Mong

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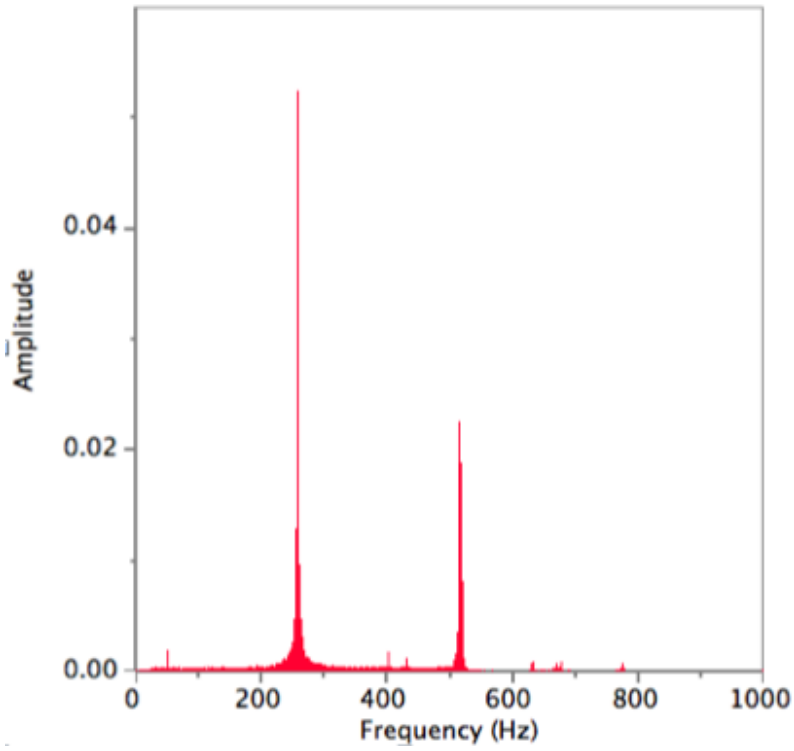
Mong, โหม่ง in Thai and embossed- or nipple-gong in English, are the medium sized gongs that hang in the grounds of Thai temples (Wat). Mallets are in easy reach for visitors so melodic booms may echo from surrounding hills.

Shannon beating a mong at home.

Thai Mong are made from beaten bronze and are not flat like Chinese gongs. The common feature is a bowl shaped ‘nipple’ at the centre that seems to serve two functions. It ensures that the gong is struck in the centre and the sound is modified by the shape. It is not the harsh bell-like ring and splash of a flat Chinese gong. A Mong rings with mellow ‘rounded’ melodic tones.

The small set of Mong were bought at a market in Bangkok.

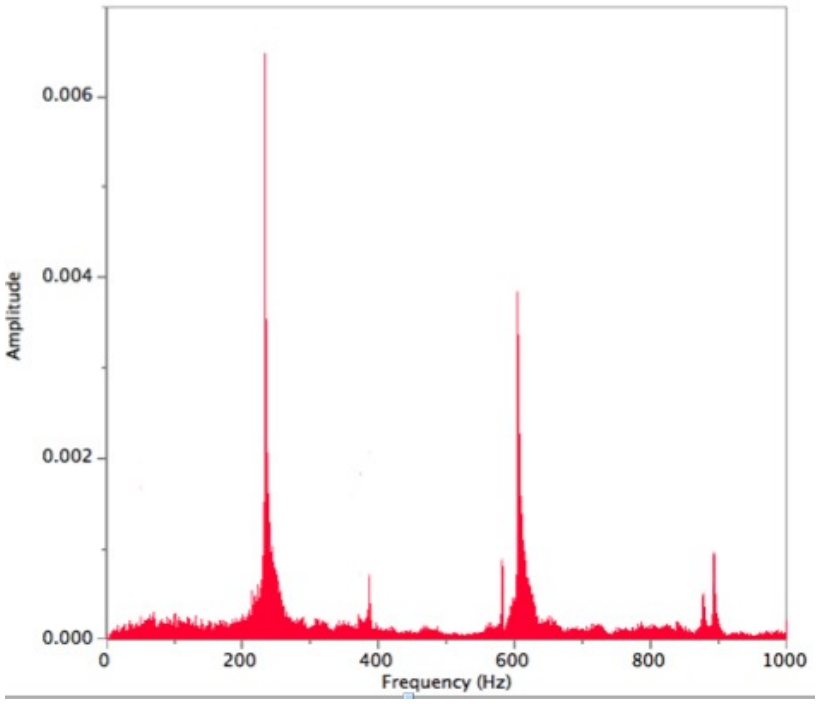
Their pitch is related to the diameter, that ranges from 12 to 30 cm. Mong are unusual among percussion instruments with two dominant peaks an octave apart on a frequency spectrum.



A typical frequency spectrum made with a microphone and software from vernier.com. for the 22 cm member of the set when hit in the centre. The frequencies are close to 260 and 520 Hz: the pitch is of middle C on a piano keyboard.

An improvised gong for comparison.

This steel pot, for steaming vegetables, rings like a gong when struck in the centre. The holes weaken the flat bottom, which allows it to ring for much longer than the bottom of an iron pan or a steel pot that holds water.



There are two dominant frequency peaks for the steel pot that are *more than an octave apart*. The ring is a little harsh, more like that of a bell than a Mong. There are several weak resonances (and some additional smaller peaks above 1000 Hz that are not shown).

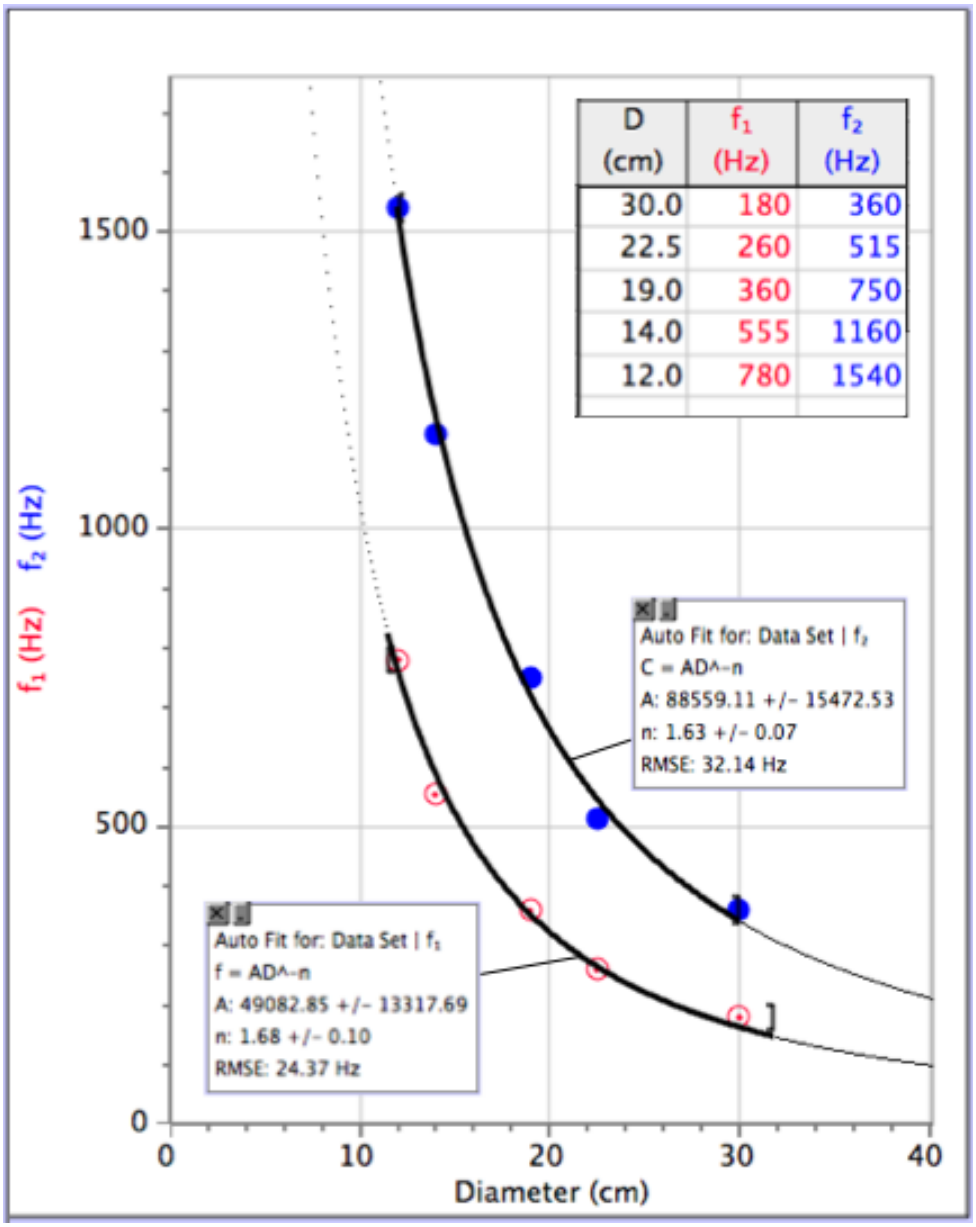
The Mong and the bottom of the pot vibrate with the oscillations of a drumhead. The lowest frequency when a circular drum is hit in the centre is the 01 mode for which the rim is a node and the centre is an antinode (oscillating in and out). The mode with the next higher frequency has a ring node between the rim and the centre. The centre is again an antinode. The frequency of this mode on the Mong is increased by x2.0 and on the bottom of the steel pot by x2.6.

Circular nodes on a vibrating drum that we made some time ago.

Fine tea-leaves were scattered on the drum as it was hit many times in the middle. As the head vibrated the dry powder collected along nodes (lines of least vertical movement). The nodes are circular, one at the outer edge (lower left) and two complete rings between that and the centre. The drum head is vibrating with a combination of at least the first two modes.

The reader might like to think about how to excite one mode at a time so that the patterns are more easily interpreted. We plan to attempt this in the near future.

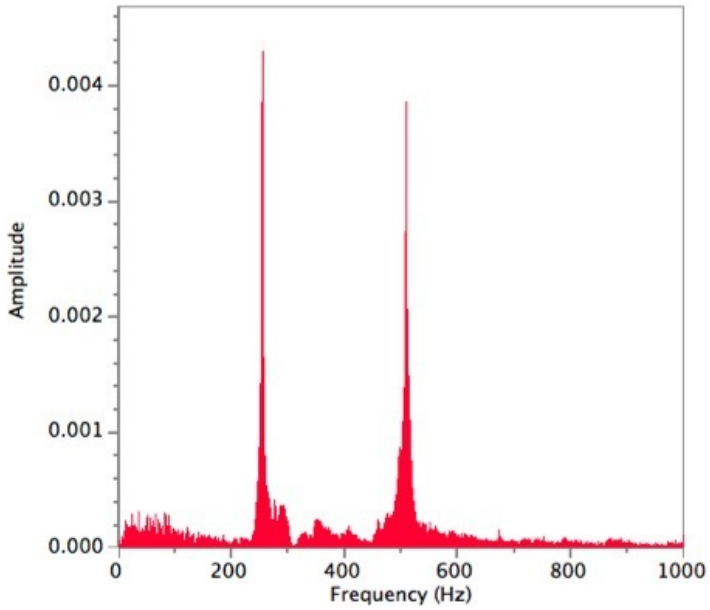
Frequencies of the first and second harmonics



In each case the higher frequency is close to twice the lower one. The two frequencies are an octave apart, which is the reason for the sweet melodic sound of the gongs, more like the sound of a Ranat ek (wooden xylophone) than a drum, bell, or flat Chinese gong that all have much larger harmonic intervals.

One of us (Shannon) played Ranat for three years before taking up the Khim twelve months ago.

The sound spectrum of Shannon's Ranat played with two hammers one octave apart has two peaks. Each bar has one dominant mode.



A Ranat spectrum when played with two hammers an octave apart is like the spectrum of a Mong with almost no upper harmonics.

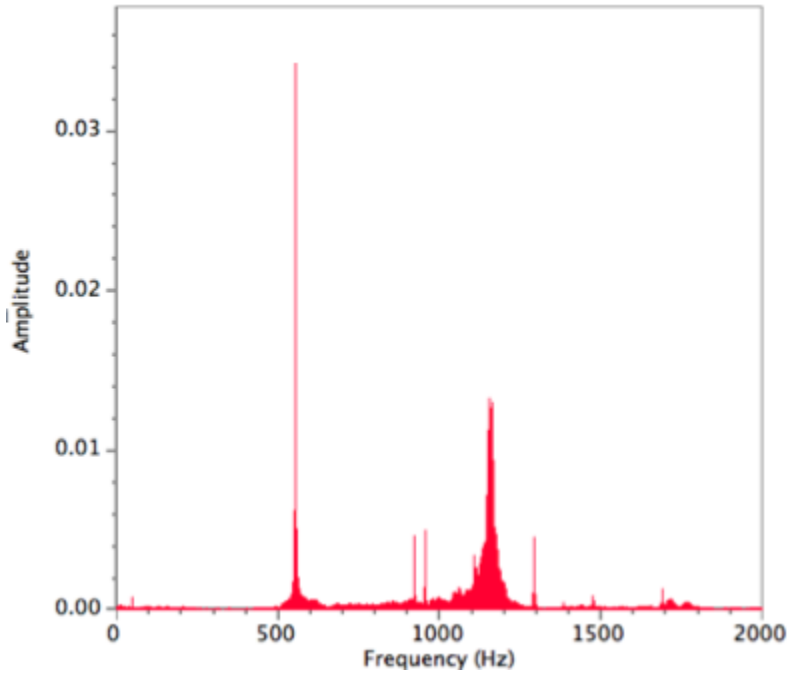
An ensemble: four Ranat and three Khong wong. T

The gongs are mounted horizontally in a circular arc for easier playing. Both instruments have sweet melodic sounds and blend together very well. The result is pleasing, loud and exciting.

Appendix

Our two smallest gongs (12 and 14 cm in diameter) suggest that as the diameter of the nipple is reduced the interval increases to more than one octave.

The frequencies of the two gongs are listed in the table on the graph above. The larger gong has frequencies of 555 and 1160 Hz, shown on the frequency spectrum below. The upper frequency is above the ideal one octave separation for which it would have to be 1110 Hz.



The smaller gong has frequencies of 780 and 1540 Hz. The upper frequency is a little below the ideal, which would be 1560 Hz. These intervals suggest that the separation depends on the diameter of the nipple and will increase as the nipple diameter is reduced towards zero. It would be interesting to examine the sound spectra of Mong of the same outside diameter, as the size of the central nipple is reduced. *A set of gongs would have to be specially made to do that and would not have good resale value*.