

Building and Using the *Physical Score*

2015-2025

Dennis Bathory-Kitsz



Building and Using the *Physical Score*

Dennis Bathory-Kitsz

Copyright ©2025 by Dennis Bathory-Kitsz (ASCAP). All rights reserved. Westleaf Edition W254.

For more information: bathory@maltedmedia.com

Building and Using the *Physical Score*

Dennis Bathory-Kitsz

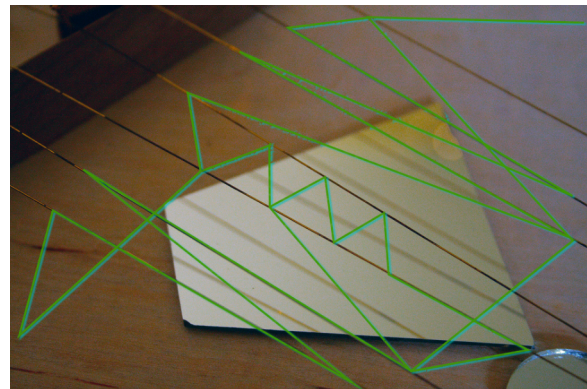
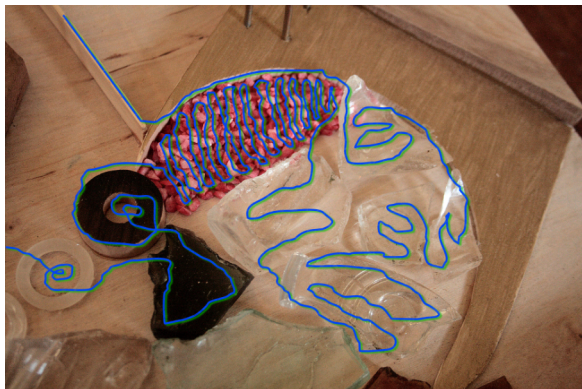
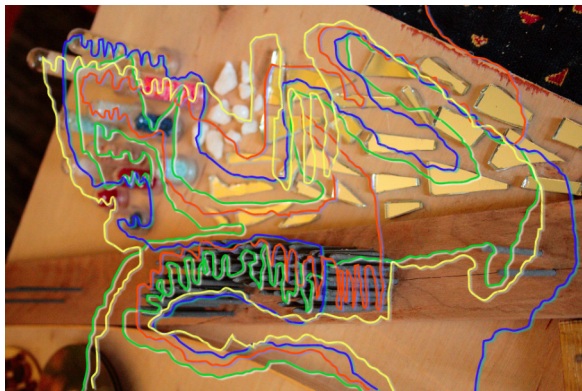
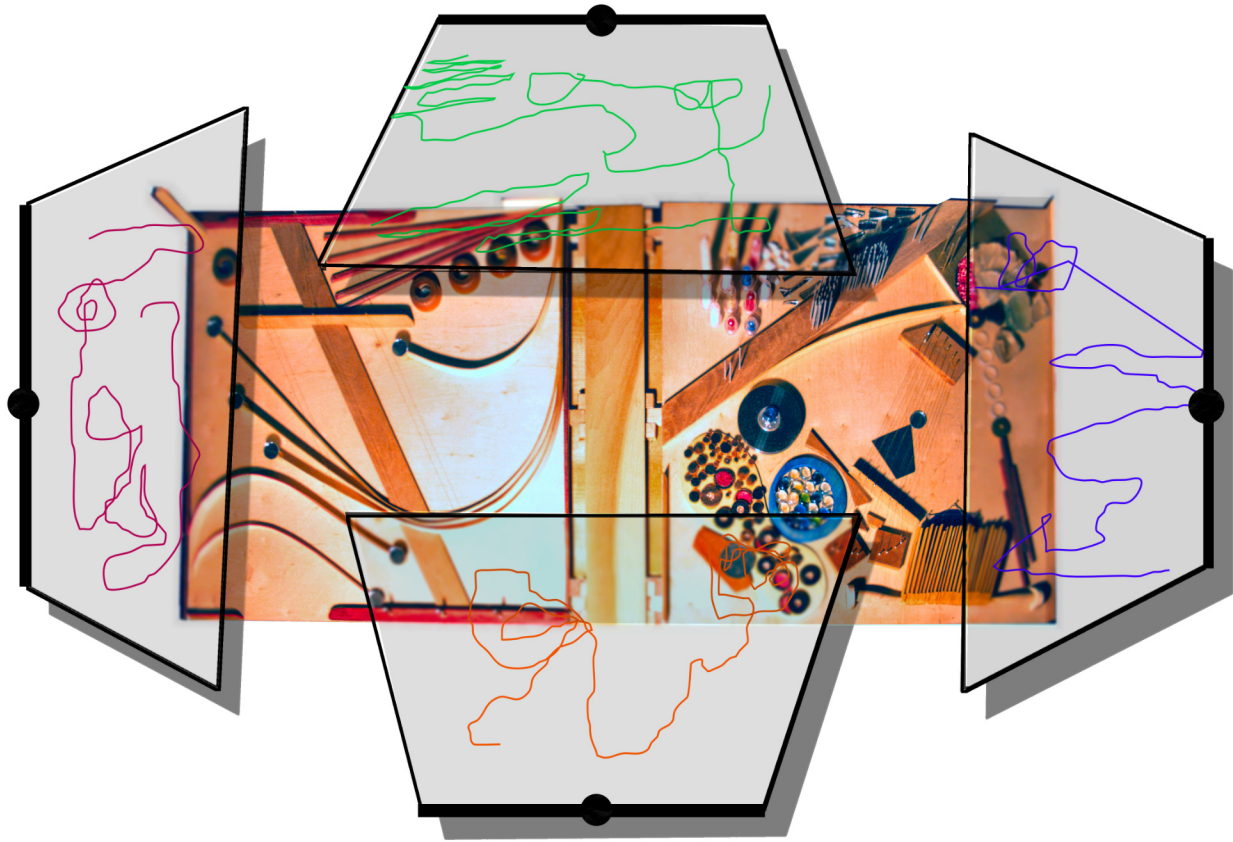


Background and Performance Considerations

The *Physical Score* opens like a book, revealing a wealth of arranged and grouped source materials, with the performers intended to stand at the four sides and look through clear plastic ‘windows’ that are engraved with performance *Pathway Scores*—hand-drawn pathways that change with a performer’s angle, perspective, and movement while looking into the three-dimensional regions of the *Physical Score*.

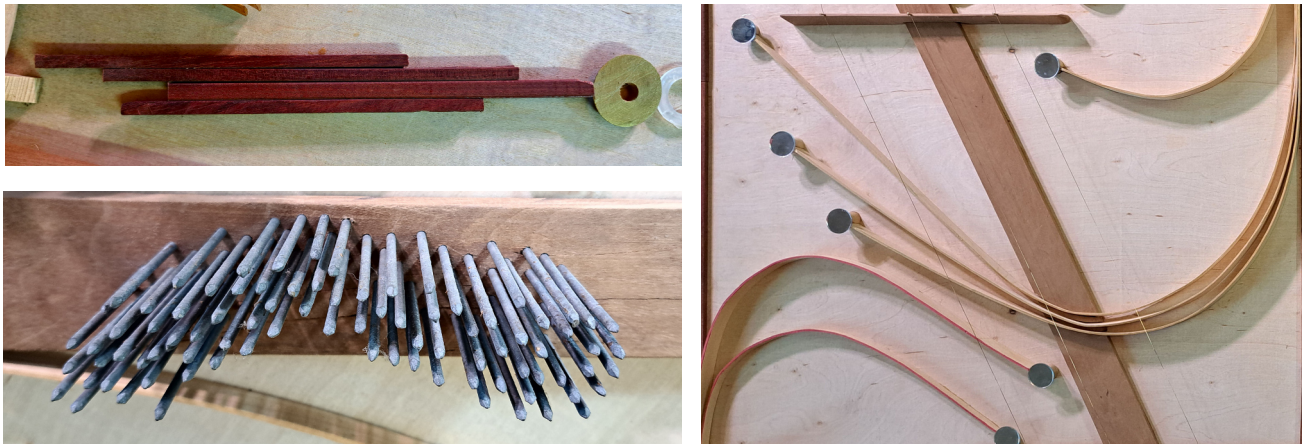
The *Physical Score* was created for the ensemble Reed, Rosin and Pedal during April and May 2015. Sadly, the ensemble disbanded before the score was ready, so an initial set of detailed, multi-movement *Pathway Scores* was never completed.

The *Physical Score* is a framework, an architecture, a source of materials, and a sound sculpture. Though a simple set of pathways is shown in the following photographs, composers or performers are invited to design their own more detailed (and more compositionally astute) *Pathway Scores* through the source materials. The work is conceived as an ensemble piece—though it can be done solo, duo, and trio—and each set of four *Pathway Scores* creates a composition’s movement or major section. Performers agree upon the musical meaning in preparation and rehearsal, and discuss how to express the events that will be performed; their sound, color, dynamics, and tempi; their orchestration, variation, combination, and reappearance; where synchronization and regular rhythm are applied (and where not!); and other musical characteristics, including traditional melody and harmony. The grouped elements can even be considered as Wagnerian *Leitmotiven* or Schoenberg-like *Hauptstimmen/Nebstimmen*, allowing the *Pathway Scores* to re-trace their way through them—perhaps using several felt marker colors. (The *Physical Score* was inspired by the now-lost 1973 *String Quartet No. 1*, which used a two-dimensional graphical source score using transparent overlays with pathways in four colors.)



Pathway Scores can be used effectively by marking beginning and end points, total time, and—most importantly—by demarcating points and areas that act as sections, phrases, or even measures and repeats (see page 14). These can be timed by a clock or by nodded agreement while playing, as with group minimalism. The *Physical Score* and its *Pathway Scores* are **not** intended to be chaotic. As an exercise, an ensemble can have a Haydn string quartet (one they do not know) rewritten by an outside musical consultant or composer as a set of pathways, and then perform it; the result will reflect Haydn, but in a recomposed way.

The use of fixed source materials provides thematic congruity throughout the *Physical Score*. Passing through a ‘density’ can occur from different directions, with the level of density and performance techniques agreed upon before rehearsals begin. For example, the Canon Rods suggest a canonic performance that is melodically shallow and perhaps brief and, because of the staggered placement and different rod sizes, may include different tempi and become more of a round than a fugue. By contrast, the Nail Bed can suggest sharp, dissonant, and clustered or pointillist harmonies, with extended performance techniques; the Nail Bed itself can also be played as a percussion instrument. Depending on entrances and exits, the Bent Bands may be used as single, rising/falling pitches (solo or in harmony) or dynamics or bow pressure or, at a faster tempo, animal howls or stressed machines; the presence of a Bent Band on the right side offers a reference to the left side motives. The three-note harp on the left can also be played, as can the disc platters or the Fir Comb.



Throughout, the variety of woods (types, finishes, colors, and shapes), the presence of different glass (in boules, chips, mirrors, and a bullseye), the similar geometrical elements (such as nine kinds of washers/buttons), the wires and discs (that can be played), and the overall architecture and geometry determine how the composition is built.

Note on the photographs: Since its creation, the *Physical Score* has been carried by hand to be exhibited and examined by possible interpreters. During its travels, it sustained some damage. The photos here were taken after the score was repaired, with a few missing pieces replaced, a few strands of hot glue still occasionally visible, some of the glass tubes switching position, and some dust still gathered here and there. The travel damage is the reason for this manual, as the *Physical Score* will not be moving again until it finds a permanent home in a museum or university collection.

Materials Required to Build the Physical Score

The quantity specified will make an exact copy of the original *Physical Score*.

Luan: both bases (unfinished)

Bloodwood: left pin block, nuts, wooden fan (sealed)

Fir: bent bands, rotating comb, miscellaneous edges (unfinished)

Walnut: bridges, diagonal plates, edge closures (unfinished)

Black cherry: edge braces, support blocks, right pin blocks, spine, base straps (sealed)

Cedar: angled flat pieces on right side (painted)

25 commercial glass jewels (boules)

Small amount of various commercial glass beads

Small amount of uncooked rice, spices, salt

Small stone chips, various colors

11 standard glass or plastic bead tubes and caps, cut to several sizes

11 broken glass pieces, several sizes, ~1.0-2.0 cm

11 small white stones, ~5-8 mm

100 galvanized nails, 6.5 cm (4d, 12.5 gauge)

Harpsichord wire, .018 and 0.022

7 harpsichord tuning pins

24 brass hitch/bridge pins

7 round mirrors, six 2.5 cm, one 5.0 cm

2 trapezoidal mirrors, 6.5 cm long edge, 3.0 and 6.0 cm other edges

25-30 small broken mirror pieces

5 clear plastic washers from bulk CD cases

6 felt bumpers (for tie buttons), 2.5d × 0.6h cm

3 connected hard drive platters with bearings, 9.5 cm

One blue glass bullseye, 10 cm

Small amount of felt sheet (for bullseye hole)

Length of brown nylon twine (for bullseye star and closing ties)

2 tapered rods, 9.0 cm long, tapered diameter ~0.5-1.5 cm

Numerous wooden buttons, ~0.5-1.5 cm

Several wooden washers, 3.0d × 0.5h cm with center hole 1.0 cm

Length of 14 gauge (1.5d mm) brass or copper wire/rod for hinge pins

Red, gold, and green paint



General construction

Use high-strength wood glue for wooden pieces; glue gun for glass, mirrors, and tubes.

Both sides are built on a 60.8×60.8 cm luan base

Full width when open flat, 135.0 cm

Thickness when closed (including straps), 11.5 cm (1 cm gold trim along the edges)

Thickness when closed (include straps and tie buttons), 12.7 cm

Edge brace, $60.8 \times 0.5 \times 0.5$ cm

Front and back straps, $63.0 \times 2.0 \times 1.0$ cm

Base to hinges distance, 63.5 cm

Back hinged spine, $63.0 \times 9.0 \times 0.5$ cm

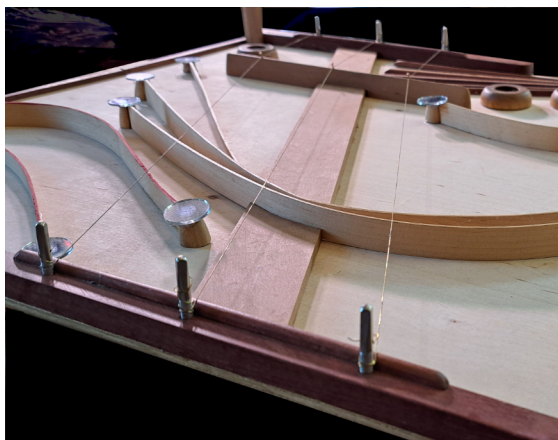
Back hinged spine straps, $11.5 \times 2.0 \times 1.0$ cm

Hinge pins, 7.5 cm, bent to $0.5 \times 6.5 \times 0.5$ cm

Bases are completed first so that all cutting and major gluing and screwing (left pinblocks, diagonal plates, and side braces, glued; right pinblocks and disc array screwed) are finished before attaching straps and hinges. Then the entire score can be laid flat on the front/back base straps and spine to affix the remainder of the source material.



Specific Construction Information



Score left side (the left side becomes the top when closed)

The left side is dedicated to specific placement of objects

Three-string harp (top photo):

Bridge, 2.5×27.5 cm, tapered

Tuning pin blocks, $1.2 \times 1.5 \times 37$ cm

Nuts, $0.5 \times 0.5 \times 22.5$ cm

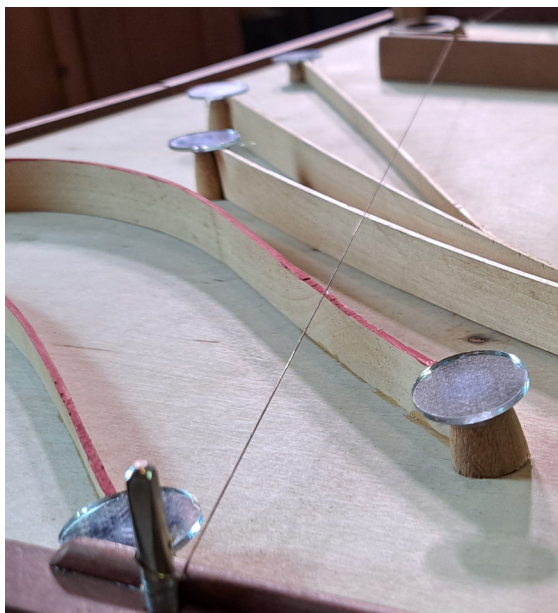
Tuning pins, distance on center, 8.5 cm

Harpsichord wire, .022 gauge

Hitch/bridge pins



Diagonal plate: $0.7 \times 4.5 \times 63.5$ cm, angled 2.5 cm parallelogram, 14.5 cm from right edge, 13.5 cm from left edge. Cut the plate to allow the Bent Bands and bridge to pass through. See top photo. Because of wire tension, fasten with glue and screws.



Wooden fan (second photo): five pieces $0.5 \times 0.5 \times 37.2$ cm, 11.5 cm across open end, tapered where they join.

Four donuts (second photo; parallel to the wooden fan) $4.0d \times 1.5h$ cm, with a hole $2.2d$ cm

Internal jewels (boules) $2.0d \times 1.0h$ cm

One donut (on the other side of the harp), $4.0d \times 1.2h$ cm

Cones and mirrors at end of the bent bands (third photo; see below for details on the bent bands):

Cones, 1.2 cm at top; bottom based on height

Tall cones, 1.5 cm

Short cones, 1.35 cm

Round mirrors, 2.5 cm



Side supports (bottom photo):

Left bottom (front) length, $2.0h$ cm \times 6.5 to 7.0 cm, red top edge

Right top (back) length, $2.0h$ cm \times 9.0 to 9.2 cm, gold top edge

Rounded support blocks, $2.0 \times 0.8 \times 3.5$ cm (top of rounded edge)

Bent Bands (see photo):
A and E = 1.2cm, red top edge
B, C, D, and F = 1.8cm, gold top edge

Bent band **A**:
31 cm chord
13.5 cm top of arc to bottom of instrument base
12 cm radius
3 cm cone to bottom of base

Bent band **B**:
34 cm chord
21 cm top of arc to bottom of instrument base
14 cm radius
9.5 cm cone to bottom of base

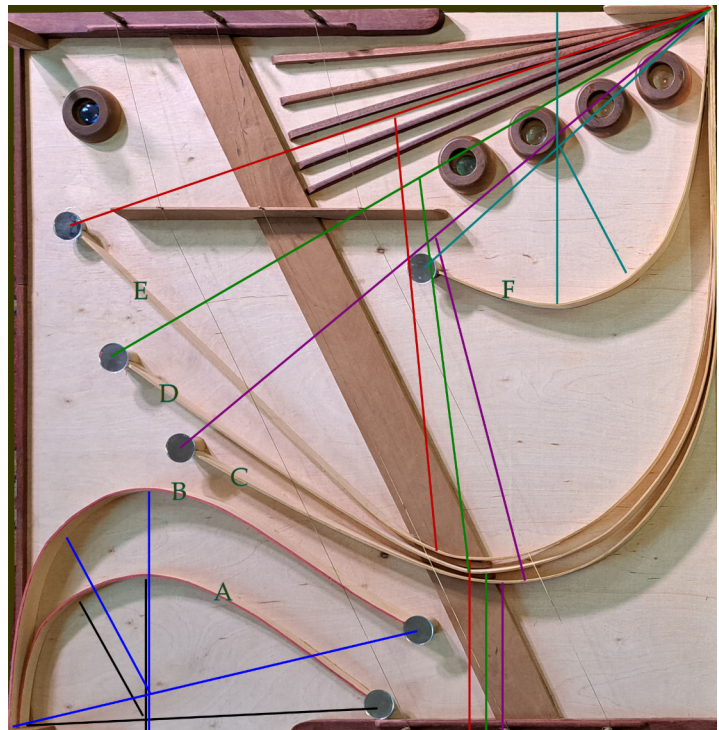
Bent bands **C**, **D**, and **E**:
44, 50.5 and 55 cm chord
13, 14, and 15 cm arc to bottom of instrument base
18.5, 20, and 21.5 cm radius
24.5, 31.5, and 42.5 cm cone to bottom of base

Bent band **F**:
32.5 cm chord to top of instrument base
25.0 cm arc top from top of base
12.0 cm radius
21.5 cm cone to top of base

The above measurements are approximated to 0.5 cm and do not describe the Bent Band curves in detail. Ideally, the photograph should be used to recreate the curves.

To create the wooden curves, the thin fir Bent Bands should be soaked in warm water for at least 24 hours and then bent to match the measurements/ photograph.

The cones are slit so that the end of the Bent Band fits into the side of the cone, and then the cone is glued to the instrument base to hold the assembly in place. The mirrors are hot-glued onto the cones later.



Score right side (*the right side becomes the bottom when closed*)

Much of the right side is dedicated to densities and clusters, so placement may be approximate. Use the photos for details. Wood glue for wooden parts, hot glue for glass, stones, tubes, etc.

Diagonal plate: $4.5 \times 1.0 \times 53/62$ cm trapezoid, 30 cm from top, 43 cm from left.

Nail Bed: Holes are drilled in the diagonal plate and ~95 galvanized nails pushed through before affixing it to the base (see top photo).

A flat, angled plate is cut from a 15.3 cm cedar square with a 13.5 cm circular cutout. Three galvanized nails protrude (see top photo).

A single bent band runs from the left side 36 cm from the top, gently curves, and mates with the flat, angled plate (with the semicircular cutout) 15.3 cm from its end, 9.3 cm from the diagonal plate (see second photo).

11 glass or plastic bead tubes: 2.5 to 8.0 cm, vertically mounted in a cluster 15-25 cm from the top left. Tubes are filled with various colors of stone chips, rice, spices, and salt, and then affixed to the base. A black rubber washer is included for contrast of color and height.

24-tongue Fir Comb: ~13.5 cm total length, with supports and rods.

24 tongues (~1.1 mm \times 1.0 cm) are separated by 23 spacers (~1.8 mm).

Tongues are ~11-12 cm long but somewhat irregular.

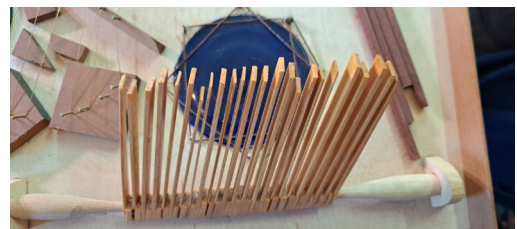
Spacers are ~1.0 \times 1.5 cm.

Tongues and spacers are glued together and then rounded at the back.

The tongue/spacer assembly is drilled so the tapered rods press into each side.

Rounded supports (3.4 cm base \times 3.2 cm high \times 0.8 cm thick) are affixed to the base so that the fir comb rotates but remains secure, staying in its position when released.

This may be adjusted and held in place for the final gluing.



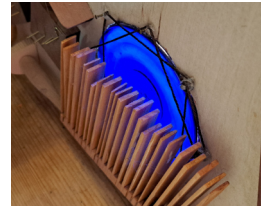
Right closure border: 2.3 cm high \times 60.8 cm long with a 0.8 cm base and tapering to a triangle at the top, like the bridges. It is attached along the full length of the right side base.

Left closure border: 2.3 cm high \times 21 cm long, also tapered, and attached to the bottom left of the base.



The Blue Bullseye is aligned 6.5 cm from the bottom and 11.5 cm from the right side.

It is fitted into a hole cut in the base, held in place by a rim of felt at the outside and a weave of brown twine in an 8-pointed star on the inside. The outside felt is painted gold (even though it cannot be seen when the *Physical Score* is laid flat for playing).



Cedar wooden ring, 12 cm, tapering \sim 0.2-1.0 cm thick. Cut with a 9.5 cm eccentric circle 0.8 cm from the left. It is painted gold. 19 glass boules will fit in the circle. All are affixed as in the photo.



2 squares 4.5 cm on a side and 1.0 cm high are the pin blocks. A $4.0 \times 6.0 \times 8.0$ cm trapezoid of the same material is prepared (see photo). It contains the single tuning pin. A $13 \text{ cm} \times 2 \text{ cm}$ bridge is put into place as shown in the photo, with the 0.18 harpsichord wire wound around hitchpins on the blocks and over the bridge, as in the photo. The tuning pin should be tightened immediately, before the harpsichord wire fixes in place around the hitchpins; after that, the wrapped strings will maintain their one tuning and only the first length of wire will be adjustable.

Four canon rods are placed, 14.5, 14.0, 17.0, and 14.5 cm, with gold plated wood washer 2.5 cm with 0.7 cm hole (see top photo)



Clusters of white stones, tiny colored stones, broken mirror pieces, and broken glass are clustered as if strewn and affixed to the base, as in the second and third photos.



The Amoeba Plate is made of angled cedar covered in wooden buttons and washers. Some of the washers are filled with glass beads while the centers of others are painted red. The Amoeba Plate is just below the eccentric green circle that is filled with boules. Below the Amoeba Plate is a small, raised slab of wood topped by the larger 5.0 cm circular mirror (see fourth photo).

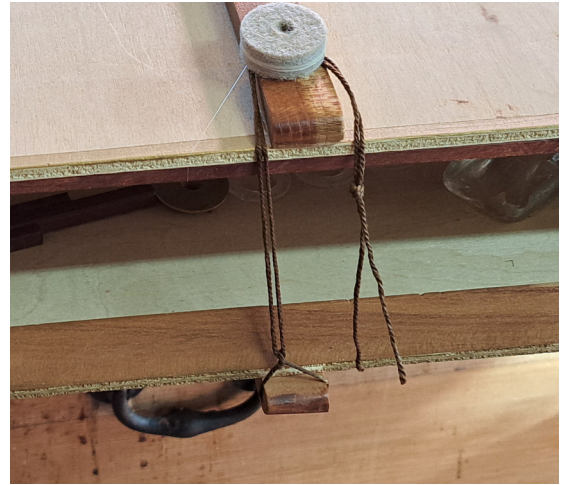
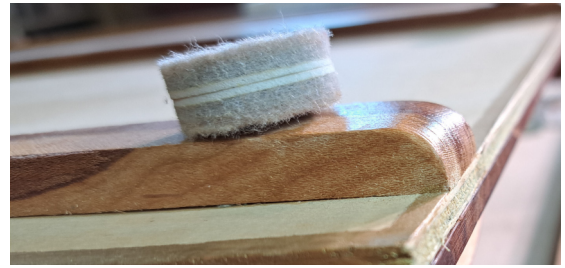


The disc platters are placed above the Amoeba Plate toward the top of the base and are affixed to the base from below. A bolt is used so that the platters can spin freely on their original bearings. A single blue boule is fastened to the axis of the platters (see bottom photo).

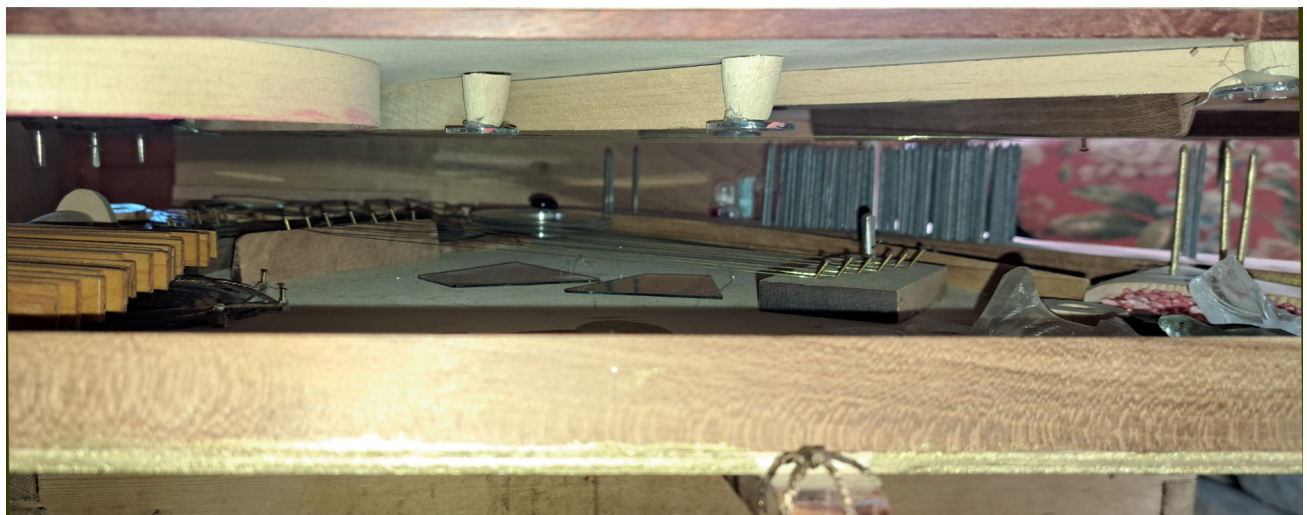


Aside from the hinges, the most structurally important elements are the ties. The ends of the three lower straps are drilled horizontally to accept the nylon twine, tied off on both ends. Affixed by wood screws to the ends of the three upper straps are felt buttons. The *Physical Score* is closed, and the nylon ties are wrapped around the buttons. Keeping the score flat is recommended (and essential if it is to be transported or store for any period of time), but it can temporarily be put on end, with the spine to the back, like a book (see top and second photo).

If the *Physical Score* is to be shipped—not recommended—it is opened flat, biodegradable packing peanuts (usually made from corn starch or potato starch) are poured in to fill every crevice, and then it is closed carefully to avoid disturbing mirrors or tubes. It is then placed in a large box or crate, leaving 25 cm or more space from ends, top, and bottom. The space is filled with biodegradable peanuts. For additional protection, this box should be placed in another, larger box with crushed paper, and labeled ‘This Side Up’ and ‘Fragile’.



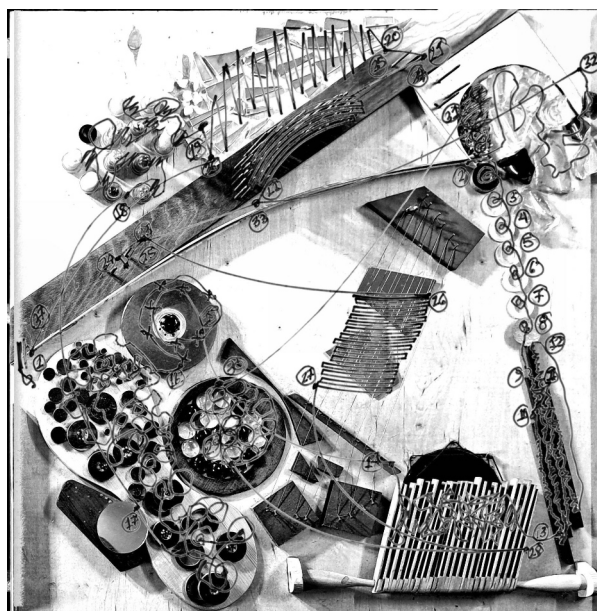
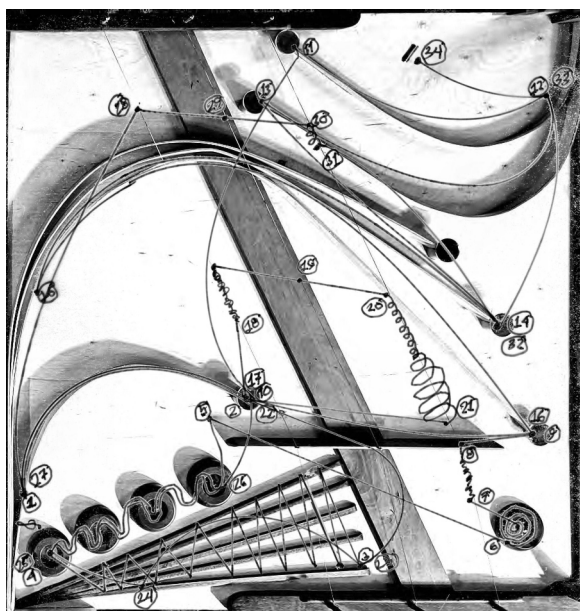
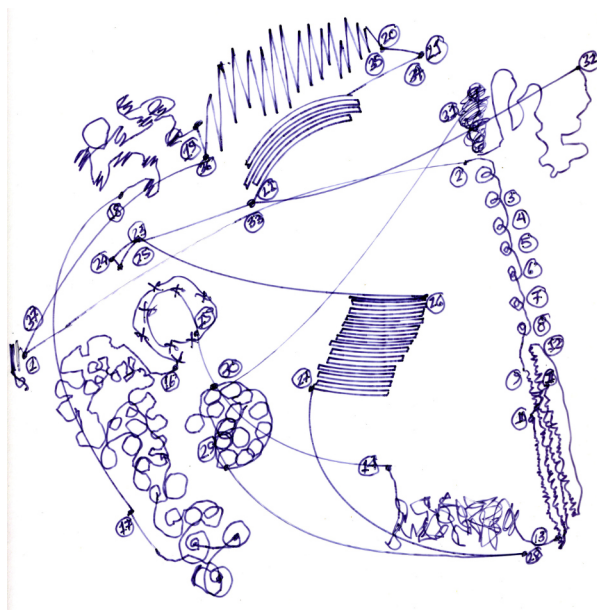
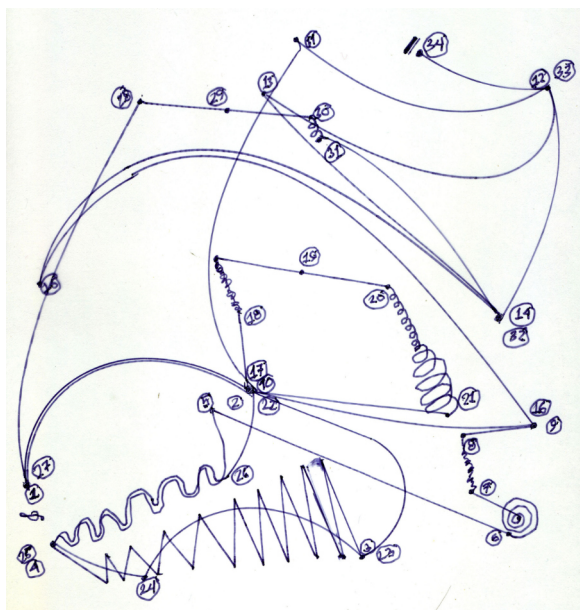
The closed *Physical Score*. (The tie in the bottom photo is not seen wrapped around the button.) All the score’s elements are placed so that the left/right (top/bottom) materials do not come in contact with each other. The rounded left and right side supports exactly stop the top so the front becomes parallel to the back spine.



Sample Overlays

Overlays, called the *Pathway Scores*, are created on transparencies. Performers look at the source material in the *Physical Score* through the *Pathway Scores*.

Hand-drawn *Pathway Scores* may be laid out in specific detail or may lean more toward improvisation or aleatory. Here are two hand-drawn samples for one player who is positioned directly above the score. The first is a slow movement using the left-hand base only, with the player situated looking down at the score at the top edge. The second is a fast movement using the right-hand base only, with the player situated looking down at the score at the bottom edge. The playing begins at the treble clef position (#1 in each) and ends at the final position (#34 and #37 respectively) and the final barline. The sample overlays shown here are incomplete; timing between the numbers determines the tempo, which can be as flexible as desired, and dynamics and expressions—all the elements of a traditional score—are added as needed for a complete, performable work.



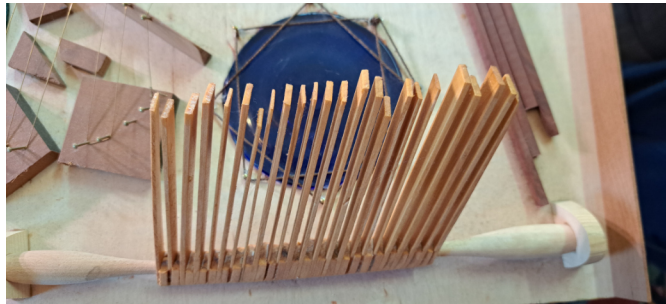
In a live performance, the players will actually be looking from each of the sides of the *Physical Score*, not from above, using an angled, transparent music stand (see page 4). To achieve both of these examples, then, either the *Pathway Score* would need to be stretched vertically or the performer would need to be moving forward and backward to align the image, as well as keeping the image centered.

This is, indeed, one concept of both the score and the parts—that angles are always in flux as is the level of performance detail. It is a collaboration between composer/designer and performers.

Special Properties

Several of the objects in the score have special properties. Among them:

- The strings on the two harps can be played.
- The Fir Comb can be rotated from fully flat to fully vertical, and can be played.



- The disc platters can be spun and played.
- The Nail Bed can be played.
- The Blue Bullseye can be illuminated from behind or from below.

