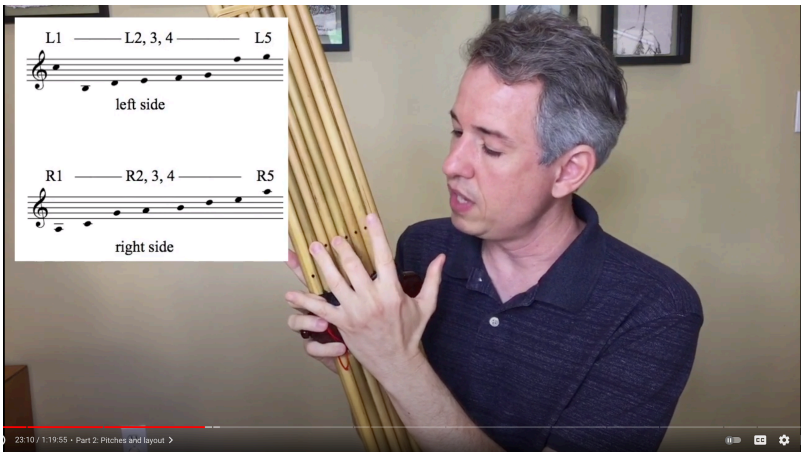
**Khaen, the bamboo free-reed mouth organ of Laos and Northeast Thailand: Notes for Composers**

by Christopher Adler



Updated March, 2023

For a video version of this guide, including playing demonstrations and audio of all musical examples, see https://youtu.be/EK9yqdS-XfM or find the link at http://christopheradler.com/khaen.html



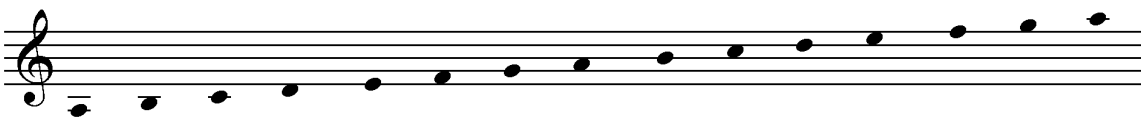

Contents:

## 1. Construction and playing position

The khaen is held between the hands and air is blown into, and drawn through, the central wooden windchest which holds all the pipes. Each bamboo pipe contains a small metal free reed. When air moves in either direction through the pipe, it escapes through the finger hole and the pipe does not sound. When a finger hole is covered, the pipe sounds. It is therefore possible to play as many as ten notes simultaneously, or more if putty is used to activate drone pipes. The khaen should therefore be considered a polyphonic instrument like the accordion or pipe organ.

## 2. Pitches and layout

The khaen plays a two-octave diatonic minor scale at a variable pitch level. The tuning is near-equal temperament and varies slightly from instrument to instrument. Since the pitch level is not standardized, it is preferred to notate khaen music in A minor and allow the instrument to transpose.



At present, I have khaen at the following pitches (referring to the sounding pitch of the lowest note):

D (transposing down a fifth)

F (transposing down a major third)
G (transposing down a major second)
A (concert pitch)
B-flat (transposing up a half step)
B (transposing up a whole step).

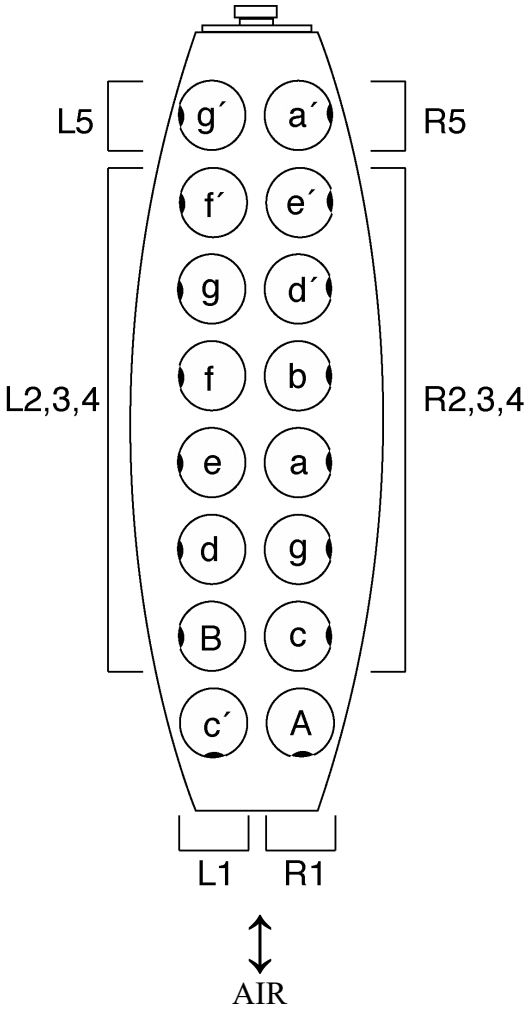
The timbre and flexibility of each instrument varies, and for solo pieces I will select an instrument that suits the piece and context. Khaen are handmade instruments and do not last forever, so it is possible that pieces written for a specific pitch may become unplayable until instruments can be replaced. For khaen in combination with other instruments, I recommend using the khaen in D, G or A as I try to keep more than one of each of these instruments available.

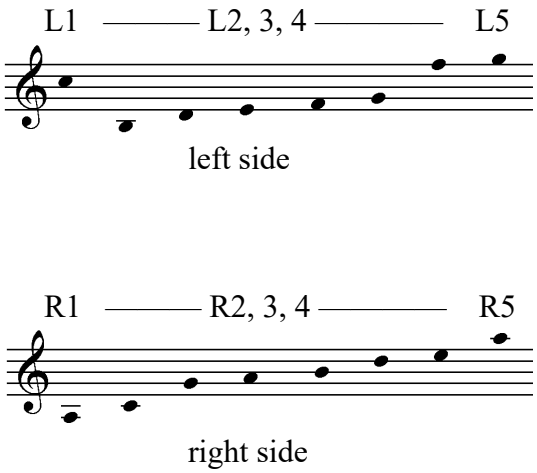
The layout of the pitches as viewed from above is shown in the diagram on the following page. The position of the finger holes constrains both the thumb (1) and the pinky (5) finger of each hand to play only the indicated pitches (see Part 7 for exceptions). The other three fingers freely and easily reach the middle six pipes in any combination.

Note that the pitch **g** is duplicated on both side of the instrument. When a specific pipe is required, a small “L” or “R” written above the pitch may be used to indicate which pipe is to be used, but often this will be dictated by the musical context and does not need to specified.

In slow music, and with sufficient time to adjust hand position, it is possible to use the fifth finger to play other pitches, but bear in mind that this results in an awkward hand position which reduces flexibility of the other fingers (see section 7, below). Reaching around the instrument such that both hands play on the same side is not feasible.

Each hole is small and sensitive and therefore it possible to play very rapidly, especially on higher-pitched instruments. The lower pipes of larger instruments speak more slowly, especially at lower wind pressure.




**3. Breathing**

Each pipe of the khaen is able to sound whether the air is moving in or out. Mouth organ players in general specialize in breath control and shaping the flow of air according to musical requirements equally, whether the air moves in or out.

When necessary, I indicate breath direction on the score as “O” for blowing (out-breath), and “I” for drawing (in-breath). In general, composers need not specify breath direction as it will be evident from direction-specific techniques, such as fluttertongue and singing. The effective breath length varies significantly between instruments, and as a function of dynamic level, and so is best left to the player.

It is idiomatic, and typical of traditional Lao music, for the instrument to be played continuously. Continuous legato playing is not possible, however, because a slight accent is created each time the breath changes direction. In traditional music, this is masked by nearly constant use of rhythmic accents made by tonguing. For legato playing, phrasing may be indicated as with any wind instrument with the understanding that no break or

space for breath between phrases is required. It is possible to expel or take in air through the nose while playing so the breath changes can be placed somewhat flexibly regardless of dynamics. More air is required to play at louder dynamics, so more frequent breath changes are required. While very soft playing is possible, at very low dynamic levels pipes may speak too slowly, or not at all, and other pipes may 'whine' (where the reed vibrates at its natural frequency), and so there is often a point below which soft playing is not practical, and that point varies between instruments.

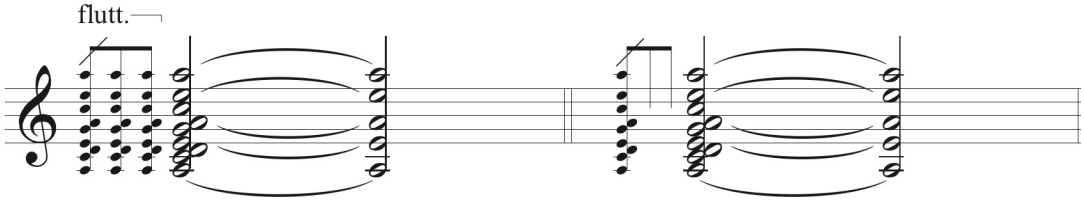
I am not able to do circular breathing. At a moderate dynamic level, it is possible to play continuously for a very long time (for example, my piece *Epilogue for a Dark Day* calls for twelve minutes of uninterrupted playing, and traditional khaen accompaniments to *maulam* performances may last considerably longer than this).

All manner of breath effects and tonguings are possible in order to create articulations. Standard wind instrument notation is appropriate for these. Double tonguing is possible and I would employ this for fast, rhythmically articulate passages, but it does not have to be specifically indicated. The spoken syllable for tonguing does not make a significant difference in the articulation.

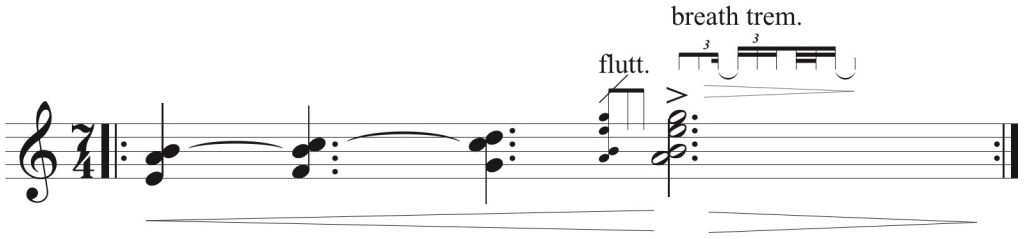
Staccato can be accomplished with breath, tonguing or with the fingers, or a combination. A fingered staccato may be employed when another voice must be legato or without a tongued articulation.

Note that fluttertongue is only possible on an out-breath. Fluttertongue may be done with a variety of intensities, from a slight pulsating coloration to an extremely rapid staccato.

The use of fluttertongue grace notes as an embellishing accent is idiomatic, as in this typical cadential figure of a pentatonic clusters resolving to an open fifth. The notation on the left is most precise, indicating that fluttertongue is used to play the grace notes as rapidly as possible, but the simplified notation on the right is also adequate:




Breath tremolo is possible, and may serve as an expressive coloration akin to vibrato. Both the intensity and speed of breath tremolo can be specified, as in this example from *Epilogue for a Dark Day* (excerpt ©2001 Christopher Adler, all rights reserved), where the breath tremolo speeds up and also recedes in intensity (indicated by the smaller hairpin):




**4. Basic traditional idioms and techniques**

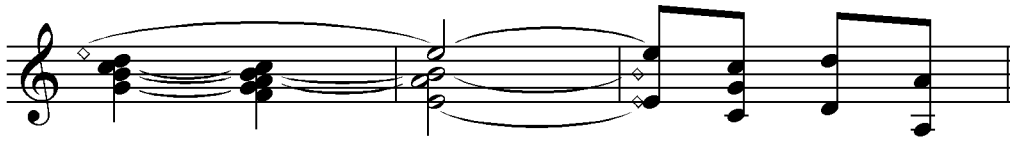
Traditional Lao and Northeast Thai khaen playing consists of two layers: drone and melody. The melody is often embellished in parallel octaves, fifths and harmonies and may also be elaborately ornamented. For more detailed information about the structure of traditional khaen music, the best reference is Terry Miller, *Khaen Playing and Mawlum Singing in Northeast Thailand* (Greenwood Press, 1985). An additional useful reference is *The Garland Encyclopedia of World Music, vol. 4.: Southeast Asia* (see "Laos"). A Thai-language reference is สนอง คลังพระศรี. ศิลปะการเป่าแคน. มหาวิทยาลัยมหิดล 2549.

***drones***

If drones are used, they may be held by one of the fingers or stopped with putty. If a drone is stopped with a finger, note that it will constrain the hand position. For example, if the third finger holds the **a** on the right side of the instrument, the second and fourth fingers will each be limited to playing notes below or above the **a**, respectively. It is often possible, however, to quickly and subtly substitute the finger which holds a drone pitch. If putty is used to hold a drone pitch, care should be taken as to when the putty is placed or removed during the piece, if at all. Placing putty one a drone pitch during a pause or rest takes only a few seconds. For putty to be placed or removed while the instrument is sounding, the hand on the proper side of the instrument must be entirely free. This technique is awkward in performance but is possible (see *Epilogue for a Dark Day*).

I use a diamond-shaped notehead to indicate a drone pitch. An ordinary note tied to a diamond-shaped note indicates that the pitch is to be held as a drone from that point on. To indicate that the drone is to be released, a diamond-shaped notehead is tied to an ordinary note, thus indicating exactly the point at which the drone is to be released. This helps to reduce the visual density of the score, especially when multiple drones are used. In contemporary music, a note held for more than a measure or two may be more effectively notated as a drone.

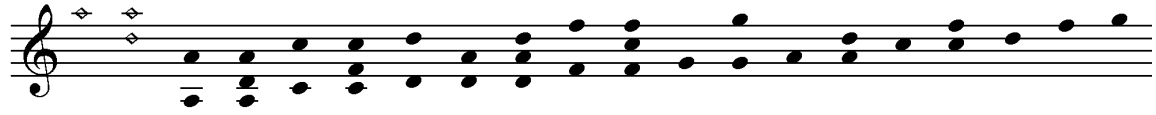
An example from *Epilogue for a Dark Day* demonstrating a change of drones held by the fingers (excerpt ©2001 Christopher Adler, all rights reserved):



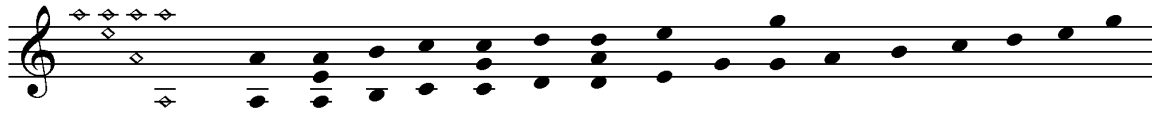
***modes***

Traditional khaen playing is based on five melodic modes (*lai*), each with characteristic drones and idiomatic melodic figures. These five modes are shown here in their most basic form, with alternative doublings for some notes, and with the different drones (diamond-shaped notes) that are typically used. The hand configurations within these modes are very idiomatic and comfortable. On one hand, music in these modes will be particularly easy to play, and on the other hand music in these modes will be more evocative of traditional music and therefore subject to expectations, associations and comparisons. If a composer wishes a passage to sound idiomatic within a traditional mode, it is possible and preferable to simply indicate the mode by name and the desired drones, and write out a single monophonic melody. The performer will be able to realize the melody with characteristic doublings and ornamentations.

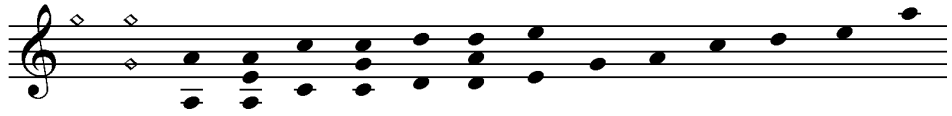
*lai noi*



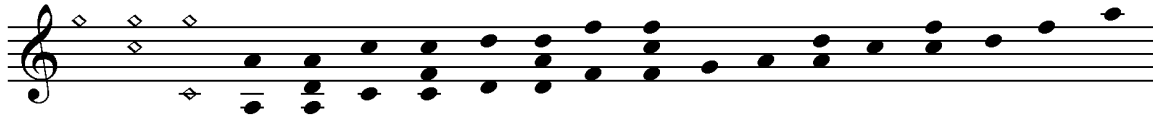
*lai yai*



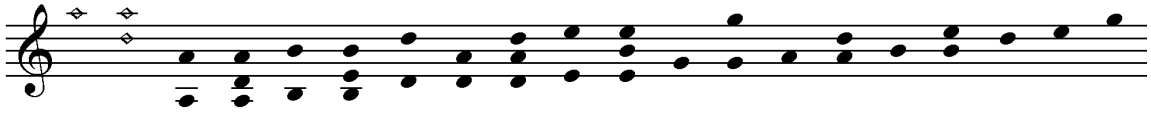
*lai sootsanaen*



*lai bo sai*



*lai soi*



***modal theory***

The five modes are grouped into two families with transpositionally-equivalent scales, called *thaang san* ('short') and *thaang yao* ('long'). Each pair of modes from the two families employ the same pitches but with different pitch centers (listed first and underlined in the diagram). Whereas each of the modes within the same family share the same scale structure, but employ different pitches.

Traditional genres/repertoire may be realized in any of the *lai* of the same family. Effectively, changing *lai* within a family just means transposing the music, and this would be done to suit the range of the singer being accompanied. But in actuality, changing *lai* will result not only in transposition, but changes in drone(s), characteristic doublings, and some octave displacements of melodic tones.

As shown in the diagram, an analogy to concepts of major and minor in Western tonality is apt, but note that in the case of *thaang san*, the central/final/resting tone is the Western fifth rather than the tonic (although this theoretical concept of pitch centrality has little bearing on melodic shape in many genres).

| ***Thaang San*** (major) | ***Thaang Yao*** (minor) |
|---|---|
| *lai bo sai* | *lai noi* |
| **C-D-F-G-A** | **D-F-G-A-C** |
| *lai sootsanaen* | *lai yai* |
| **G-A-C-D-E** | **A-C-D-E-G** |
| *lai soi* | *lai se* |
| **D-E-G-A-B** | **E-G-A-B-D** |

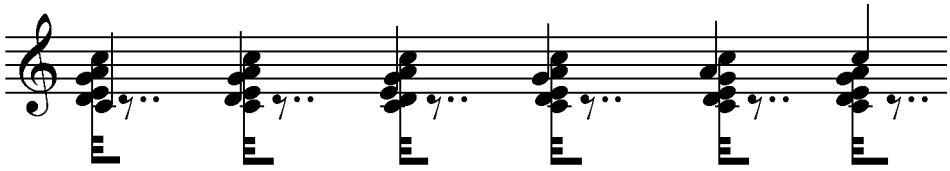
The symmetries in the chart imply the existence of a sixth mode, known as *lai se*, however this mode is almost never played. Some players can play simple demonstrations but it is otherwise not used.

***grace notes***

Grace notes are frequently used as melodic articulations. These may be done singly or in octaves, fifths, or other combinations, may cover any interval provided the fingers are available, and may be performed very quickly.

***chord-on-attack***

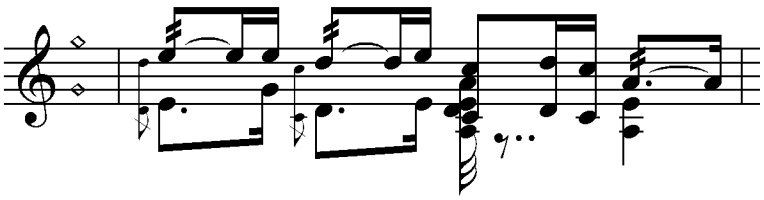
Another method of melodic articulation used in traditional playing is to play and rapidly release a cluster or harmony while holding only a melody note or notes. This results in a burst of sound similar to very strong tonguing but with an audible harmonic content. I prefer to notate it as shown below:



This technique is used extensively by Christopher Burns in *Triangulation* (see example in section 7, below).

***finger tremolo***

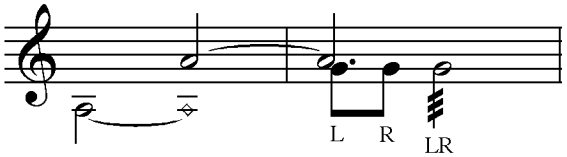
This traditional technique is often used when playing a melody in parallel octaves. The lower melody note is held while the upper note is rapidly repeated with finger motion while the breath is steady. The result is akin to a breath tremolo or fluttertongue, but on only one note. This may be done on any pitch (although rapid repetitions are more effective on the higher pipes which speak more quickly) or combination of pitches. The following is an artificial passage demonstrating the combination of many of these techniques as they are used in traditional playing:



***using the two g's***

A double tremolo on the pitch **g** is possible by using the pipes on both sides of the instrument. This may be notated by writing a single **g** with the tremolo symbol and writing "LR" above the pitch to distinguish it from a tremolo on a single **g**.

An example from *the wind blows inside* demonstrating a double tremolo (excerpt ©1997 Christopher Adler, all rights reserved):



## 5. Dynamics

Note that the dynamic range of the khaen is compressed compared to most western concert instruments. The actual loudness possible varies from instrument to instrument, but composers should simply be aware that a large variation in dynamics due to force of breath alone is not possible. Too little pressure will result in pipes not sounding or 'whining' (where the reeds vibrate at their natural frequency, which is not the same as the frequency of the pipe).

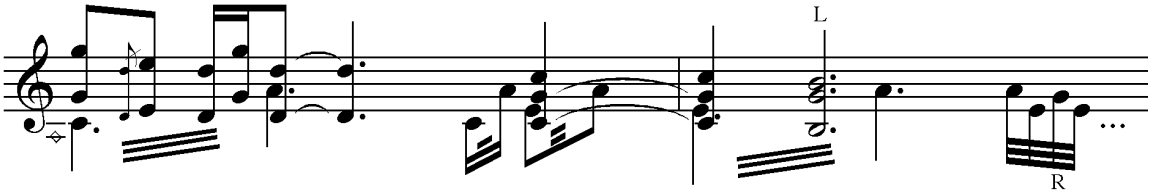
For solo music, I will interpret the full range of specified dynamics over the possibilities of the instrument selected. For ensemble music, consider that the khaen will probably not be able to achieve the same fortissimo or pianissimo extremes as other instruments. I have a clip-on mic to amplify the khaen that may be useful for ensemble playing, or when playing with electronics, so as to better control the balance.

One way to expand the dynamic range effectively is to consider the number of pipes sounding, as one would with the harpsichord or pipe organ. Octave- and other doublings effectively increase the volume of sound, and large chords will seem particularly loud.

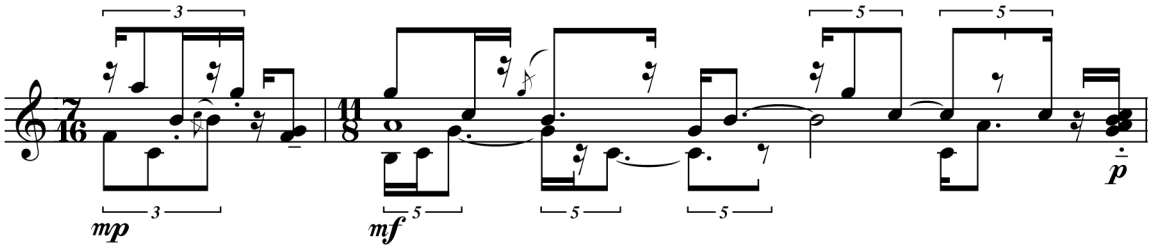
## 6. Notating contemporary music

Khaen music may be notated on a single staff as in the above examples. The use of the drone symbol eliminates the visual clutter and unnecessary notation of pitches held as drones, so that the notation shows only moving voices. Fairly complex polyphony may be read from a single staff.

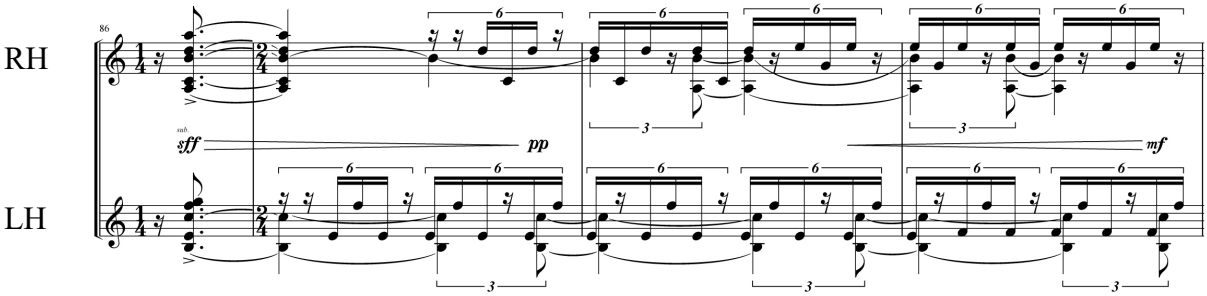
An example from *the wind blows inside* demonstrates three-voice polyphony (drone, melody, and harmony in tremolo) notated on a single staff. Reading this particular example is aided by the fact that the melodic voice uses characteristic doublings of the *lai yai* mode (excerpt ©1997 Christopher Adler, all rights reserved):




Here is an example of two- and three-voice polyphony from *Triangulation*, by Christopher Burns (excerpt ©2009 Christopher Burns, all rights reserved, used by permission):




In cases of dense harmonies, or passages in which the hands play independently, it is advantageous to notate using two staves, the upper staff for notes played by the right hand and the lower staff for notes played by the left hand. The following excerpt from *Mystische Minatüre*, by Yu Kuwabara (excerpt ©2017 Yu Kuwabara, all rights reserved, used by permission) is far too polyphonically intricate to be notated on a single staff. And large chords, such as that in the first measure, are much easier to read when notated on two staves.




It is acceptable to switch between notating on one or two staves in a single piece as convenient. It is also possible to notate polyphonic layers of very different character on multiple staves, each of which potentially represents the full range of the instrument (see *Telemetry Lock*).

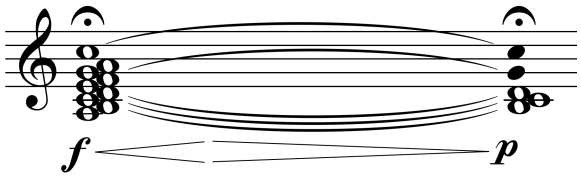
## 7. Extended techniques

Half-hole technique, portamento, glissando, detuning, vibrato and harmonics are not possible on the khaen.

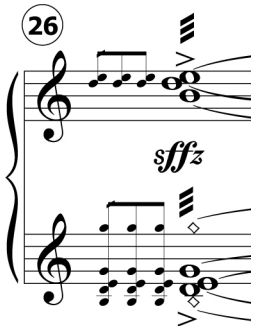
### *non-standard hand placement*

It is possible to take the thumb or pinky out of regular position to play one of the pipes normally played by the 2nd-4th fingers. This takes extra time to ensure the holes are completely covered and so is best done for longer chords rather than melodic passages. It is also best to do only one such out-of-position note at time as taking those fingers out of position weakens the player's grip on the instrument.

In this excerpt from *Five Cycles* (excerpt ©2002 Christopher Adler, all rights reserved), the fifth finger of the left hand plays **f**, while the 2nd-4th fingers play **B-d-e**. This chord is preceded by a phrase break to allow careful placement of the fingers.



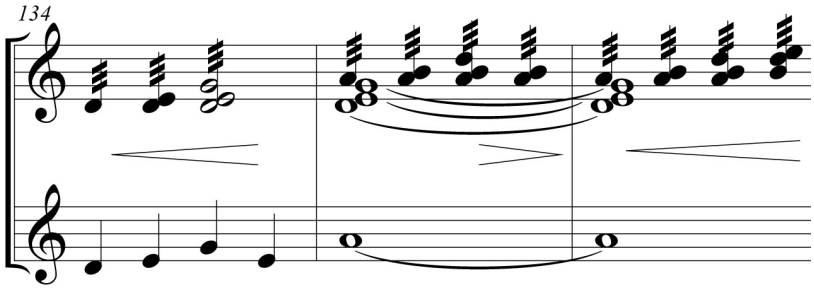

Similarly, in this excerpt from *Watawat*, by Sidney Marquez Boquiren (excerpt ©2017 Sidney Marquez Boquiren, all rights reserved, used by permission), the low B is played by the thumb of the left hand.




***vocalization/singing***

Vocalizing and singing into the instrument is possible. Of course, this may be done only on an out-breath. It is possible to independently control the relative dynamics of the singing and khaen, to an extent. Singing into the instrument modulates all the pitches in unpredictable ways, resulting in unsteady and vibrating pitches. When the sung pitch corresponds to a pitch of the khaen, that pipe may ring whether or not the finger hole is covered. When the finger hole is covered, that note may buzz more loudly than others. In *Tashi Delek*, singing a low G at a softer dynamic emulates the sound of the khaen without drastically modulating the timbre of other notes, effectively adding a pitch that the khaen does not have. Sung glissandi over sustaining chords are used in *Three Body Problem*.

In this striking example from *Palpable Breathing*, by Vera Ivanova (excerpt ©2017 Vera Ivanova, all rights reserved, used by permission), the sung part is notated on the lower staff and the tremolo symbol is used to indicate fluttertongue. The effect of the voice both emphasizes the melody in the first measure and modulates and destabilizes the sustaining voices throughout.




***breath sounds***

Breathing through the instrument produces very little audible sound and runs the risk of causing reeds to activate. So for breath sounds, I blow air from the side of my mouth on the outside of the instrument, and this produces a much more audible 'breath sound'.

Blowing on the end of the bamboo pipes produces a faint tone.

***guiro effect***

Scraping across the bamboo pipes with a fingernail produces a percussive sound similar to a *guiro*.

**8. Contemporary works**

(see christopheradler.com/khaen.html for the most up-to-date list)

Scores for all of my pieces are available at www.christopheradler.com

***Solo works***

Christopher Adler, *Epilogue for a Dark Day* (2001)
Christopher Adler, *Five Cycles* (2002)
Christopher Adler, *Sirens of the Pack Ice* (2023)
Christopher Adler, *Tashi Delek* (1998)
Christopher Adler, *Telemetry Lock* (1999)
Christopher Adler, *the wind blows inside* (1997)
Sidney Marquez Boquiren, *angel music* (2007)
Sidney Marquez Boquiren, *Watawat* (2017)
Christopher Burns, *Triangulation* (2008)
Philip Carlsen, *Frangipani Blossoms* (1975)
Chua Zi Tao, *Paddy Fields* (2021)
Peter Hager, *A Seasonal Rain* (2021)
Jinhee Han, *Paysage on Danube* (2019)
H. James Harkins, *Late Passing*, for khaen and electronics (2017)
Jeff Herriott, *Patterns in Wide Space*, for khaen and electronics (2011)
Vera Ivanova, *Mockingbird Hopscotch* (2020)

Vera Ivanova, *Palpable Breathing* (2017)
Yu Kuwabara, *Mystische Miniatüre* (2017)
Kevin Leomo, *tracing a line* (2021)
Joogwang Lim, *... at Beaconsfield* (2023)
David Loeb, *An Ancient Harbor* (2020)
David Loeb, *Autumn Green* (2017)
David Loeb, *Caprices* (2020)
David Loeb, *Emerging from the Deep Mist* (2011)
David Loeb, *A Garden to Linger In* (2019)
David Loeb, *Karin: A Forest of Verses* (2006)
David Loeb, *Kawagiri: Rivermist in Summer* (2003)
David Loeb, *The Legend of Tha Tien* (2015)
Matthew Welch, *Ulrikke* (2006/arr. 2011)

***Ensemble works***

Christopher Adler, *Cowries*, for three khaen (2021)
Christopher Adler, *Diomedea*, for khaen and harp (2017)
Christopher Adler, *K's crossing*, for haegum (or melody instrument) and khaen (2019)
Christopher Adler, *The Memories that Drift from Mountain Peaks*, for khaen and 25-string gayageum (2022)
Christopher Adler, *The Serpent's Dance*, for violin (or melody instrument) and khaen (2021)
Christopher Adler, *Three Body Problem*, for khaen and cello (1999)
Christopher Adler, *Three Lai*, for khaen, violin, and viola (1996)
Christopher Adler, *Three Forest Characters*, for shamisen, khaen, violin and cello (2020)
Sidney Marquez Boquiren, *Babaylan*, for khaen, flute and cello (2011)
Narongrit Dhamabutra, *The Asian Euphony*, for four Asian instruments and orchestra (2018)
Sunhee Lee, *Maehwa Hyanggi*, for khaen, geomungo, violin, viola and cello (2023)
Sunhee Lee, *2020 Suyeonjang*, for geomungo, khaen and bass (2020)
Sunhee Lee, *2020 Suyeonjang*, version for for geomungo, khaen, viola and cello (2023)
Annea Lockwood, *The Angle of Repose*, for voice, khaen, and alto flute (1991)
David Loeb, *Three Friends of Winter*, for khaen, flute, guitar, cello and percussion (2004)
David Loeb, *The Maltese Plaza in Fog*, for three khaen (2010)

***Recordings***

Recordings and videos of many of the above pieces may be found on
http://christopheradler.com/khaen.html

Compact discs available are:

Christopher Adler, Landscape Traces: New music for khaen, volume two (compact disc, Liber Pulveris Recordings)
includes works by Christopher Adler, David Loeb, Jinhee Han, Kevin Leomo and Peter Hager

Christopher Adler, *Triangulations: New music for khaen, volume one* (compact disc, Liber Pulveris Recordings)
includes works by Christopher Adler, Vera Ivanova, Yu Kuwabara, Jeff Herriott, Sidney Marquez Boquiren, Christopher Burns and David Loeb

Christopher Adler, *Epilogue for a Dark Day* (compact disc, Tzadik TZ 8004)
includes *Epilogue for a Dark Day*, *Three Lai* and *the wind blows inside*

David Loeb, *The Silent Waterfall* (compact disc, Vienna Modern Masters VMM2048)
includes *Kawagiri: Rivermist in Summer*

David Loeb, *A Forest of Verses* (compact disc, Vienna Modern Masters VMM2054)
includes *Karin* and *Three Friends of Winter*

David Loeb, *Travelogue: Music of David Loeb* (compact disc, Centaur Records)
includes *The Maltese Plaza in Fog*

David Loeb, *World Winds* (compact disc, Centaur Records)
includes *Karin*

See also my youtube playlist of contemporary music for khaen:
https://www.youtube.com/playlist?list=PL1euiR8RcG1dU9XKgIdZhwaYAbGxXxllz