993 at about 2.30 pm my sisters Mrs Catherine Archampong and Mrs Ann Andoh accompanied me on a trip to Nuaso at Odumase-Krobo. As we walked down the incline from the mountain Yogaga I observed a young Krobo woman reading the Krobo/Dangme Bible by the road side. Wishing to see what she was reading, we stopped and I asked her to read aloud to me. The first half of the sixth verse of the 17th chapter of the Gospel according to St John reads (in Authorized Version English):

“I have manifested thy name unto the men whom thou gavest me out of the world”

Bible readers recognize instantly this portion of Scripture as part of the ‘High Priestly Prayer of The Lord Jesus Christ’ to GOD The Father. This is how the Krobo/Dangme Bible renders this passage (Konotey-Ahulu 2001):

“I je obiεϯ si ngϯ tsϯ nimli ne ongϯ kε je je ϯ mi ha mi ϯ”

The lady read this aloud perfectly, pronouncing the word **je** in 3 different ways, thus imparting 3 different meanings to the word. The first **je** is pronounced differently from the second, which in turn is different in pitch to the third.

jé (high pitch) coupled with **si** means ‘revealed’ or ‘manifested’, the thing revealed is placed between the **jé** and the **si**, thus:

jé (thy name) **si** means ‘reveal thy name’.

jè (low pitch) means ‘leave’, ‘out of’, or ‘departing from’

The third **je** has a pitch that is neither ‘high’ nor ‘low’ but lies somewhere between the octave **jé** ... **jè**.

I have identified this mid pitch as not just lying any where between **jé** and **jè** “but exactly 3 semi tones below the high pitch” (Konotey-Ahulu 2001). This is not only so in Krobo but in all the Tonal Languages I have examined where a third pitch is part and parcel of the mother tongue. Some have indicated this pitch with a vertical rod above the vowel, hence **jè** for mid pitch identification. This, to me is unsatisfactory, as lower mid pitch (2 semitones below mid pitch) would be impossible to distinguish using supra-vowel signs. I decided to resort to colour. But first, what is a semitone?

WHAT IS A SEMITONE?

Look at any music keyboard, or sing **d r m f s l t d**. A *semitone* I define simply as the ‘distance’ in pitch between one key on the piano/organ keyboard and the very next key black or white. That

mid pitch is 3 semi-tones below high pitch, which itself is a full octave above low pitch is easily demonstrable to anyone who is not tone deaf and who is familiar with the **d r m f s l t d** scale.

Using 3 different pitches, try pronouncing CANADA slowly and deliberately to get *Ca* (high), *na* (mid) and *da* (low). Note the pitch of the second ‘a’ and you will find that it is 3 semi-tones below the first ‘a’ before hitting the low pitch of ‘da’. If *Ca* has the pitch of *s* on the **d r m** scale (ie G above middle C on the music keyboard), then *na* becomes *m* on the scale (ie E below that G). If one chooses to make high pitch assume **d** (C octave above middle C) on the downward **d t l s f m r d** scale, then *na* (mid pitch) is **l** on that **d t l s f m r d** scale, – exactly 3 semi-tones below high pitch when you check with your music keyboard – the complete octave being **d de r ma m f fe s se l ta t d** each note separated by a semitone. The italicized notes are the black keys, starting with **d** on the C Clef, and ending an octave higher with **d**. Descending from **s** to **m**, one goes **s** to **fe** to **f** to **m** (3 semitones).

One does not need a piano to prove that the gap between high and mid pitch is 3 semi-tones. Just sing the complete *tonic solfa*. While this information can be ignored by those whose mother tongue is English, a language that often makes perfect sense even when

spoken in monotones, it nevertheless is of vital importance in tribal tonal linguistics. While the context enabled my parents decipher whether ‘ta’ meant ‘fish out’, or ‘war’, or ‘chew’, or ‘narrate’, or ‘giant ant’, or ‘palm tree’ (Konotey-Ahulu 2000) later generations have found it increasingly difficult to read their mother tongue.

COLOURING SOUND

To aid Adult Education in the tribe I have used colour for pitch, making high pitch ‘red’, low pitch ‘blue’, and mid pitch ‘green’. Thus Canada is phonated **Canada**. Green is 3 semitones below red, which itself is an octave above blue.

But how can I confirm that low pitch is an octave below high pitch and vice versa? I use the musical phrase in *Handel’s Messiah* where the remarkable octaves produce exactly the *tonic solfa* pitch variations that we hear in our mother tongue. In his Alleluia Chorus, immediately after the double 5 “Alleluia”s we hear this remarkable tonic solfa phrase: **s: l t ddd: dt l: s**, then after another 4 “Alleluia”s we hear **d: r m fff: fm r: d**, which octaves are exactly what we hear phonated in the Accra market when the women at Makola say **O’ sika** (“your money” in Krobo/Dangme) or **O’ shika** (**O’ fika** in Gã). These tribal octaves (high low high) accurately match Handel’s **ddd** and **fff** in his Alleluia Chorus. (Konotey-Ahulu 2007b).

FOURTH PITCH [LOWER MID PITCH]

A 4th pitch that does not always impart a different meaning to the consonant also occurs in the tribe just as is heard in English. My native ear enables me to hear 4 pitches in the word “Agriculture” in Queen’s English [high mid lower-mid low] where lower mid is exactly 2 semi-tones below mid pitch. In the tribe this lower-mid pitch (**r** [D] below **m** [E] in key C major) is often merely decorative, and is often assigned to the definite article “the” when mid pitch is already occupied by a vowel. Corresponding to the pitch of ‘cul’ in **a gri cul ture** I assign this pitch the colour lime green hence **a gri cul ture**, (**s m r s**) where green is 3 semi-tones below red and 2 semi-tones above lime green. Blue is an octave below red for the same person in normal human speech. Watching the following colour sequence, it becomes obvious therefore that the term **proto-agriculture** (low low high mid lower-mid low) phonates exactly like the tribal **korkordeney ler for**, “the frog’s fat” in Gã (Konotey-Ahulu 2007a&b). When the two terms are hummed rather than spoken, there is no acoustic pitch difference between Ghanaian and English, though the significance of pitch in the former outweighs by far that in the latter.

MID PITCH ARREST

It is a remarkable fact that my entire Krobo/Dangme tribe has perfect mid pitch, that is to say mid pitch is locked in the brain and assigned to several words, like reserving the pitch of **na** in **Canada** to specific words (Konotey-Ahulu 2001, 2007a&b, 2008, 2009). This phenomenon is unheard of in English, and is not mentioned in David Crystal's *The Cambridge Encyclopedia of Language*. (Crystal 1997). Words like **bo** (cloth), **je** (world), **to** (keep), **yo** (hill), **ho** (honey), **gaga** (tall) are all mid pitch specific. To pronounce them with other than mid pitch gives an entirely different meaning to each word. Ability to pronounce (or rather phonate) the name of our elegant Krobo mountain **Yogaga** ("hill tall") pronounced in tonic solfa with **m m m**, maintaining mid pitch throughout, is a feat I dare non-natives to try (Konotey-Ahulu 2007, 2008).

LOWER MID-PITCH ARREST

Equally significant is the ability of Gã speakers to arrest lower mid pitch **r** (lime green, 2 semitones below **m**) on the **d r m** tonic solfa scale and assign it to a vowel when asking a question. Thus:

In Gã "the stone" (stone the) is **tɛ lɛ (s m)** while "the stone?" (stone

the?) becomes **tɛ lɛ?** (**s r**). Change the vowel pitch to **r** (lime green) and you change a positive statement to a question, not only with the definite article and indefinite article, but also with any other word.

bo (low pitch) in Gã means ‘you’ (Accusative), but ‘you?’ (a question) becomes **bo** (lime green or **r** on the **d r m** scale). ‘Came’ is **ba**, and ‘came?’ becomes **ba**. The remarkable thing is that the native speaker can go straight to that pitch without reference to any other pitch. Such mid pitch arrest in Krobo/Dangme, and lower mid pitch arrest in Gã, is a phenomenon that lends itself to extensive research in Glossogenetics. The beauty of Tonic Solfa is that while any piece of music can be played in 12 different keys of the piano or organ, there is only one way of rendering it in Tonic Solfa. Similarly, there is just one way of recognizing a tonal language in Tonic Solfa. By a remarkable coincidence our Ghana National Anthem starts with 3 notes of mid pitch **m**. *Any Ghanaian who does not know what mid pitch sounds like may begin singing or humming our national anthem, and mid pitch will be struck. This is fail-proof!* (Konotey-Ahulu 2007b).

SOUND QUALITY

Significance of vowel quality is even greater in the tribal situation. Indeed, this cannot adequately be demonstrated without using the

invaluable Ghanaian word *tafracher* that I was at pains to introduce into medical parlance some 34 years ago (Konotey-Ahulu 1975). ‘Tafracher’ not only pre-empts but also effectually negates the vulgarity and crudeness of a succeeding utterance. “The more respectable the speaker the less vulgar in speech he is expected to be and the more likely he is to use ‘*tafracher*’ when he has to mention something he thinks is not pleasant to the ear.” (Konotey-Ahulu 1975). The word is repeated if the offending succeeding sentence is really awful. Thus while a Ghanaian would quite happily say **e sa** [low high] meaning “she/he scrubbed” in Krobo/Dangme, [**e sha** in Gã], when using the nasal quality of the second vowel at the same pitch, Ghanaian Africans are always expected to say “***Tafracher, tafracher e sã***” or “***Tafracher, tafracher e shã***” being interpreted (even while on a medical ward round discussing a patient after abdominal operation), to mean: “Do please, please, excuse me when I have to say: she passed wind”. Nasalizing the vowel, when it should not be nasalized can be a linguistic nightmare for the African.

It is, therefore, a social disaster of enormous proportions if, when an African desires to say she scrubbed she is rather heard to say unmentionable things because of cleft palate. The need for early correction of this defect cannot be over-emphasized. Any African

baby born with cleft palate stands in great danger of being ostracized in later life, and should be helped immediately. Pregnant women need to be put on Folic acid early; a mere 500 micrograms daily is known to prevent cleft palate. (Konotey-Ahulu 2007, 2008).

VOWEL DUPLICATION AND TRIPLICATION

Scripts in my mother tongue that place a bar above vowels to indicate that they must be prolonged give no indication regarding how long the vowel is to be stretched. As different people speak at different speeds, I find it unsatisfactory to use musical terms like minims, crotchets, quavers, and semibreves to indicate the length of vowels. I have adopted my own terms that can easily be explained to even illiterates. The concept of 1 vowel value, 2 vowel values, and 3 or more ‘vowel values’ or ‘vowel places’ becomes obvious when illustrated as follows:

One vowel value (1 vv): **e ta** She chewed; he chewed;
it chewed.

Two vowel values (2 vvs) **e taa** She chews (habitually)

Three vowel values (3 vvs) **e taaa** She does not chew [high
mid mid low]

It is virtually impossible to get the meanings of these words wrong when one combines pitch and vowel multiplication.

DISCUSSION: Marvels of Ghanaian Tonal Linguistics

Much tribal knowledge can be shared if only we have the tools to disseminate it. Tonal linguistics is one such domain which non-natives have always struggled with. “The African” I once said “continued to admire attractive flourishes in someone else’s language and wished he could say the same things the same way in his own language until suddenly it dawned on him that some expressions in his mother tongue were quite without aesthetic parallel in any other language of mortals” (Konotey-Ahulu 1975).

Experts in linguistics have tended to interpret *tonal* linguistics with simplistic tools, and have sometimes failed to fathom the amazing depths where our linguistic gem resides. My mother tongue Krobo/Dangme, for instance, abounds in linguistic treasures, yet it is not mentioned once in David Crystal’s *The Cambridge Encyclopedia of Language*. (Crystal 1997). I have devised a verifiable method of writing my mother tongue, using colour for the various pitches, the gaps between which are quantifiable to enable anybody to phonate it correctly. As demonstrated above, normal human speech spans an octave, and the gaps between the pitches

within the octave can be measured with *tonic solfa* precision. I have done this both in tribal tonal linguistics and in Queen’s English.

Using my mother tongue (Krobo/Dangme-Gã) as an example, I define a tonal language as one whose vowel can impart at least six different meanings to the same consonant. What is written *ta* in my mother tongue has (without prolonging the vowel) 6 different meanings derived from 3 pitch positions of the vowel (high mid low) with each pitch possessing two possible quality modes, nasal and non-nasal (Konotey-Ahulu 1999, 2000, 2001, 2007a&b, 2008a&b, 2009a,b,c). Such is the potential of our Mother Tongue, that just 2 letters of the Gã alphabet - ‘a’ and ‘f’ – can be used to express no less than 74 (seventy-four) English words, phrases, and sentences. How many non-natives can pronounce these correctly?

Pitch

Quality

a fa **s s** it was borrowed

a fã **s s** it was uprooted

a fa **s s** it has been borrowed

a fã **s s** it has been uprooted

a fa? **r r** was it borrowed?

a fã? **r r** was it uprooted?

a fa? **s r** has it been borrowed? **a fā?** **s r** has it been uprooted?
a fa **s m** let it be borrowed **a fā** **s m** let it be uprooted
a fa? **s r** should it be borrowed? **a fā?** **s r** should it be uprooted?

aa fa **s s s** it is being borrowed **aa fā** **s s s** it is being uprooted
aa fa **s s m** it will be borrowed **aa fā** **s s m** it will be uprooted
aa fa? **s s r** will it be borrowed? **aa fā?** **s s r** will it be uprooted?

a faa **s s s** it is borrowed **a fāā** **s s s** it is uprooted
a faa? **r r r** is it borrowed? **a fāā?** **r r r** is it uprooted?

a faaa **s m m s** it is not borrowed **a fāāā** **s m m s** it is not uprooted
a faaa? **s m m r** is it not borrowed? **a fāāā?** **s m m r** is it not uprooted?

fa s	enough	fǎ s	to order/ or half
fa? m	borrow?	fǎ? m	uproot? move?
fa s	borrowed	afǎ s s	the half or half of it
		fǎ he s m	defend it
		fǎ he? s r	defend it?

faa s s	river	fǎǎ s s	uproots
faa! s s	borrow!	fǎǎ! s s	uproot!
		fǎǎ he s s s	defends
		fǎǎ he? s r r	defends?
		fǎǎ he s s m	does not defend
		fǎǎ he? s s r	does not defend?

faaa! s s r do borrow!! **fǎǎǎ!** do uproot!! do move!!

faaa s s s not enough

fāāā did not order or command

To order in Gã is **f**ā (high pitch, nasal quality)

To borrow is **f**a (low pitch, non-nasal quality)

Pitch

Quality

a fa s s it was borrowed

a fā (s s) it was ordered

a fa s s it has been borrowed

a fā (s m) it has been ordered

a fa? r r was it borrowed?

a fāā? (s s r) was it ordered?

a fa? s r has it been borrowed?

a fāā? (s m r) has it been ordered?

a fa s m let it be borrowed

a fā (s s) let it be ordered

a fa? s r should it be borrowed?

a fāā? (s s m) should it be ordered?

aa fa s s s it is being borrowed

aa fā (s s s) it is being ordered

aa fa s s m it will be borrowed

aa fā (s s s) it will be ordered

aa fa? s s r will it be borrowed?

aa fāā? (s s s r) will it be ordered?

a faa s s s it is borrowed

a fãã (s s s) it is ordered

a faa? r r r is it borrowed?

a fãã? (r s r) is it ordered?

a faaa s m m s it is not borrowed

a fããã (s s s s) it is not ordered

a faaa? s m m r is it not borrowed?

a fããã? (s s s r) is it not ordered?

fa s enough

fã (s) to order/ or half

fa? m borrow?

fãã (s r)? order?

fa s borrowed

fã (s) ordered

fã he (s m) defend

fã he (s r) defend?

*NB: Not knowing the difference between **m** and **r** in the tonic solfa makes it impossible for a non-native to identify these distinct pitch differences.*

faa s s	river	fãã (s s)	orders
faa! s s	borrow!	fã! (s)	order! Do order!
		fãã he (s s s)	defends
		fãã he? (s r r)	defends?
		fãã he (s s m)	does not defend
		fãã he? (s s r)	does not defend?

faaa!! s s r	do borrow!!	fãã!! (s r)	do order!
faaa s s s	not enough	fããã (s s s)	did not order or command

TADKA RULES AND EQUATIONS

‘Tadka’ stands for ‘Tetteh-A’Domeno Konotey-Ahulu’. It was the name my paternal grandfather gave me the day I was born at Odumase Krobo in the Gold Coast (Ghana). I have attached this name to rules and equations I have formulated to evaluate my phonation techniques.

Tadka Rule One: Every African vowel written must be assigned a pitch. A corollary of this rule is that any African vowel written without pitch notation is considered incomplete, “and the word in which the vowel appears may be the ‘wrong’ word, that is to say *not what was intended*”. (Konotey-Ahulu 2001).

Tadka Rule Two: Every African vowel must carry only the pitch assigned it, and none other. If an additional vowel is required to make up a word, or the same vowel is repeated, or lengthened, then additional pitch or pitches must be provided. Thus a Krobo/Dangme word can have several “vowel places” or “vowel values” each of which must carry a pitch notation. [The Krobo African vowel differs significantly from English where the word “no” sounds to my native African ear like “**no oh**” (high–low) sounding as if the “no” has 2 vowel places each with a different pitch. Indeed, David Crystal has demonstrated 9 different ways the word ‘No’ can be nuanced, stretching the ‘o’. (Crystal 1997, page 173].

Tadka Rule Three: Every African word written must not only be pitched but also qualified. If there is no wriggle above the vowel then it is assumed to be non-nasalised. ‘**Ga**’ in Accra language means ‘ring’ (the noun, like wedding ring, as opposed to the verb to

ring), while ‘**Gā**’ (with the nazalized vowel) is Accra language in low pitch (blue) **Gā**. If the nazalized vowel is pitched an octave higher (red) then the word **Gā** means ‘garden egg’.

Tadka Equation 1: $S = p^n \times n$ where S is the total number of reproducible sounds, p the number of ordinary pitches known, and n the number of vowels in a word or phrase, or sentence. Hence if the tribal word is spelt ‘ta’ and there are just high and low pitches, and not taking into consideration nasal or non-nasal quality of vowels, the number of reproducible ways ‘ta’ can be pronounced in the tribe is $S = 2^1 \times 1$ which equals 2, that is **ta** or **ta**. For Canada, which has 3 vowels with 3 different pitches, $S = 3^3 \times 3$ which equals 27. There are thus 27 reproducible ways in which Canada can be pronounced, one of which in the Fantse language of Cape Coast means “say it and go to sleep” – **Kā nā da** (high high mid) which has a fixed place in a triple vowel chart I have constructed to aid proper phonation of tribal words and sentences (Konotey-Ahulu 2007a&b).

Tadka Equation 2: Recognizing the fact that (unlike the case in spoken English) nasalizing a vowel can impart a different meaning to the same word, I have devised the equation $S = (p \times q)^n \times n$ to indicate the number of reproducible ways a word or sentence can be phonated to mean different things. S is the number of expected

sounds, p the number of pitches in the word or sentence, n the number of vowels, and q the number of quality options. If **tata** (or **ta ta**) is the word, phrase, or sentence under consideration then in addition to the possibility of either vowel appearing in 3 pitches, there are the non-nasal **a** or/∓ nasal **ã** qualities. The reproducible ways tata (or ta ta) can be pronounced then becomes $S = (3 \times 2)^2 \times 2 = 36 \times 2 = 72$. Translators must recognize the potential different meanings of a written tonal language word or phrase. Of 36 different ways ‘ta ta’ can be reproducibly pronounced, only one can be recognized in Krobo/Dangme to mean “war ended” or “war finished”, and that is **ta tã** (mid low pitches, with the second vowel nasalized). My Adult Education exercise in the tribe becomes far easier than has been achieved hitherto.

PRACTICAL APPLICATIONS

What I have described cannot be considered just an academic or merely pedantic exercise. Far from it! Translators to and from Tonal languages need to appreciate the number of meanings a written word, or phrase, or sentence can have. The sentence from the Gospel of St John which the Krobo woman was reading in 1993, and which intrigued me so much, can now be written with my Tadka phonation technique thus:

I je obie ɔ sī ngɔ tsɔɔ nimli ne ongɔ kɛ je je ɔ mi hā mi ɔ

Note that the three meanings of “je” are clearly indicated by the 3 different colours, and that not even one vowel in the sentence has remained un-pitched. The third ‘i’ and the ‘a’ have been nasally qualified. The words in this Krobo/Dangme sentence from the Bible can be precisely and accurately read without reference to context, so mathematical are the pitch gaps that failure to hit the correct pitch would seem impossible.

AUDIENCE PARTICIPATION

Question: It has been shown that the same person may utter high pitch one moment, and when asked to repeat it quite often produces another pitch, perhaps a lower one. How does this affect your findings?

Answer: This is where the genius of Tonic Solfa comes in. The person altering high pitch to something else is just changing the piano keys as it were, just like different people singing our National Anthem with different voices – school children having a go, adult males making their noises, sopranos also doing their own thing – you will find them all singing in different keys (G Major, F Major, C major, E Flat Major and so on) but the Tonic Solfa is exactly the

same **m m: m s d f: m l s f m r r r r** The person altering high pitch will be found to have the same pitch gaps down the line, and the language will be recognizable, just as our National Anthem cannot be mistaken for anything else regardless of who sings it. Take for instance the Gã translation of the English sentence “Run quickly from there”. ‘Run’ is **joo foi**. ‘Quickly’ is **oya**. ‘From’ is translated **keje**. ‘There’ is rendered **jeme**. Now, native speakers will not render “from there” **keje jeme** (**s m s m** or high mid high mid); it is acoustically more pleasurable to say **keje jeme** (ie ‘high mid mid lower-mid’, **s m m r**). Rather like Professor J H Nketia’s examples illustrating with horizontal lines pronunciation of *adwuma*, meaning ‘work’ in Twi (low high high) and *pa* which means ‘good’ (high pitch), but this famous international ethnomusicologist was quick to point out that good spoken Twi is not pronounced *adwuma pa* (low high high high) but *adwuma pa* (low low low high) which is the proper native pronunciation (Nketia 1975). Colouring the sound, I would take Professor Nketia’s advice and not write **adwuma pa**, but rather **adwuma pa** for ‘good work’ (work good).

Question: How can you be so sure that the normal speaking voice spans an octave? Surely it may be G above Middle C to, say, A below Middle C? How can you say with such certainty that normal speaking voice spans exactly an Octave?

Answer: The remarkable thing about the human ear is that it is more precise and accurate than the most sophisticated machine. This is how we are able to identify who is on the other end of the phone before they mention their name. When I hear women say **O' shika** (**O' ſika** in Gã) at the Makola Market in Accra it sounds in Tonic Solfa exactly like the **d d d** and **f f f** of the **GOD OMNIPOTENT** that is sung in the Alleluia Chorus of Handel's Messiah. Please check this out yourselves; consider it a little Home Work and you will be surprised at what you discover.

RESEARCH

There is much material here for detailed research. For one thing, all the tribes represented here in this room can begin looking into things they know which have not been published in any book of Linguistics. The size of the tribal information we possess is simply mind boggling.

Take what I have come to call DNS - "DUPLICATION-NEGATION SEMANTICS" in Krobo/Dangme-Gã where **one plus one is not equal to two, but zero.**

Noko is something, but **nokonoko** is nothing in Krobo/Dangme-Gã

Noko in Krobo/Dangme is somebody, but **nokonoko** is nobody.

Moko in Gã is somebody, but **mokomoko** is nobody.

Gbiko in Gã is one day, but **gbikogbiko** is never.

Dugblɔko in Krobo/Dangme is one day, but **dugblɔkodugblɔko** is never.

One glosso-papalatal click **lk** means ‘yes’, 2 clikcs **lk lk** mean ‘no’ in my tribe. Similarly one ‘**ngk**’ means ‘yes, but ‘**ngk ngk**’ is ‘no’ (Konotey-Ahulu 2007, 2008).

Research, please, to see how many human tribes behave like this. Which tribes in Ghana and abroad display this Duplication-Negation Semantics?

Which other peculiar characteristics can be found and described?

Which other names like ACHIMOTA have been written wrongly, thus conveying the opposite meaning to what the natives intended?

ACHIMOTA (high low low low) means ‘name has been mentioned’, but the correct name of the place has 5 vowels

ACHIMOTA, (name must not be mentioned – high mid mid low low) (Konotey-Ahulu 2009 b&c).

Non-African Tonal Languages can also be researched into. *Nihongono* is Japanese in **JAPANESE**. Tonally, it is phonated **s s m m** (low high mid mid). Of the 4 vowels only the first is not nasalized. Using my Tadka equation 2, of the 1296 reproducible ways that the 4-vowel word can be pronounced, just the one shown above can be recognized as correct by a Japanese native. When hummed **Nihongono** sounds exactly like the Krobo **e ji lolo** [she has not yet left] which proves I have much in common, tonally, with the Japanese.

YORUBA is one other African tribe that has no difficulty hitting mid pitch. The word spelt **ojo** means ‘coward’ when both vowels are in mid pitch **ojo (m m)**, but it means ‘rain’ when the vowels are low pitch **ojo (s s)**, and ‘burnt’ (like food burnt) when both vowels are an octave higher in high pitch **ojo (s s)**. When I hear the Yoruba name *Ojo* pronounced, my Krobo ear discerns three vowels, though just 2 are written. I hear **Ojoo** (low low high **s s s**), which is how I will write it for my Adult Education exercise at the tribal level. The Yoruba name for Sickle Cell Disease is *aromolegun* pronounced with mid pitch throughout except for the ‘e’ vowel which is high

pitch, **aromolegun** (m m m s m), also sometimes referred to as **lakuregbee** (s s s s s). Without tonic solfa it would not be easy for me to remember how these words are to be pronounced.

KIKUYU is a language I concluded has mid pitch vowels, listening to Professors Kihumbu and Wanja Thairu speak. The Kikuyu word for ‘GOD’ **Dgai** was clearly pronounced in mid pitch. Swahili, which appears to be a created language does not seem to place much significance on mid pitch. Would someone wish to research the tonality of these East African languages?

SPECTRUM OF MID PITCHES

As mentioned earlier, pitches are forced to drop a notch when a higher position is occupied, but the pitch gaps below mid pitch are predictably exactly 2 semi tones. Earlier this year while teaching the Gã La Kpe Group in London how to write and read Mother Tongue, I gave the audience the following exercise:

Sing or hum **s s s m m r r d** (low high high mid mid lower-mid lower-mid 3rd-mid pitches) several times’. This tune can be played on the piano or other musical instrument to check precisely the pitch gaps. While low pitch is blue, high pitch red, mid pitch green, lower-mid pitch lime green, I colour what I call 3rd mid-pitch bright

green. After getting the tune **s s s m m r r d** thoroughly fixed in your brain Gã speakers among you are invited to translate the English sentence “She/he/it will emerge from there” into Gã, and you will find that the sentence translated into Gã as **e e pue kɛjɛ jɛmɛ**, phonates precisely as this tune you learnt:

e e pue kɛjɛ jɛmɛ

s s s m m r r d

The **kɛjɛ jɛmɛ** (“from there”) has been terraced down till the last vowel occupies the ‘C’ note on the C Major Scale. I have coloured this note (3rd mid-pitch) bright green whose peculiar significance for me is that it is the pitch I use to say “Yes” in Krobo/Dangme. When someone invites me to dinner and says to me: “Please do arrive early tomorrow” and I reply “**yoo**, I will arrive early” the meaning is this: “Yes, I will”. The pitch of **yoo** is exactly 2 semitones below that of lower mid-pitch **r**. But the word “Yes” which is the opposite of “No” uses another word in Krobo/Dangme. When asked: “Will you be able to arrive early for dinner tomorrow?” my Krobo answer “Yes” is not “**yoo**” but “**ēē**” (nazalized); in Dangme “**ee**” (not nazalized) - same 3rd mid-pitch. The Gã equivalent of the first “Yes” is the same **yoo**, while the second “Yes” (opposite of ‘No’) is nazalized but hetero-pitched **ēē** traversing an octave.

The Research questions here are these:

- i) Does this specific pitch for “Yes” in Krobo/Dangme-Gã apply to me only, or to all speakers of the language? Will other speakers of the mother tongue pick **d** for their ‘yes’, the same way that they must pick **m** to start the Ghana National Anthem? Good research material, this.
- ii) How do speakers of other Ghanaian languages say “Yes”? And “No”?
- iii) Can you compile other sentences in Tonal Language that lend themselves to playing accurately and melodically on the piano as

e e pue kɛjɛ jɛmɛ (s s s m m r r d)?

THE RIDDLE OF TEN HUMAN PITCHES

The Gã sentence above has 5 clear pitches - low, high, mid, lower-mid, 3rd-mid:

s blue, **s** red, **m** green, **r** lime green, **d** bright green. As each of these pitches is entitled to have 2 quality modes, non-nasal and nasal, and as nazalized vowels have a different pitch from the non-nazalized

some tonal language researchers who do not ‘hear’ nasalization may conclude that they have heard 10 different pitches in a particular language. Some American researchers need to be particularly careful, as their normal American speech is produced entirely nasally.

FOREIGN ANTHROPOLOGISTS, BE CAREFUL!

A European teacher in a Congolese tribe was commenting in an almost derogatory manner about one of the languages that pygmies spoke (Konotey-Ahulu 2001, page 71). He said that sometimes the same word in the tribe had opposite meanings and that made teaching of natives a formidable task.

What he should have said was this: “The way we Europeans have written this particular language leaves a lot to be desired. It does not bring out the correct meaning of the language.”

I do not know what the precise Congolese language was, but that European teacher could have been referring to Klogbi (Krobo language), my mother tongue. ‘It is evil’ would sound to him **ehi**. ‘It is good’ would also be written **ehi**. He would then go away and, “like some ignorant if not arrogant foreign anthropologists” (Konotey-Ahulu 2001) “write their textbooks and comment ‘the

Krobo people do not know the difference between right and wrong. They use the same word for evil as for good”.

When pointed out to him that the Krobo word for ‘good’ and ‘evil’ has a nazalized “i” he would still say “well, I told you, didn’t I? ‘**ehĩ**’ stands for ‘it is good’ and the same ‘**ehĩ**’ also stands for ‘it is bad’, I rest my case!”.

But wait a minute, I would correct him thus: “By my tadka rule NO AFRICAN VOWEL SHOULD BE WRITTEN WITHOUT A PITCH. Obey that rule, and you will find that the Krobo for ‘it is good’ is **e hĩ** (low low), and ‘it is evil’ is **e hī** (low high).”

If the foreigner cannot pick out the huge octave difference between the two, that surely “is hardly the fault of the native” (Konotey-Ahulu 2001, page 72). Moreover, without the nazalized ‘i’ **e hi** means ‘it is full to the brim’. People with cleft palate who cannot help but speak nasally and some Americans whose voices always possess a nasal twang will struggle to get themselves understood in my tribe (Konotey-Ahulu 2008a&b).

HIEROGLYPHIC RESEARCH

The brilliant Ghanaian author Ayi Kwei Armah who has studied

Ancient Egyptian hieroglyphic writing mentions “a substantial accumulation of evidence in favour of linkages between various African populations and ancient Egypt” (Armah 2006, page 190). He mentions “the playfully coloured parrot, said to possess unusual skills of eloquence, known by the same name, *ekoo*, from the Atlantic coast of Ghana all the way to the Senegal river” (Armah 2006, page 191). Using my colour scheme the Krobo/Dangme name for parrot is **akoo** (high mid high), Gã is **akoo** (high mid mid), the Ewes call it **ako** (high mid), the Akim and Akwapim speakers call it **akoo** (high low high) while the Yorubas refer to the bird by a longer name within which is incorporated the letters **ekoo**. Further research will shed light on similar pronunciations along the west coast of Africa.

CONCLUSIONS

The good work that has been done in my Mother Tongue goes back more than a century and half when the Swiss-German Basel missionary Johannes Zimmermann, known as Tei-tse Zimmermann in Krobo land, produced “*A Vocabulary of the Accra or Ga Language*” in 1858. Since then with the translation of the entire Bible and producing more than 500 hymns in Gã, impressive work has been done by various experts in Ghana. The first time I realized that the way my Mother Tongue was written needed improvement was in the summer of 1954 when Dr John Berry of the School of Oriental and African Studies in London University asked the Colonial Office to look for a Gold Coaster (Ghanaian) who could translate an English Dictionary into Gã and Krobo. Mr Miguel Ribeiro, working then at the Colonial Office in Victoria Street, had no difficulty in putting me in touch with Dr John Berry who paid me, a student embarking on a medical career, so handsomely that I was quite amazed. Being paid for writing one’s own language was unbelievable. From the very start I realized that mid pitch in Krobo/Dangme Gã had yet to be *precisely* identified. Dr Berry was very pleased with what I began to do, and even happier when I handed over the work to my sister Edna Konotey-Ahulu (now Mrs Soyannwo) because my medical course in London was proving

demanding. The Dictionary was duly completed, and Dr Berry took it to the USA when he left the UK for a professorial post there. Up till today experts working on my Mother Tongue have not found a way to pitch every single vowel in a Krobo/Dangme-Gã text so as to make it easier for Adult Education purposes in my tribe.

The information I have described corrects the problem, but what this means is that the onus is on me (and on those who agree with me) to produce literature for our own tribes folk, and not wait for government to take this matter up. Computer capabilities ensure that the work can be done. If the University of Cape Coast where (in the days of Professor Samuel Adjepong as Vice-Chancellor) I first gave a lecture indicating my huge interest in Tonal Linguistics takes this matter up seriously, well and good, but every tribe represented in this room today deserves to have material written in their Mother Tongue that is easy to read. In his excellent J B Danquah Memorial Lectures Professor R F Amonoo in February 1986 defined Mother Tongue as (among other things) “the medium of our innermost feelings and thoughts”. We must record every single Mother Tongue in Ghana, noting precisely the pitch and quality of the vowels. Let us do this before we lose our heritage. Start by learning Tonic Solfa, and think of Tonal Linguistics in musical terms. We must all learn as many Ghanaian languages as conceivably possible.

Learn English, learn French, by all means, but also learn to speak at least 3 other languages of our dear country.

Finally, these marvels of Ghanaian Tonal Linguistics show that **Tonic Solfa affords unique insights into Ghanaian Tonal Language (eg Krobo/Dãngme-Gã)**. Those scientists who say that there is no such thing as Intelligent Design in the universe (*just 2 letters - a vowel and a consonant - producing 76 intelligible sentences and words in Gã language*) from just ‘borrow’, ‘uproot’, ‘defend’ and ‘order’ need to explain how all this came about. Advances in Informatics have exposed such scientists as having feet of clay.

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