

## RECOGNIZING THE MIDTONE, A PRIMARY MUSICAL INTERVAL

Douglas Leedy

### *Abstract*

Recognized as a melodic interval in the musical scales of the ancient Greeks, the three-quarter tone, or so-called “neutral” second, is a fundamental melodic interval, along with the tone and semitone of the Western diatonic scale, in present-day musical cultures that extend eastward in an arc from northwest Africa along the Mediterranean to Egypt and the Near East, the former Burma, much of southeast Asia, and Indonesia. For this interval, which is incommensurate with the tone and semitone (and which is, for example, considered to exert a powerfully expressive effect in classical Arab melody), the more autonomous name of *midtone* is here proposed, along with a parallel renaming of other “neutral” intervals. An overview of the use and significance of the midtone in a number of musical cultures is presented, with references to recordings, published studies, and musical notation, as well as to its occasional, exotic appearance in Western classical music. (2006/2011)

## RECOGNIZING THE MIDTONE, A PRIMARY MUSICAL INTERVAL

Douglas Leedy

Western music theory recognizes as fundamental two melodic and scalar intervals: the semitone and the tone, and in fact in 12-tone equal temperament it is possible to postulate a single unit interval, the semitone, exactly two of which constitute the interval of a tone.

In music around the globe, however, a third fundamental interval is commonly found, the three-quarter or neutral tone, intermediate in size between the semitone and tone, an autonomous interval that is entirely distinct from each and not commensurate with either. Considering the importance of this interval in music worldwide, it has seemed to me that it has lacked the acknowledgement and respect that it deserves (as, for example, under "Interval" in reference works on music). I am proposing therefore to try to elevate its status and to simplify reference to it by conferring on it the unique, unambiguous and readily recognizable name of *midtone*.

The perceptible midtone varies in width from about 130 to about 170 cents (in the standard units of 100 cents in a semitone of 12-tone equal temperament). This is a much smaller range than that of the semitone, namely, from around 34 to 133 cents (for experiments on perception of intervals, see Kolinski 1965), or of the tone, from 165 cents or so to about 250 cents. In practice there is some overlap of categories, but the deliberate or inadvertent inflection of a semitone, for example, into the midtone range does not produce a midtone if context prescribes for the ear a functional semitone.

As for the terminology itself, "three-quarter tone" is cumbersome and misleading (implying some connection with the quarter tone, to which it is intrinsically unrelated); "neutral" comes from the Latin *ne+uter*, "neither (of two)," and carries the unfortunate connotation of characterlessness, which is definitely not an attribute of the midtone. Larger intervals can be regarded as compounded of smaller: the "neutral" third, for example, which will be called the *mid third*, is the sum of a tone and a midtone.

In European music the midtone occurs in some relatively isolated traditions: for example, in the scale of the highland bagpipe, in Norwegian folk music, and perhaps most characteristically in folk music of the Balkans. To the ancient Greeks, who included it in a half dozen tetrachordal tunings, it was clearly a familiar musical interval.

The case of the bagpipe is something of an anomaly: Alexander Ellis observed that its midtone "serves indifferently for what would be a Tone or a Semitone in music for another instrument" (Helmholtz 1885/1954, p.525; the consecutive scale intervals for the bagpipe recorded by Ellis and A.J. Hipkins and given on p.515 and 519 are 197, 144, 154, 208, 150, 156 and 191 cents). The frets of the Norwegian folk dulcimer, the *langeleik*, traditionally give midtones and tones only, in a scale structure called "anahemitonic heptatonism" by Reidar Sevåg.

The incidence of the midtone in the area of the Eastern Mediterranean will occupy us later; its appearance in ancient Greek music theory strongly suggests its presence in even earlier practice around the Aegean (Chalmers 1993, p.11-12). Ptolemy calls the character of his even (*homalon*) diatonic tetrachord of two midtones and a tone “rather foreign and folk-like” (*xenikōteron men pōs kai agroikoteron*; *Harmonics* 1.16 (38.31-2) in Barker 1989, p.312); nevertheless, a single midtone is a regular feature of chromatic tetrachords of Archytas, Ptolemy and Aristoxenus, and occurs in the latter’s soft diatonic division as well (Chalmers, p.8-9, 18-19; Barker, p.301-3, 347-50).

The midtone seems only quite rarely to have been called for by western composers. It essential, however, in defining a characteristic, perhaps *the* characteristic melodic interval of the musical genre of blues, the neutral or *mid third*.

Possibly the most often heard (though probably not always recognized) midtone in the concert hall occurs in the solo horn Prologue and Epilogue of Benjamin Britten’s *Serenade*, op. 31 (1943), for tenor, horn and strings, where the 11th harmonic, written as *f*′, forms a midtone with both neighboring tones, *e*′ and *g*′, and the 13th harmonic, written as *a*′, is a midtone above the *g*′. (The composer instructs the player that “The Prologue [Epilogue] is to be played on natural harmonics.”)

The fifth of Gunther Schuller’s *Seven Studies on Themes of Paul Klee* (1959), “Arab Village,” includes a melody based on Arab *maqām* (modal scale) with two midtone pairs dividing the thirds *a*′-*c*′ and *d*′-*f*′. This melody is played by oboe, viola and (retuned) harp against a string drone and drum pattern.

Although her intervallic system was based nominally on the quarter tone, Tui St. George Tucker seems to have characteristically raised the fourth degree of the major scale by that amount, giving the midtone division of the interval between the third and fifth degrees associated with the 11th harmonic. These intervals are used particularly expressively in her three antiphons, *Indian Summer* (1983) (Opus One LP 107).

Lou Harrison (much of whose music was in various just tunings) developed, in his ninth decade, the hexatonic octave of harmonics 6 through 12 (see below) into a scale for a new guitar fretting, where harmonics 10-11 and 11-12 form midtone intervals. His *Scenes from Nek Chand* in this tuning have been recorded by the guitarists John Schneider (“Just Guitars” (2003), Bridge CD 9132), David Tanenbaum (“Serenado” (2003), New Albion CD NA123), and no doubt others more recently.

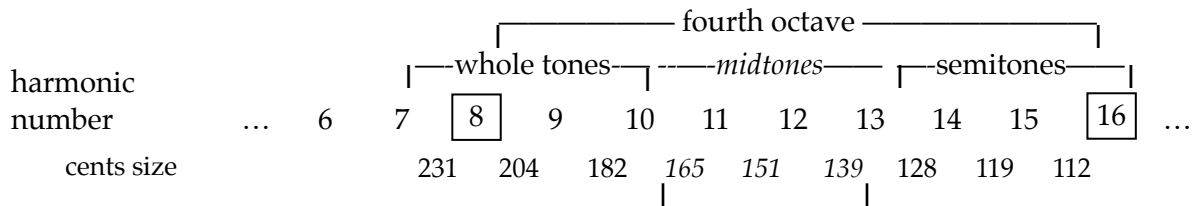
The nature and origin of the “Blues Third” have been the subject of a good deal of controversy, but there is no real disagreement about its wide, expressive range of pitch inflection. My own strong impression (agreeing with the conclusion of Evans) is that the melodic prototype of the blues scale is pentatonic, and consists of two descending disjunct trichords of a fourth, each divided into an upper midtone and a lower mid third; the two trichords are separated by a whole tone. The inner tone of each trichord is intonationally mobile, the upper interval varying from a semitone in width to a quite wide whole tone, but its central focal pitch seems to be in the midtone range. (Note that pianists regularly simulate the effect of a mid (“major-minor”) third by playing simultaneously the major and minor thirds of a triad an octave apart.) It is suggestive that a large midtone is nearly as large as the equal heptatone, one seventh of an octave, or about 171 cents (two of which make a mid third of 343 cents); several scholars have adduced this interval to link the blues scale to putatively equiheptatonic African scales.

Two particularly clear recorded examples of these basic blues intervals and scale are “Prettiest Train,” sung by a prison work crew recorded by Alan Lomax (“Negro Prison Blues and Songs,” re-released as Legacy International CD 326) and “Death Letter Blues,” part 2, sung and played by Huddie Ledbetter (“Leadbelly,” Columbia CD CK 30035), though there are many other similarly revealing recorded examples.

§ § §

Where does the midtone come from? Probably most directly from the harmonic series, the intervals of which have become internalized through constant exposure, even in the womb, to the harmonics of sounded tones, perhaps most of all those of the human voice.

In the middle of the fourth octave of the harmonic series, between whole tones and semitones, lie three shades of midtone:



(The intervals created by these harmonics are familiar to most brass-instrument players — French horn especially — and can be sounded, with some patient effort, on a guitar string.)

In the harmonic series segment above, the minor thirds  $6/5$  ( $=12/10$ ) and  $7/6$  ( $=14/12$ ) are divided in harmonic proportion by the middle terms 11 and 13 respectively. Thus the numerically simplest midtones can be considered to be produced by the numbers 11 and 13. Western music theory generally rejects the 7th, 11th and 13th harmonics, though the 7th is admitted *sub rosa* as a possible (quite narrow, but in fact highly consonant) minor seventh in a dominant-seventh-type chord: it creates an additional minor third (the interval  $7/6$  above) atop a major triad. Because they give rise to midtones, harmonics 11 and 13 are mainly considered, when considered at all, in terms of melody, but in just tuning they color wonderfully the third-built chords of the eleventh and thirteenth, and are the most harmonious tunings for those chordal elements. (The composer Terry Riley used harmonics through number 13 in a just piano tuning for music from his *Crow's Rosary*, 1993.) While there is in the Western chromatic scale a tolerable substitute for the 7th harmonic (Bb if one begins with a fundamental of C), there is none at all for any of the mid intervals.

A perhaps more intuitive, empirical midtone comes about from the dividing of the interval of a minor third into two roughly equal intervals, analogous to the whole-tone division of the major third. The Greeks constructed tetrachordal tunings that included midtones by adding smaller intervals, or by tuning simpler intervals in order to obtain a more complex interval as a remainder.

Having rationalized the whole tone ( $9/8$ ) as the difference between the intervals of the fifth and fourth, the Greeks derived their most ancient "semitone" as the difference between the fourth and two tones (the ditone,  $81/64$ ). This difference, which they called the *leimma* ("remainder"), is given by the proportion  $256/243$ , and is today sometimes referred to as the Pythagorean semitone.

They went on to arrive at various midtones in several ways. Ptolemy used the midtones  $11/10$  and  $12/11$  in his chromatic and diatonic genera; Archytas obtained a remainder of  $243/224$  (141 cents) as the central interval in his chromatic tetrachord (Chalmers, p.8-9). And Aristoxenus makes a midtone of three of his quarter-tone unit intervals, and of two of the third tones that actual musical practice evidently compelled him to include in his interval system (Chalmers, p.18-19).

The interval of two thirds of a tone is, however, ambiguous. At 133 cents it is just recognizable contextually as a midtone. An interval of the same size is more commonly encountered as the largest just-intonation semitone,  $27/25$ , which is, for example, the difference between the just minor third  $6/5$  and the smaller whole tone  $10/n = /9$ .

There are many ways of obtaining midtones by manipulating chosen intervals. One can quite simply take the difference between a pure major third  $5/4$  and a septimal tone  $8/7$ , which is the  $35/32$  midtone (155 cents). A given interval can be repeated until a mid interval results: a stack of four pure major thirds (e.g., Gb-Bb-D-F#-A#) less an octave gives a mid third (345 cents); two chromatic semitones of just tuning ( $25/24$ ) added give a midtone of 141 cents. If the pure fifth  $3/2$  is repeated, good midtone intervals do not appear until the 19th, 22nd and 31st fifths, a rather long reach. When tempered intervals are used, results are contingent: four units of the theoretically important 31-tone equal temperament make an excellent midtone; the unit interval of the equal octatonic scale is obviously the midtone itself; but no amount of fiddling with the intervals of 12-tone equal temperament will result, needless to say, in any mid interval.

Empirical tunings of the midtone are quite practical: one can easily make by ear a rough division of a minor third into approximately equal parts. The exact division — the geometric mean — is more difficult to approximate, but one can come quite close with practice. A good approximation by ear of the mid third is not at all difficult, and can be an aid in tuning a midtone division of the minor third.

Midtones can occur incidentally on unfretted stringed instruments, it goes without saying, by the misplacement of a finger; a change of intention can, of course, change the nature of the same interval. In the lowest octave of the recorder (and some other woodwinds), opening the bottom three holes in succession from the lowest tone will give the interval sequence tone-tone-midtone-midtone, arriving at a pitch a fifth above the starting note, a disposition necessary, it seems, in order to give relatively in-tune (forked) fingerings for both a perfect and an augmented fourth above the lowest note.

The names proposed here for mid intervals are intended to be self-explanatory and unambiguous: the midtone (mid step, mid second), and the mid third of around 350 cents (a particularly good example of which is the interval between harmonics 9 and 11 in the octave segment shown above), along with their inversions, the mid sixth (around 850 cents) and mid seventh (around 1050 cents).

An important interval in this system, distinct from those just mentioned, is the semi-augmented fourth that occurs between the 8th and 11th harmonics. (At about 550 cents, it is midway between the perfect fourth of about 500 cents and the augmented fourth of somewhere between 580 and 620 cents in width.) The proposed name for this interval is the plus fourth, as explained below.

Scales that include one or more midtones can be designated easily: midtone diatonic, for example, midtone pentatonic, hexatonic and heptatonic seem free from ambiguity.

The proposed mid-interval terminology is as follows:

<i>abbreviation</i>	<i>approximate size (cents)</i>	<i>name(s)</i>
m2	100	minor second, semitone (st), half step
♯2 or M2	150	mid second, midtone (Mt), mid step
M2	200	major second, whole tone (WT), whole step
m3	300	minor third
♯3 or M3	350	mid third
M3	400	major third
P4	500	perfect fourth
+4	550	plus fourth
A4	600	augmented fourth
d5	600	diminished fifth
-5	650	minus fifth
P5	700	perfect fifth
m6	800	minor sixth
♯6 or M6	850	mid sixth
M6	900	major sixth
m7	1000	minor seventh
♯7 or M7	1050	mid seventh
M7	1100	major seventh

The nature of the interval of a fourth required a name — here the plus fourth (+4) — for its semi-augmented form. The modifier “plus” is borrowed from Hormoz Farhat’s interval terminology for the classical Persian modal scales, where the interval of a five-quarter tone, about 250 cents (in effect a supermajor second), Farhat calls the *plus tone* (NG, v.12, p.532). The five-quarter tone — a semitone plus a midtone — appears in the harmonic series between harmonics 13 and 15 (about 248 cents; see the figure above). The inversion of the plus fourth (+4), the semidiminished fifth (about 650 cents), is correspondingly called the *minus fifth* (-5) here.

The supermajor and subminor forms of seconds, thirds, sixths and sevenths could be abbreviated with the plus and minus, respectively, for example in the sequence subminor second (-2), minor second (m2), mid second (M2), major second (M2), supermajor or plus second (+2). The sub-

minor second is in the general area of Archytas's *diesis* of 28/27, about 63 cents; the septimal tone 8/7 (231 cents) is an example of a supermajor second (Helmholtz-Ellis, 195, 453-6).

The midtone and associated intervals can easily be accommodated within standard Western musical notation with the addition of four modified, easily recognizable accidentals, the forms of which — the semisharp ♯̣) and semiflat ♭̣) or ♮̣) of about 50 cents and the sesquisharp or “sharp-and-a-half” (♯̣̣) and sesquiflat (♭̣̣) or (♭̣̣̣)\* of about a midtone, or 150 cents — are generally accepted and understood (Leedy, p. 424). (A confusing array of accidental signs that remain too often unexplained — even in such encyclopedia entries as those of *New Grove* — will be found in the notation of Arab and Persian music; the notational complications of Turkish music are mentioned below.)

The following example shows the correct notation for a series of minor thirds with midtone divisions, using the modified Western accidentals given above. (These symbols can also be used in a key-signature.)

Examples of approximate pitch-equivalents in this notation:



For precise notation in just intonation, including of mid intervals, the ratios themselves can be used. Less cumbersome is Ben Johnston's notational system, based on the just major scale (Doty, p.32-33; Leedy, p.424). Daniel Wolf's notation is similar in principle, but is based instead on the Pythagorean scale (generated from pure fifths).

§ § §

In much of East Asia intervals in the midtone range result from the expressive inflection in melody of the semitone or tone; this practice seems especially noticeable in certain musical traditions of Japan. The consistency and repeatability of true midtones can be confirmed by measurement, for example in the scale tunings of harps and zithers, or in the placement of movable frets, as we find in several Southeast Asian musical cultures.

Perhaps the most remarkable of these, and undoubtedly the least known in the West, is the traditional Burmese art music for voice and the venerable horizontal arched harp, the *saung-gauk*. Several of the established harp tunings have conspicuous tuned (rather than inflected) midtones

\* The second sesquiflat notation shown here derives from the joining of the flat and semiflat symbols, and in some fonts confusingly presents a doubled stem. It should not be regarded as two separate symbols.

in their scales. A striking use of these intervals is in a sudden shift of the apparent key by a midtone, briefly, or for one or more phrases, with a return to the original tonal center, creating a unique and highly expressive effect. In recent decades Western equal temperament has come to be regarded by some Burmese musicians as an acceptable, parallel intervallic system in which — on the piano, for example — traditional classical music is now also performed.

The effect of inflection or “bending” of the semitone or tone is quite prominent in the wind-instrument technique of the traditional Japanese *gagaku* repertoire (some of which can be heard in a fine recording, “Gems from Foreign Lands” (2002), performed by Tokyo Gakuso, Celestial Harmonies CD 13217-2). It is even more so in the playing of the *shakuhachi*, the end-blown flute. (There are many recorded examples of this; a particularly expressive one is the interpretation of the traditional “Distant Cry of Deer” of Masayuki Koga, “Eastwind” (1998), Celestial Harmonies 17067-2.)

The midtone is not a recognized interval, so far as I am aware, in the theory, whether ancient or recent, of the classical music of India, although there are a few rare cases of midtones as the expression of the affect of a specific *rāga*.

The *saung-gauk*, the harp of classical Burmese music, has four basic pentatonic tunings; additional pitches are produced by stopping a string with a fingernail. Two of these tunings require one or two tuned midtone-mid third pairs in each octave, while other midtones are stopped pitches. The effect of mid intervals in this music is to my ear unique and resistant to description. Fortunately there are recordings available of excellent performances: among the most elegant (and perhaps authentic) are those of the renowned *saung-gauk* player Inle Myint Maung (1937-2001), with the singer Yi Yi Thant (“Mahagita: Harp and Vocal Music of Burma” (2003), Smithsonian Folkways Recordings SFW CD 40492; information on the music and tunings, apparently by the ethnomusicologist and album annotator Ward Keeler, at [www.folkways.si.edu/catalog/40492](http://www.folkways.si.edu/catalog/40492)). (On the *saung-gauk* and its tunings, see Williamson.) It should not go without saying that in a change of interval structure of the Burmese art music to that of Western equal temperament, the colors and shades of the traditional intervallic subtleties are largely lost.

The classical music of Vietnam, although having absorbed over centuries musical influences from Asian cultures as remote as India, is nevertheless quite different from that of its immediate neighbors. Its fundamentally pentatonic scale system has two main subdivisions, the *bac*, or “Northern” modes (sometimes referred to as “happy”), which conform closely to the universal minor-third pentatonic scale, and the *nam*, or “Southern” (sometimes called “sad”) modes. In these latter modes one can consistently hear midtones that careful measurements have shown to be from about 144 to about 166 cents in width.

The Vietnamese traditionally emphasize the emotional quality or affect of the different tunings of modes and intervals. In contrast to the recent changes in Burmese practice just mentioned, Vietnamese musicians seem to have rejected equal temperament as suitable for their classical music; for example, although the Western guitar has found its way into some traditional ensembles, its frets have been adapted, by making the fretboard concave between the frets, in order to allow a wide range of pitch inflection.

The difference in the *nam* and *bac* tunings of classical Vietnamese music, as I hear it in recordings of the *dan tranh*, a sixteen-string zither with movable bridges, played by different artists, is con-



siderably more dramatic than the descriptions in encyclopedias and scholarly articles suggest. The midtones in the nam modes are striking and expressive, and contrast vividly with the more familiar-sounding bac pentatonics. Some midtones are inflectional, it seems, and produced by increased string tension, while most are tuned by setting the bridge positions. It is significant that in tuning the dan tranh the Vietnamese musician “first contemplates or meditates upon the sentiment [of the mode being tuned] before beginning to tune the instrument .... The sentiment, mode or modal nuance associated with a *dieu* [mode], has no counterpart in Western music” (Keefe et al., p. 44).

Excellent examples of the modal expressions of this music can be found in recordings by the great scholar and musician Trần Văn Khê (b.1921) (“Viet-Nam: Improvisations” (1973/1998 re-release), Ocora CD C580070; midtone modes, tracks 4, 6), and in more recent dan tranh performances by Trần Quang Hải of his own compositions in traditional styles (“Cithare Vietnamienne/Vietnamese Zither” (1993), Playa Sound (Sunset-France) CD PS65013; tracks 1, 6 and 9), the first of which presents three different modes, “north, centre and south,” in dramatically contrasting sequence. (The overview of the modes by Trần Văn Khê is excellent, but its revision in the 2001 *New Grove* has made the comparative chart of modal tunings (Table 1) less accurate, in my opinion. Nguyen’s somewhat different presentation is also valuable.)

Both the Burmese and Vietnamese languages are tonal. There has been some recent suggestion that the musical intervals characteristic of the respective spoken tones of Burmese and Vietnamese may have influenced the characteristic intervals of their respective musics. Further research on this question would, I think, be worthwhile, especially if extended to music of other cultures with tonal languages.

### § § §

Indonesia’s *gamelan* music presents quite different sound-structures and intervals from any other considered in these pages. The main reason for this is that most of the gamelan’s instruments are bars or bowls of bronze, the characteristic sounds of which are determined by their “inharmonic” overtones: they do not have the orderly array of upper partials such as we hear in the harmonic series generated by a vibrating string or column of air.

When tuned to a Western scale, bells and chimes often seem oddly out of tune, owing to the incompatibility of their inharmonic overtones with the scale intervals. In the gamelan, by contrast, it would probably not be too much to say that the overtones of the bronze instruments themselves strongly influence the actual tunings of their intervals. Each gamelan has its own unique tuning, and that of its instruments may differ somewhat; octaves are usually wider or narrower than pure. It seems clear as well that the tunings of the fixed-pitch instruments represent something of a compromise, a “temperament” that permits as close a fit as possible of their intervals with the somewhat different intervallic intonation of each *patet* (mode) as sung — not I think unlike the case of the Western modes, which as sung also differ somewhat in intonation.

Indonesian gamelan music has two primary scale systems: *slendro* is a five-tone scale that sounds to Western ears like the minor-third pentatonic, but with large tones and narrow thirds. *Pelog* is a seven-tone scale out of which several different five-tone scales are usually chosen. To Western ears pelog sounds most like the major-third pentatonic mode, but the octave scale most

often contains one to three midtones, intervals that seem to be established as a category in pelog melody.

Listening to, and looking at the measurements of, the intervals of the Javanese pelog scale and its Balinese counterpart (not usually called pelog by Balinese musicians), one is struck by the prominence of the midtone. The five-tone patet (modes) derived from the seven-tone pelog scale usually will include one midtone in addition to semitones and “major thirds” of variable size.

The repertory of western musical intervals is helpful here for general orientation, but gamelan intervals do not conform to such rigorous prescriptions as we find in western music theory, or in theories of classical Arab or Indian music. The midtone will help our ear: Colin McPhee, the great 20th-century scholar of Balinese music, whose *Music in Bali* is the authoritative work on the subject (and who not incidentally rescued a good deal of gamelan repertoire that was at the time — the 1920s and 1930s — on the brink of extinction), was at a loss to account for intervals of *saih pitu* (i.e., the seven-tone pelog scale) that did not conform to those of the Western scale. He wrote that “some tunings approach the Western tempered system; others veer off in *intervals impossible to define* [my emphasis] except in terms of cents” (McPhee, p.36). With no internalized model of a midtone to draw upon, he could hardly have avoided what seems to me a considerable misapprehension.

An average of pelog interval sizes from thirty sets of Javanese gamelan instruments presents the following ascending scale:

pitch number	1	2	3	4	5	6	7	1
cents size		120	138	281	136	110	158	263

(Note that the “average octave” here is 1206 cents.)

The most familiar pentatonic scale of pelog, pitches 1, 2, 3, 5, and 6 above, has the (average) intervals of 120, 138, 417, 110 and 421 cents’ width. A quite different pentatonic scale uses pitches 2, 3, 5, 6 and 7, giving (average) interval sizes in cents of 138, 417, 110, 158 and 383. (The Balinese scales of the pelog type have the same general interval structure; comparative tunings are given by McPhee, p.40-49.)

While an average is helpful in getting an overall picture of scale structure, one must be aware that average intervals represent neither a real nor an ideal gamelan: in the individual gamelan the various instruments will likely not be in exact agreement on the pitch of any scale-degree; nor on anyone instrument are octaves likely to be exact.

The complex link between the timbre of the gamelan instruments and the scale tunings has been carefully studied by William Sethares, from whose *Tuning, Timbre, Spectrum, Scale* the above average interval sizes have been quoted (p.180). Subtleties of the relationships of the fixed tunings of the instruments to the heard intonation of the different patet as sung are treated extensively by Marc Perlman, who also describes (p.534-41) how a specific gamelan tuning is achieved, a process that, like the dan tranh tuning of Vietnamese music mentioned above, involves reflection on the desired interval affect, and thus on the emotional character of the gamelan itself as a musical instrument.

There are many recordings of Javanese gamelan performances in various regional and local styles that display beautifully the colors of the pelog modes, particularly (in my judgement) the historic

recordings of the early 1970s in the Nonesuch Explorer series, re-released recently on CD. In the pelog modes the midtone intervals tend to stand out clearly, regardless of the individual gamelan. A possibly closer representation of the true intervallic intonation may be heard not from the fixed-pitch instruments, but rather from the intonationally flexible *pesinden* (solo female voice), *suling* (flute), and the bowed string, the *rebab*. A completely vocal gamelan, with clapping percussion, can be heard giving with remarkable accuracy the characteristic melodic intervals (midtones included) of pelog, in a style called *jemblung*: “Music of Indonesia 14: Lombok, Kalimantan, Banyumas: Little-known Forms of Gamelan and Wayang” (1997), Smithsonian Folkways Recordings SF CD 40441; track 6.

For Bali, one can hardly do better than the recent re-releases of superb field recordings made in the late 1920s to early 1930s by Colin McPhee: “The Roots of Gamelan” (1999), World Arbiter CD 2001.

### § § §

In sub-Saharan Africa, in central Asia, and among the indigenous peoples of the Americas, the Pacific Islands and Oceania, there are ethnomusicological field reports over many decades of musical cultures that use (or seem to use) mid intervals. Two of these, at least, are accessible and clear: first, the folk music of Okinawa, where midtone scale intervals are evidently a very old oral tradition, now being pushed out of memory by Western equal temperament.

The second concerns local and individual tunings of a type of hand-held African instrument known technically as a *lamellaphone*, which consists of some number of vibrating metal tongues on a soundboard, often in a gourd-resonator. Such instruments are quite widely used in Central and Southern Africa; among their names are *sanza* and *kalimba/karimba*. Known in the Shona culture of Zimbabwe as the *mbira*, it is virtually a sacred musical instrument, used as an accompaniment — solo or ensemble — to song, dance and ritual. The *mbira*'s tunings vary from one player to another. Individual tunings have been measured, and their scales frequently include midtones.

Summaries of field research in music around the planet have not infrequently reported possible midtone intervals quite vaguely: “between a tone and a semitone,” “neither whole tones nor semitones, or, at times, “micro-tones” (whatever the definition of that word may be). From these vague impressions comes an intervallic uncertainty that may or may not be present in the music itself.

The extended essay on Okinawan music by Jan LaRue in the 1980 *New Grove* (vol.9, p.543-48) is very informative. The Shona *mbira* culture is given detailed treatment in its social context in Paul Berliner's study, where he includes tables of his careful measurements of the instrument tunings of several celebrated *mbira* players. A selection of his field recordings, rereleased on CD (“The Soul of Mbira” (1973/1995), Nonesuch Explorer CD 72054-2), is an indispensable complement to his book.

### § § §

By far the most widespread and highly formalized use of the midtone occurs in classical Arab music and the closely related Persian and Turkish art music. Arab art music is divided into two

main traditions: the more Persian- and Turkish-influenced East, including Egypt, Iraq, Lebanon and Syria; and that of North Africa west of Egypt. It was formalized in the court music of the Umayyad and Abbasid caliphates (8th to 13th centuries CE) by a number of great theorists of music, especially Zalzal (d.791), al-Kindī (d.ca.874), al-Fārābī (d.950), Ibn Sīnā (known also as Avicenna, 980-1037) and Ṣafī al-Dīn (also a prominent court musician, d.1294), who based their methods and principles to a considerable extent on the music theory of the Greeks. Zalzal introduced a new fret on the *‘ūd* (lute) for the middle finger, giving the sequence, from the open string, of whole tone (first finger) and midtone (middle finger). These add up to a mid third, and likely represented a tangible acknowledgement of intervals long present in music of the Middle East. Arab theory is unique in the elegance of its rational structures, which come out of the theorists’ understanding of number and acoustics.

The midtone is a familiar interval in the muezzin’s call to prayer. Next to the tone, in fact, it is the most common scalar interval in the Arab *maqāmāt* (modes), though perhaps not more frequently heard than the semitone. In his *Making Music in the Arab World* (2003), the noted scholar A.J. Racy writes that the opinion is often voiced — presumably among Arab musicians — that *maqāmāt* “with such ‘neutral’ steps,” i.e., midtones, “embody ecstatic qualities that are extraordinarily potent” (p.98).

Of the modest handful of studies of Arab music theory by Western scholars, probably the most important in English is that by Owen Wright, *The Modal System of Arab and Persian Music A.D. 1250-1300* (1978), also the author of *New Grove’s* valuable overview of Arab art music. History, theory and practice (including regional and folk musics, and a good introduction (p.153-58) to the chanting of the Koran and the *adhān*, or call to prayer) are presented by Habib Hassan Touma in his book, *The Music of the Arabs*, which is accompanied by a CD that includes recordings of some extraordinary performances and widely diverse styles and ensembles.

In the nineteenth century a movement began to “modernize” (i.e., Westernize) Arab music theory, one of the main proposals of which was the adoption of 24-tone equal temperament, whose quarter-tone unit interval could accommodate all of the midtone scales. (The interval of the quarter tone itself perhaps occurs in a very rare case in the Arab system, and not at all in the Persian.)

A good many musicians were in favor of these adoptions, deemed progressive. In such subtle and elaborate monophonic music, however, small intonational inflections (passed on by ear from teacher to pupil) count for much, and the quarter-tone system simply could not accommodate them. The conflict between the modern theory and traditional practice is examined in detail by Scott Marcus (1993), who shows how the intonation of the midtone can vary (p.45-6). (Touma writes (p.43, 45): “Every *maqām* presentation possesses its own emotional content, which is determined primarily by the structure of its nucleus, but also by the tones of the *maqām* row. ... [T]he size of an interval can change during the performance of a *maqām*, giving rise to a particular characteristic coloring [of a pitch] ... and simultaneously eliciting a specific emotional mood in the Arab listener.”) Marcus’s more recent survey of Arab theory and practice (2002) is an excellent introduction to the subject.

The beauty and emotional power of these intervals in their musical context can of course be most truly appreciated by listening to the greatest artists of Arab music: the famous Egyptian singer Umm Kulthum (1908-1975), the Iraqi *‘ūd* virtuoso Munir Bashir (1930-1997), and the Nubian singer, composer and *‘ūd* player Hamza el Din (1929-2006), to name but three.

The development of the musical cultures of the Middle East is a dauntingly complex history of interinfluences, as in the course of more than two dozen centuries it is passed through three great empires. The first of these was that of the Persians (before 650 BCE-7th century CE), which extended from northwest India to Egypt and northeastern Greece. The Islamic Arab caliphates came next (661-1258 CE, and until 1517 in north Africa), centered in Damascus, Baghdad and Córdoba, and stretching along Mediterranean Africa and to most of the Iberian peninsula. Most recent was the Ottoman Empire (late 13th century-1918), ruled from Turkey, and in some sense a continuation of the caliphates. It extended from present-day Iran westward to Egypt and Libya and included parts of the Arabian peninsula along with Greece, Hungary, Romania, Bulgaria, Albania and most of the former Yugoslavia.

Although the mutual influences of the folk and art musics of this durable succession of imperial cultures can hardly be untangled today, we can hear clearly nonetheless the close relationship of the intervallic structures and modal scales of classical Persian and Turkish music to those of their Arab cousins in their employment of the midtone.

Both the Persian (Iranian) and Turkish cultures have seen their art-music traditions suffer significant loss over the past century. They are both, after all, the legacy of what was music for the court; Western popular music has become increasingly influential; and religious fundamentalism in Iran has threatened to destroy altogether what remains of the great Persian musical traditions.

The theory of Arab and Persian music is treated in Wright's book, mentioned above. Classical Persian music has, like the Arab, been the object of attempts at a Western-style systematization of its intervals, particularly into the equal quarter-tone scheme. The modern theory that seems to represent most faithfully its intervals and modes as actually practiced is that of Hormoz Farhat, given in detail in his book *The Dastgāh Concept in Persian Music* (1990); he gives a close account of the musical treatment characteristic of each of the twelve *dastgāh-hā* (modes), including the minute intonational inflections that color the performance-practice of each. (Farhat's summary of his theory can be found in *New Grove* in the entry "Iran.")

John Baily gives a fine account of the meeting of the Persian *dastgāh-hā* and north Indian *rāga* in the practice of professional musicians of the city of Herat, Afghanistan, before the 1979 Soviet invasion (p.37-50).

Recordings are available of some of the Persian musicians Farhat mentions in his *New Grove* article, as well as of others. A particularly fine CD is "Bidad (Injustice)" (in the *dastgāh homāyun*, whose scale has a midtone and a plus second) by the noted singer Mohammed Reza Shajarian, with large ensemble (recorded 1984), World Village 468043.

The standard exposition in English of the modes of classical Turkish music is Karl Signell's *Makam: Modal Practice in Turkish Art Music* (1977/ 1986); a useful summary is Signell 2002. Turkish musicians have adopted a unique, complex notational system that adapts Western notation with modified sharp and flat signs (Signell 2002, p. 48-51); unfortunately this system cannot accommodate the midtone intervals that are commonly found in some scales: "Performers often find traditional theory puzzling. The *makamlar* [= *maqāmāt*, modes] they play and hear show

more flexibility than traditional theory would imply" (Signell 2002, p.55-6). Some wonderful vocal and instrumental performances (including midtone modes) can be heard on CD re-releases of early recordings: "Masters of Turkish Music" [vol. 1] (1990), Rounder CD 1051; vol.2 (1996), Rounder CD 1111.

A comparative, selective synopsis of the intervals, scales and modes of classical Arab, Persian and Turkish music can be found in the article "Mode" by Harold Powers in the 1980 *New Grove* ("Mode" V. 2(i) "The concept-maqam," vol. 12, p.423-28). The revised version of this section of the "Mode" entry in the 2001 *New Grove* is seriously compromised by errors and misprints, and is not recommended.

The middle-eastern midtone modes can be found in the music of isolated communities as remote from their origins as Brooklyn, New York, in the devotional music of Syrian Jewish immigrants (Shelemay, with recorded examples on an accompanying CD), or in the liturgical music of the Coptic Orthodox Church of Egypt, to cite but two of many such instances.

### § § §

Would mid intervals be a commonplace of Western music today had Charles Martel failed to defeat the Muslim forces at Tours in 732-33, when European music was still an essentially monophonic art? Why did not the midtone modes of al-Andalus become established when they travelled north from Iberia, as they surely did?

It is hardly surprising that the sounds of mid intervals are almost entirely unfamiliar to even well educated Western musicians. Mid intervals are to our ears much as an unknown script is to the eye, yet even more alien, since Arab script, for example, is often admired by the untutored beholder for its elegant graphic design.

Familiarity with mid intervals will come only with internalization, which constant listening and repetition alone over time can reinforce and secure, ideally through the practice of singing.

The adoption and recognition of the midtone terminology presented here, along with that of its associated scales and modes, may help reduce the awkwardness and uncertainty that have been evident in Western treatment of mid intervals: the proposed terminology offers to scholarship and field research technical language that is more precise and readily understood. It must be kept constantly in mind, however, that an interval category is not an absolute quantity, as the application of our standard terminology may sometimes encourage us to think, but designates a more or less wide perceptible range for any category of interval: we may think of a semitone, for instance, as Pythagorean, diatonic, chromatic or equal, but in practice it is as flexible in its intonation as musical expression and musical traditions demand.

As useful as a more precise technical vocabulary might be, it is to my mind *a fortiori* the possibility of opening ears to the unique qualities of the midtone and its family of intervals, scales and modes that may be the present proposal's true benefit to music and musicians everywhere.

## SOURCES CITED

## Abbreviations

GEWM: Garland Encyclopedia of World Music, 1998-2002

NG: The New Grove Dictionary of Music and Musicians, 2nd edition, ed. by Stanley Sadie and John Tyrrell. Macmillan, 2001

Baily, John. *Music of Afghanistan...* Cambridge University Press, 1988

Barker, Andrew, editor and translator. *Greek Musical Writings II: Harmonic and Acoustic Theory*. Cambridge University Press, 1989

Berliner, Paul F. *The Soul of Mbira: Music and Traditions of the Shona People of Zimbabwe*. 1978; repr., University of Chicago Press, 1993

Chalmers, John. *Divisions of the Tetrachord: A Prolegomenon to the Construction of Musical Scales*. Frog Peak Music, 1993

Doty, David B. *The Just Intonation Primer*. 3rd ed. Just Intonation Network, 2002

Evans, David. "Blues," GEWM 3: *The United States and Canada*, ed. by E. Koskoff. Garland, 2001, p. 641-2

Farhat, Hormoz. "Iran II," NG

\_\_\_\_\_. *The Dastgāh Concept in Persian Music*. Cambridge University Press, 1990

Helmholtz, Hermann. *On the Sensations of Tone as a Physiological Basis for the Theory of Music*. 2nd Engl. ed., transl. with notes and an Appendix by A.J. Ellis. 1885; repr., Dover, 1954

Keefe, D., E.M. Burns and P. Nguyen. "Vietnamese Modal Scales on the Dan Tranh," *Music Perception* 8:4 (1991), p.449-68

Kolinski, Mieczyslaw. "Gestalt Hearing of Intervals," *The Commonwealth of Music ... In Honor of Curt Sachs*, ed. by G. Reese and R. Brandel. Free Press, 1965

LaRue, Jan. "Okinawa," *The New Grove Dictionary of Music and Musicians*, ed. by S. Sadie. Macmillan, 1980. Vol.9, p.543-48

Leedy, Douglas. "Tuning Systems," *The New Grove Dictionary of American Music*, ed. by W. Hitchcock and S. Sadie. Macmillan, 1986. Vol. 4, p.424

Marcus, Scott. "The Eastern Arab System of Melodic Modes ...," GEWM 6: *The Middle East*, ed. by V. Danielson, S. Marcus and D. Reynolds. Routledge, 2002, p. 33-44

\_\_\_\_\_. "The Interface between Theory and Practice: Intonation in Arab Music," *Asian Music* 24 (1993), p.39-58

McPhee, Colin. *Music in Bali*. Yale University Press, 1966

Nguyen, Phong. "Vietnam," GEWM 4: *Southeast Asia*, ed. by T.E. Miller and S. Williams. Garland, 1998

Perlman, Marc. "American Gamelan in the Garden of Eden: Intonation in a Crosscultural Encounter," *Musical Quarterly* 78 (1994), p. 510-55

Racy, A.J. *Making Music in the Arab world: The Culture and Artistry of Tarab*. Cambridge University Press, 2003

Sethares, William A. *Tuning, Timbre, Spectrum, Scale*. Springer, 1998

Sevåg, Reidar. "Neutral Tones and the Problem of Mode in Norwegian Music," *Festschrift to Ernst Emsheimer ...*, ed. by G. Hilleström. Stockholm: Nordiska Musikförlaget, 1974, p.207-13, 292

- Shelemay, Kay Kaufman. *Let Jasmine Rain Down: Song and Remembrance among Syrian Jews*. University of Chicago Press, 1998
- Signell, Karl. "Contemporary Turkish *Makam* Practice," *GEWM 6: The Middle East*, ed. by V. Danielson, S. Marcus and D. Reynolds. Routledge, 2002. P.47-58
- \_\_\_\_\_. *Makam: Modal Practice in Turkish Art Music*. 1977; repr., Da Capo, 1986
- Surjodiningrat, W., P.J. Sudarjana and A. Susanto. *Tone Measurements of Outstanding Javanese Gamelans in Jogjakarta and Surakarta*. 2nd ed. Jogjakarta: Gadjah Mada University Press, 1972
- Touma, Habib Hassan. *The Music of the Arabs*. 1989; expanded ed., transl. by L. Schwarts. Amadeus Press, 1996
- Trân Van Khê. "Vietnam," *The New Grove*, 1980 (see citation above under "LaRue"). Rev. by Nguyen Thuyet Phong, NG
- Williamson, Muriel C. "Saùng-gauk," NG
- Wolf, Daniel J. "More about Notation," 1/1 (*Just Intonation Network*) 9:3 (1996), p.15
- Wright, Owen. "Arab Music I. 1-5," NG
- \_\_\_\_\_. *The Modal System of Arab and Persian Music A.D. 1250-1300*. Oxford University Press, 1978

Note: Performances of music that include the midtone interval by artists mentioned here, and by many others, can now be found on the internet. The Arab *maqām* genres with midtones are *rāst*, *bayātī* and *sikāh*. The midtone Persian *dastgāh-hā* are *shūr*, *abu atā*, *dashtī*, *bayāt-e tork*, *afshārī*, *segāh*, *chahārgāh*, *homāyun*, *bayāt-e esfāhān* and *navā*.

## ACKNOWLEDGEMENTS

I am grateful for criticism from Ervin Wilson and Daniel Wolf, for the elegant demonstration of *dastgāh* tunings and private performance by the *tār* master and composer Dariush Dolat-shahi, and especially for the generous assistance of Charles Shere, without which the publication of this essay would not have been possible.



## RECOGNIZING THE MIDTONE

### TOPICS

Afghanistan, classical music of  
Arab music, classical  
bagpipe scale  
Balinese gamelan  
blues scale  
Burma (Myanmar), classical music of  
*dan tranh*  
*dastgāh*  
harmonic series  
interval, musical  
Javanese gamelan  
just intonation  
*langeleik*  
*makam*  
*maqām*  
*mbira* of Shona culture (Zimbabwe)  
midtone mode  
midtone scale  
notation, musical  
number in music  
Okinawa, folk music of  
Persian classical music (Iran)  
*rāga*  
*saùng-gauk*  
theory of music, Arab  
theory of music, ancient Greek  
three-quarter-tone musical interval (midtone)  
Vietnam, classical music of