

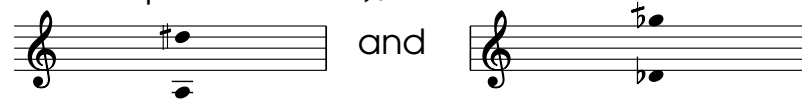
How to Tune a Hammered Dulcimer in Natural Tone Modes:

The modes of interval proportions corresponding to the fifth octave space of the natural tone series, developed in 1987, need a special and additional notation:

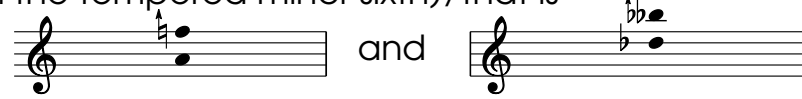
↓ for intervals corresponding to the 7th (14th, 21st, 28th) natural tone (about minus 1/6 tone deviance from the tempered minor seven), that is



♯ and ♭ for the interval corresponding to the 11th (22nd) natural tone (about minus 1/4 tone deviance from the tempered tritone), that is



♯ and ♭♭ for the interval corresponding to the 13th (26th) natural tone (about plus 1/5 tone deviance from the tempered minor sixth), that is



Tuning:

It seems essential to me not to tune with an electronic device, but as far as possible by ear. The necessary steps to follow are described here.

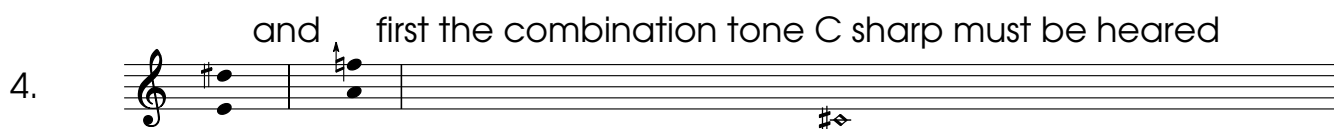
Tuning in mode 1 (in A):

Proportions of chromatic half tones: 16 : 17 : 18 : 19 : 20 : 21 : 22 : 24 : 26 : 27 : 28 : 30 : 32



The fifth C sharp and ↓ G - ↓ D are now perfectly tuned.

Only if the major thirds and minor seventh remain in consonance, i.e. have abandoned all directional and tension characteristics, continue with the next steps.



(which is already tuned and offers resonance), then the "aura" of A major. After that tune the corresponding octaves.



Table of deviances in Cent:



Tuning in mode 2 (in D flat):

Proportions of chromatic half tones: 16 : 17 : 18 : 19 : 20 : 22 : 23 : 24 : 25 : 26 : 28 : 30 : 32

1. perfect fifth of perfect fifth of

2. perfect third of perfect third of and perfect third of

3. natural seventh of

4. and listening to the combination tone as well as to D flat major "aura"

(which is already tuned and offers resonance).
Then tune the following octaves.

5. somewhat sharper than tempered, and minimally flatter.

6. very sharp tritone to the fundamental note; strong leading tone to the fifth.

Table of deviances in Cent:

±0	+5	+4	-2,5	-13,5	+51 from G flat!	+28 *)	+2	-27 *)	-59,5 from B flat!	-31	-12	±0
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*) G and A are noted without special prefix accidentals, even if they differ significantly, in order to keep the score layout readable.

Notes regarding the Invocations in natural modes:

An increasing interest in a differentiated expansion of the tempered tonal systems has led me from around 1985 on to occupy myself more intensely with the laws of acoustic overtone series and from there to the numerical background of musical intervals. Important impulses came from my personal contact with musci theory writer Herrmann Pfrogner (1911-1988) and from his writings. I had not realized before that an interval per se in music offers a specific inner experience, i.e. two pitch levels taken together or as a melody in both directions. Furthermore, I had not realized that an apparently clearly defines interval like "major third" or "minor seventh" can influence the emotional experience in a highly different way when used with different intonation, without any of the versions actually being "wrong".

Shortly after encountering the sound and possibilities of the hammered dulcimer, I tried to tune those twelve chromatic notes differently, i.e. so they are related to one fundamental or basic note, what allowed to use twelve different half note values. Here the long lasting resonance of the dulcimer, which sometimes people consider as a disadvantage, appears in a new light: the notes exactly corresponding to overtones of one low, imaginary) fundamental note sound together. This offers a wider range of consonance and at the same time a wider range of dissonant intervals, without any of them being "off-tune".

Rudi Spring (1992)