

A THEORY DEFINING THE RELATIONSHIP BETWEEN AFRICAN VOCAL HARMONY AND  
THE HARMONIC PROPERTIES OF THE MUSICAL BOW

by Thomas F. Johnston

ABSTRACT

Historical folklorists concerned with Africa have frequently suggested that, because much African vocal harmony appears to depend upon the parallel movements of parts, it is probably derived from the parallel 5ths yielded by the African musical bow. During two years (1968-70) of field work among the Tsonga of Mozambique and the Transvaal (under grant #2504 from the Wenner-Gren Foundation) the author came to the conclusion that a converse theory is more plausible: musical bows are selectively utilized by African tribes in proportion to the ease with which they reproduce the established musical principles of the communal vocal music. Evidence for this new theory is considerable: musical bows are capable of much musical manoeuvrability of which they are never called upon to produce, suggesting that instrumental music is controlled by the rules of vocal music. Musical bow music often descends from initial peak to cadential nadir, a vocal phenomenon resulting from strong initial breath exhalation followed by diminished breath energy. African vocal harmony is often not exactly parallel, but follows a varying span principle, while bow harmonics are always unvaryingly at the 5th. Finally, communal vocal music is vastly more important than solo bow music, and is an integral part of such rites as initiation and exorcism, group processes where cultural prescriptions are extremely structured in regard to the fulfillment of musical norms. It is hardly conceivable that such music would be moulded after the musical properties of an instrument which is found only here and there in the private possession of individuals.

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It has been suggested, and in some quarters accepted, that much parallel vocal 'harmony' in Africa is "inspired by the parallel movement of partial tones, particularly as they appear with the musical bow" (Kubik 1964:52), that the latter "has undoubtably profoundly influenced their vocal music" (Kirby 1966:281), and that "the 'new organum' of the 12th century in Europe . . . may have originated in similar fashion" (Kirby 1959:4). Kirby elsewhere states the following:

The principles laid down in the marginal notes of the medieval treatise catalogued as fonds S. Victor, 813, in the Bibliothèque Nationale, at Paris, quoted in the Oxford History of Music, vol. i, p. 87, appear to present an almost perfect analogy . . . Since the principles of part progression which I have deduced from Bantu instrumental practice are completely dependent upon physical laws, may not the same physical laws have controlled those of the medieval contrapuntalists in the early days of their art? (1965:242)

A linear development is postulated, from the accidentally discovered instrumental string-tone (which, when fingered, yields ascending parallel 5ths) to the vocal organum 4th (these same 5ths inverted). In addition, one finds a prominent Africanist attributing certain vocal tonality to the influence of the bow: "to return to choral music, bi-radical or tri-radical tonality is observable in much, if not all Nguni items, and it seems likely that bow-playing may at least have encouraged the development of this principle" (Rycroft 1967:97).

On the face of it, these arguments appear plausible. In former times, most pre-literate peoples who now sing in parallel 4ths did have the hunting bow, and in present times many of these peoples possess a body of bow-accompanied vocal music which is influenced melodically and harmonically by the bow.

However, the investigators who in the past have engaged in African musical research have generally been instrumentalists (Kirby was a keen flautist) interested more in instrumental performances than vocal. They fail to tell us that bow-accompanied singing among southern African peoples constitutes a very small, separate body of music (xichaya among the Tsonga) emically distinct from the much larger body of unaccompanied (except for untuned drums) communal vocal music. The Tsonga carefully distinguish between the two, terming the latter yimbelela.

Preoccupation with the pentatonic scale's supposed origin in the physical properties of stretched strings has led to misstatements such as the following:

The basis of southern Bantu music was originally pentatonic . . . they have been able to adopt the European diatonic scale . . . in a comparatively short time the heptatonic scale will have completely replaced the old African pentatonic type (Kirby 1959:5).

In fact, the heptatonic scale is found among many of those peoples furthest removed from European contact (the Venda, for example), and in some cases existed prior to use of the pentatonic scale, the latter being recently borrowed from more southerly peoples.

Where the 'natural series school' has been confronted in the field with the heptatonic scales of xylophones, a compounding of errors has occurred during the attempt to explain them: "the resonated xylophones of the Venda and Chopi . . . have origins which are clearly Indonesian" (Kirby 1965:277).

Unlike bow-accompanied singing, unaccompanied ensemble singing is not melodically and harmonically influenced by the bow, a fact unreported by many writers because they did only limited systematic vocal music research, and are unaware of the full spectrum of tribal music. The southern African peoples each possess many musical styles--the Chopi, for instance, sing one way with their xylophone orchestras (where the octave is divided into seven equal intervals) and another without.

In the scramble for 'interesting' instrumental data it has often escaped notice that southern African tribal music in the rural area consists overwhelmingly of the massed singing efforts of laymen (50 to 200 voices--these would render a

musical bow inaudible). Indigenous musical classificatory systems make a clear division between the functional, ritually important concerted vocal efforts of a village population, and mere instrumental self-delectation upon such solo melodic instruments as the bow, mbira (African plucked idiophone), and flute.

My argument against the statement that the harmonic properties of the bow may have been the origin of important vocal norms derives from field observation (1968-70, under grant #2504 from the Wenner-Gren Foundation for Anthropological Research) of phenomena showing that, contrary to much accepted theory, pre-literate societies utilize the properties of available musical instruments only as they coincidentally fulfill vocal music norms. This, together with historical and ecological factors, explains why different pre-literate societies favor different instruments. The following are the observed phenomena.

#### The Southern African Span-process Of 'Harmonization'

The vocal melodies of many southern African peoples are 'harmonized' by a span-process utilizing a series of irregular intervals which are not exactly parallel. These Tsonga span-process intervals can be approximated on a musical bow only by a combination of inversion and fingering. They are unlikely to have originated instrumentally, but they are likely to have been imitated instrumentally. The span-process was first described for African peoples other than the Tsonga (Jones 1959:241, Blacking 1967:192), and takes many cultural forms.

#### Accomodative Transposition Due to Limited Vocal Range

Many southern African singers, on reaching the extreme of their vocal range, transpose up (or down) short sections of the melody (Blacking 1967:174, Johnson 1972:46). Because these sections often encompass as much as a 4th, an octave transposition is not so desirable (for limited-range voices) as a lesser transposition. This is a possible contributive factor to the production of 'harmony' at the 5th/inverted 4th; however, Brandel correctly observes that "with regard to parallel 4ths and 5ths, it cannot be stated with complete assurance that the presence of the intervals is always due to voice-range variation" (1961:86). Note that the transposed version will continue to follow the indigenous rules pertaining to span-process, albeit inverted, and that the inversion taken by each interval will depend upon the sex/age ratio of the singers and hence upon the social situation. Other non-instrumental sources of African vocal 'harmony' are responsorial overlap, and drone-ostinato.

#### The Appearance, In Purely Instrumental Bow Music, Of The Vocal Phenomenon Pathological Descent

Analyses of over 500 Tsonga melodies reveals that overall melodic descent (from first tone to last) is as follows.

Interval	% of Tsonga vocal repertoire showing this overall descent
5th	24%
8ve	20%
4th	13%
unison	8%
other	35%
total	100%

In only 8% is there no overall descent, and in none is there an overall ascent. African vocal melody typically descends in a series of plateaus from an initial peak to a cadential nadir (Jones 1959:232). On the assumption that this musical characteristic originated in the explosive release of accumulated breath and the subsequent diminution of available energy as the breath expires, this has been termed pathological descent (Sachs 1962:68).

The playing of the musical bow, although often dependent upon mouth resonation, uses no breath. Thus the recurring descent within purely instrumental items such as the following is probably modelled upon vocal style (as is, incidentally, the call-and-response effect obtained by 'answering' a group of high reiterated tones with a group of lower variously-pitched tones).

It might be retorted that most bow items possess a complete set of song-words, which the audience sings, and that the descending speech-tone of these may prompt melodic descent. However, these are many Tsonga notched friction-bow (xizambi) items which possess just a title. The question then arises as to whether the speech-tone of the title might not produce the recurrent descents. The answer is that this is likely because the Tsonga generally observe a one-to-one relationship between the syllables of a song's words and the tones of its melody. A 7-syllable song-title can be appended to a 16-unit melody.

It is probable that the imitation of vocal pathological descent has long been an established feature of Tsonga solo instrumental traditions, for, according to both the anthropological viewpoint and the indigenous cognitive system, singing performances within the hard core of communal music establish a configuration of musical expectations, motivations, and attitudes, to which instrumentalists then conform in varying degrees as the physical properties of their instruments permit.

#### The Voice As Primary Musical Resource, The Instrument As Secondary

Cooke writes the following of Ganda music:

All Ganda instrumental pieces are renderings of vocal compositions . . . to study the resulting instrumental sound patterns solely by analysis of their intrinsic qualities without searching for the route by which both music and speech through song have been realized in physical terms by striking, blowing, or plucking instruments is to ignore what I consider to be the real issue--one closely connected with fundamental processes of music composition (1970:62).

Cooke is, of course, referring only to Ganda music. To imply that the instrumental music of most pre-literate societies is but a physical realization of speech and vocal music would be to make the point too strongly. What is probable is that African vocal 'harmony' developed independently of observed instrumental properties. It has psychological and physiological determinants--did not the voice of early man have that of early woman to give the octave, independently of the 2nd partial of a bow (many African societies classify their instruments as either male or female according to pitch differences)?

If it must be postulated that natural harmonics formed the basis of some societies' vocal norms, why must they be instrumental harmonics? Why not those of the voice itself? Could not the third partial of early man's sustained vocal tone have been variously favored by different habitats--caves, shelters, etc.--leading him to

become aware of the interval of the 5th? The inventor of the hunting bow lived sufficiently long ago for us to safely assume that his predecessors (who were more likely African than not) possessed more acute hearing than modern man.

Concerning the origin of 12th century 'new organum', it is pointless to seek it in the musical bow as long as all evidence points to the fact that African societies were singing in parallel 5ths prior to this period. A more fruitful approach would be to consider the various possible routes of diffusion from one vocal music to another, along the axis which was very nearly implied by Sachs: "neither the Caroline nor the Bantu (vocal) parallels are exactly harmony in the sense of western 'functional' chord writing. But there is little doubt that this go-together represents the seeds of what in Europe grew to chordal concepts" (1962:179).

Diffusion processes are often long, complex, and indirect. The route may have been a land-route--Longinus in the first century A.D. wrote that contemporary melodies were usually sweetened by the accompaniment of 5th or 4th, and Nettl has noted that certain central Asian people utilize "a variety of singing in parallel 5ths . . . surprisingly similar to certain types of medieval European cultivated music" (1956:82).

#### The Difficulty Of Obtaining Certain Instrumental Harmonics

In constructing musical bows of the Tsonga xizambi (friction), xitende (gourd), xipendana (braced), and mqangala (hollow cane) varieties, I found that a slight false cut produces a bow which yields false harmonics. The same applies to an otherwise good bow which is adjusted too tightly or too loosely, or whose milala palm-leaf 'string' is too wide or too narrow.

I furthermore possess two 36" mhalamhala kudu horns which were discarded by the Tsonga (who use them to assemble nubile girls for initiation and to deflower the novices) because the square embouchure bore into the side was mis-located and the resultant octave conflicted with vocal norms as to how an octave should sound.

In constructing mbira reeds, Tracey noted that

even in cases where the fundamental is correctly tuned, the overtone is often wildly discordant . . . filing the tip area sharpens the fundamental, the next area flattens the overtone, the next area sharpens the overtone, and the bridge area flattens the fundamental. However, the areas tend to overlap, so that one cannot simply tune the fundamental, then proceed to tune the overtone, because that will inevitable alter the fundamental again. You have to work them both together. When re-sharpening the fundamental the tip of the reed is much less sensitive, and you will be very liable to re-flatten the overtone, particularly if your reed is short, when the four tuning areas are less easily distinguishable. This may lead to chasing the tuning in a never-ending cycle (1969:99-100).

These various pieces of evidence suggest that those who assume an early facile utilization of natural harmonics may be taking too much for granted. Instrumental specialists such as are needed to make and tune the bows, horns, and mbiras

mentioned above are few in number, and in some areas non-existent. Neither their presence nor their skills are basic to the on-going life-way, but are an embellishment to it. It is therefore unlikely that the harmonics of their instruments determine vocal norms. Among the Tsonga, and in most sub-Saharan African societies, all men, women, and children participate in massed ensemble singing (whether they like it or not) as an intrinsic part of social and biological maturation. Thus it is clear that instrumental specialists will generally attempt to reproduce those intervals which in their childhood experience they learned were culturally desirable, and that they will accept or reject instruments according as the latter readily fulfill traditional cultural requirements.

The Importance, In Africa, Of Intervals Other Than The 8ve And The 5th

It is necessary to take issue with the following statement by Kirby:

The universal recognition and practical use of the harmonics of stretched strings and of open and closed tubes by the aborigines of South Africa gives us a clue to the manner in which the 'focal points' found in the songs of practically all races were discovered and applied (1965:277).

'Focal points' surely cannot refer to the octave, which is provided by men's and women's differing vocal ranges and by strong acoustical consonance (anthropologists would comment that the latter is open to cultural rejection; this is true, but in fact most societies first recognize the octave and then divide it differently).

If 'focal points' refers to the 5th, then it should be pointed out that in large areas of Africa (see Jones' map, *Distribution Of Harmony*, 1959:230) this interval is not important. In Venda music "the most common final cadences of the melodic patterns are falling minor 3rds" (Blacking 1967:170), and in Zambian Tonga music "the final cadence of a falling minor 3rd seems reserved for demarcation functions" (Rycraft 1954:18). These minor 3rds do not necessarily derive from the natural series--Tsonga bow-players always finger their 3rds although the fifth harmonic can be made to sound clearly on a good bow.

The rejection of the natural 3rd in some African areas occurs because the 3rd prescribed by the culture differs from it--an additional reason why musicologists should exercise caution when considering the musical bow's harmonics as a source of African vocal norms.

Perhaps 'focal points' refers to harmonic qualities rather than melodic ones, in which case our evidence concerning the importance of melodic 3rds is irrelevant. As it turns out, Lichtenstein's acute observation in 1804 that "they imitate these intervals and the melody of their songs upon their imperfect instruments very true" is commented upon by Kirby thus:

I would suggest that Lichtenstein put the cart before the horse, since my observation has shown me that the sounds producible from the instruments have largely directed the course of their vocal melodies (1966:284).

All of this serves to demonstrate that readers should be prepared to take into account the private values of an author, and to recognize that it is not possible (nor always entirely desirable) to eliminate subjectivity on entering the field. Allowing for it is a step toward identifying biased selectivity.

### The Influence Of Speech-tone Upon All Lines Simultaneously

Many Africanists (including Kirby, Kubik, and Rycroft) have recognized the fact that, in those regions where speech-tone is important, all polyphonic lines bearing identical words will tend to conform to one melodic contour in order to retain word-meaning, and that parallel-like 'harmony' may result. However, not all have also recognized that violation of speech-tone is permissible where it follows an indigenous system of tone-substitution in the form of 'harmonic equivalence', and that the nature of the system in many instances precludes the likelihood that the natural series contributed toward parallelness.

### Tsonga Utilization Of Instrumental Properties As They Fulfill Vocal Music Norms

Two of the Tsonga musical bows (the friction-bow and the hollow cane-bow) are fingered by up to four fingers, when played by an expert. This is done in order to produce the various tones of a pentatonic, and sometimes a hexatonic or a heptatonic, scale pattern. The fact that four different natural series, each a small scalar step apart, are thereby made available to the player, does not mean that he uses all of their partials. It indicates that these bows have the potential for yielding chromatic passages and for modulation through different keys. As is well-known, this is not done, the reason being that the culture has not developed a need for it.

I do not imply that the Tsonga occupy the lower end of some sort of musical continuum, any more than the fact that the Tsonga recognize three or four distinct kinds of 3rds places them on the upper (to those who argue for African rhythmic supremacy I would point out the orchestral rhythms of Stravinsky). We must be culturally relative, and acknowledge that each society maintains a musical integrity comprising features which are 'right' for its members, selecting from an infinite range of melodic, harmonic, and rhythmic possibilities that which fulfills societal needs and preferences.

The established musical norms of the Tsonga are many and varied, prominent among them being the use of bi-metric patterns of rhythm. One reason for the popularity of the friction-bow as a Tsonga court instrument is that its peculiar combination of fundamental (which sounds throughout changes of resonance), resonated tone, rasp of the rattlestick against the notches, and chaka-chaka (the Tsonga's own description) of the seeds within the fruitshell rattles, allows for passable reproduction of the desired polyrhythms. Another reason is that, by a combination of inversion and simple fingering, moderately skilled players can approximate those 'harmonic' intervals regularly used in vocal music.

Tsonga vocal melodies are generally reproduced upon the friction-bow by utilizing two alternating natural series, that based upon C, and that based upon D. The vocal 4th G/C is reproduced as the 12th C-G. The E is fingered in order to obtain an E which differs from that offered by the natural series. The third partial of E (B) is relatively inaudible because of the palm-leaf's inability to sound

clearly either very high or very low tones (thus the incipient B does not intrude into an otherwise pentatonic situation). The vocal 4ths A-D and G-C (lower) are inverted by the bow into parallel 5ths.

Of the friction-bow's potential tones, perhaps the most obvious omission is F#, the fifth partial of fundamental D. This is heard fairly strongly by western observers, and is readily picked out by student audiences to whom I demonstrate the various specimens in my possession. However, the tone F# bears no musical significance to most Tsonga, and tests in the field revealed that individuals tend to screen out this sound--a cultural filter comes into play. In no way does this tone bear the leading-tone (to the dominant) significance that it does in western music.

While, by Tsonga standards, the friction-bow successfully reproduces preferred vocal intervals (i.e. with minimal violation of cultural norms), the peculiar nature of the system by which instrumental properties are utilized presents the western observer with a musical puzzle. For example, a Tsonga vocal melody with the contour X may be reproduced upon the friction-bow with the contour Y, by virtue of the fact that low vocal G's may become high instrumental G's (low friction-bow tones carry poorly, so the player often transposes them up an octave), and high vocal A's may become low instrumental A's (high vocal tones are often too high for the frayed palm-leaf 'string', so they are transposed down an octave).

Adding to the musicologist's confusion is the fact that instrumentalists often begin an item with that section which, in vocal performance, is the choral response and hence the second half of a bipartite framework. Between the inversions, various musical witticisms, and the reversed order, the neophyte observer may experience difficulty in recognizing what is otherwise a familiar traditional song heard countless times in other villages in its conventional vocal format.

Once he has become acquainted with the system of 'harmonic equivalence' (it applies, of course, to octaves in addition to 4ths and 5ths) which allows transposition for reasons of volume, with musical joker's license, and with the fact that the choral response section is considered by the Tsonga to be the tonality-defining portion of the song and hence more important than the call, pairing up several dozen unidentified instrumental renditions with their easily identified (because of the words) counterparts can become an intriguing game.

Similarities, compatibility, and interaction between Tsonga vocal music and Tsonga friction-bow music does not argue for the proposition that southern African vocal 'harmony' was stimulated by bow procedures. Rather, it shows why in a given pre-literate society one type of bow predominates over another--the Sotho lesiba, bow, for instance, behaves musically in quite a different fashion, and for this reason has never been adopted by the Tsonga.

### Conclusion

The anthropological viewpoint is that, in southern African societies, both the accepted norms concerning vocal music and those concerning instrumental music have been, and are being, subjected to internal and external forces which act



concurrently upon the prescriptions governing both forms, so that both are a reflection of historical, social, psychological, and physiological factors.

Of the societies whose musics have so far been investigated by western musicologists, some are long-sessile (the Bushmen, for instance); some migrated southward early in history (the Chopi, for instance) bringing with them musical traits from the great Monomotapa empire of the north (whose center is still a spawning ground for the spread of possession cults); others came later, their musical borrowings dating only from the 19th century disturbances set up by the Zulu warrior king Shaka (the Swazi borrowing of the Tsonga handrattle and tambourine is a case in point).

Although no easy generalization can be made about a single source for observed southern African vocal 'harmonic' tendencies, the most logical approach, if one is to be made, is via a joint consideration of word-borne melody, responsorial overlap, the use of drone-ostinato, the social situation in which actors of disparate sex and age participate and their need to divide the octave into at least two major conjunct divisions, the diffusion of social practices which carry with them associated musical practices (i.e. trans-tribal initiation schools and secret cults), the potential impact of any given gifted musical individual as an innovator in his society, and (today) detribalization and the far-reaching effects of the mass media emanating from the increasingly cosmopolitan urban areas (an example of the latter is the West Indian calypso music in 3rds now popular among peoples whose forefathers knew only 4ths).

Lastly, of great significance is the new nativism or preservationism, as emerging African nations seek cultural identity by casting off foreign musical traits. The vocal 'harmony' of tribal forefathers is resuscitated in an attempt to unify the white collar and the naked, while the musical overlay of generations of outside contact (pagan, Islamic, and Christian) is declared alien as black nations enlist western musicologists in the search for a definitive profile of the national musical culture.

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