Introduction to the Harpsichord Fred Sturm
(Kansas City, 2005)

I. History

A. Historic harpsichord flourished from 1500 to 1800. A very sophisticated instrument, well-adapted for the music of its time. Displaced by piano 1750 – 1810.

B. 1800 – 1880, piano develops into modern instrument – louder, more massive. Harpsichord is no longer made, but there is continuing interest in "ancient music" and old harpsichords continue to be played in public in special concerts.

C. Late 1880's, due to perceived demand, **modern harpsichords made by Pleyel and Erard,** with many characteristics copied from pianos (especially massive case and complex mechanism). Other manufacturers soon follow, eg. Neupert, Sperrhake, Wittmayer. Most of these instruments substitute leather plectra for quill, which was far more common historically.

D. Late 1940's, Frank Hubbard and William Dowd initiate the "historic copy" type of modern harpsichord, following original dimensions and structure, using delrin as a plectrum that sounds and behaves much like quill. These instruments, with their lighter construction, are louder and more resonant than the more massive and piano-like predecessors.

E. 1950's, Wolfgang Zuckermann develops the kit instrument, a simplified design made of plywood, sold for $150. Hubbard later sells kit instruments along "historic copy" lines. In the late 1970's, Zuckermann converts to historic copy style as well.

II. Variety of instruments - harpsichords come in many shapes, sizes, designs. Some of the most common are:

A. Single keyboard, single string per note, standard (8 foot) pitch. E.g., Zuckermann 5 foot.

1. Odd-shaped, small instruments, 1 x 8 (sometimes 1 x 4)
    a. Rectangular. E.g., Zuckermann virginal
    b. "Bentside spinet" - spine at acute angle instead of right angle.

B. Single keyboard, two strings per note, both at standard pitch (2 x 8). E.g., "Flemish single manual."

1. Variant: 1 x 8, 1 x 4

C. Two keyboards, three strings per note, 2 x 8, 1 x 4. E.g., "French double manual."

D. Occasionally you will see an instrument with two manuals and four strings per note: 1 x 16, 2 x 8, 1 x 4.

III. Case structure

A. Box construction - bottom is important structural component for stiffening.

B. Inner struts - framing members which provide additional support.

C. Liner - strips of wood providing gluing support for sound board.

IV. Sound board

A. Thin and flexible, generally circa 1/8" thick, often tapered

B. Ribs - do not run under bridges. They provide a degree of stiffening to the remainder of the board.

C. 4 foot hitch pin rail - often present, glued to underside of sound board. When there is a 4 foot register, used for those hitch pins. Otherwise, an additional sound board support.

D. Bridges

1. Glued to unsupported span of sound board - hence, dips in the sound board are common and expected.

2. Generally one bridge pin per string, which provides sole termination for the string. The string contacts a ridge of bridge wood, then the pin. Often there is "back-pinning" of the bridge in the bass section.

3. If there is a **4 foot register**, the 4 foot bridge is thinner and narrower, and its strings are below the level of the 8 foot strings.

V. "Action"

A. Keys

1. Balance rail: round hole at bottom, expanded to a v-shaped mortise slot. Generally un-bushed. Generally the sides of the mortise are parallel and contact the pin from the bottom hole to the top. Sizing of the mortise must be precise to provide free movement, but avoid wobble and noise. There is no room for error here.

2. There is usually no "front rail pin." Instead, most keyboards have a pin protruding from the back of each key, which rides in a perpendicular slotted rail positioned behind the keys. This pin may be bent slightly, or removed and relocated, to address key spacing.

a) A common alternative, especially for upper manuals, is a second "positioning pin" in a rail behind the balance rail. The key has a slot which rides on this pin.

B. Jacks: consist of body, tongue (with spring), and plectrum; often there are adjusting screws at top and/or bottom.

1. The jack rides in two positioning guides. The lower guide locates the bottom of the jack over its key. The upper guide (which is usually mobile and adjustable) locates the upper part of the jack in relation to the string.

2. The upper guide for each rank of jacks is turned "on or off" (engaged or disengaged) by means of a lever protruding over the keys. Some harpsichords have pedal mechanisms for the purpose. Some guides are fixed: always "on." Some have "half-stops" (moving the plectrum so it is not as far under the string, for softer sound).

C. Coupling keyboards

1. The upper keyboard of a two manual instrument slides in (away from the player) to engage with the lower keys, and slides out to disengage. Engagement is via "doglegs" on each individual lower key, which push up on the bottom of each upper manual key.

D. Transposing

1. Some Harpsichords have transposing keyboards, which shift so that the keys contact and activate different jacks. This is a convenience to allow for both modern A440 and early A415 pitches to be played on the same instrument without major re-tuning. A spacer is removed from one side of the keyboard, the keyboard is slid over, and the spacer is replaced on the other side. Caution: if jacks are not held up by their dampers, they can catch during the sliding process. Turn on registers before transposing (and be careful).

VI. Voicing - to replace one broken or missing plectrum

A. Cut the remaining plectrum nearly flush to the front of the tongue, with scalpel or flush cutting nippers.

B. Press remainder of plectrum out of mortise (front to back) with the blade of a small screwdriver, making sure to support the tongue, so as not to break off the return spring.

C. Insert new plectrum of appropriate thickness.

D. Cut to length - so that it extends under/beyond the string by about 1/2 the width of the string. Turn the register "almost off" (ghosting) to compare with neighbors. Trim back of plectrum flush with back of tongue (or leave a bit protruding - but make sure it won't catch on neighboring string when in off position).

E. Make the final end cut a sharp acute angle, and make sure it is smooth.

F. Narrow the plectrum to match its neighbors (trim sides)

G. Thin the plectrum to make loudness and resistance even with neighbors. Corners first, then under side. Use a subtle slicing motion for control and smooth cutting.

VII Tuning

A. Ascertain target pitch: modern? "historic" (commonly A-415)?

B. Check position of transposing keyboard if applicable.

C. Note that a harpsichord can vary by 100¢ or more in response to humidity swings in excess of 50%.

D. Harpsichords have low inharmonicity. Hence, in comparison to pianos, thirds are a bit faster, and octaves can usually be cleaner.

1. On the Accutuner, defaults for FCA are too high for a harpsichord. Tune at 0.0 cents, or create an aural tuning and record it to a page of memory for future use.

2. RCT has pre-loaded templates for harpsichords. Make a copy, and convert to historical temperament of choice. Or use Chameleon to create a tuning, using narrow parameters (2 or 3 octave width).

E. Stability depends entirely on pin manipulation (no hard blows possible). Use a "flex up/flex down" (flexing the pin, not moving it in the block) technique to ensure that pin and string are in a stable state.

F. For major pitch changes, use very little overpull.

G. Temperature affects the pitch of a harpsichord dramatically and rapidly. Keep out of drafts if at all possible, and tune at the temperature it will be played. Cold = sharp, hot = flat. (When you know a harpsichord will be under hot stage lights, compensate by tuning about 3¢ sharp).

VIII. String replacement

A. Material: steel? low carbon? spring brass? red brass? phosphor bronze? (You can tell a lot from looks, and by bending the broken string, if accurate information isn't available).

B. Measure - a micrometer is a must. .007 - .016" steel, .013 - .025" brass are the common range.

C. Tie a tail: match existing. "French knot" is most common, but "German knot" is also used. For a French knot, be sure to hold the wire taut at a 90º angle to form tight spirals that won't slip, especially if using modern steel wire.

D. The tuning pin must usually be removed to replace a string (it's almost impossible to transfer a coil from a dummy pin). 4 - 5" (generally) of extra wire to form coils. Put the tail on its hitch pin (hold in place with a small spring clamp or vise grip), thread through bridge pin and jacks, pull taut, insert wire through bucket (or make preparatory bend if there is no bucket) and wind coil by hand. Pound pin into pin block hole.