**Why do our Glass Harmonicas Cost so Much?**

To begin with, the materials used to make a glass harmonic are expensive, including the quartz glass. Hydrogen and oxygen gas are needed to provide the high heat for flame polishing the cups and these are very expensive. We also have a limited supply of cups, which were made at G. Finkenbeiner, Inc., making it progressively harder to select cups for an instrument. We do not have the equipment to make our own cups, and the instruments would be even more expensive if we had the cups made somewhere else.

The building of our glass harmonicas is time intensive. First, a set of cups is carefully selected for tone and fit. Then, because no cup is perfectly round, we trim them to try to offset the out of round. Next, each cup must be tuned. Cutting the neck of a cup lowers the pitch; cutting the playing end raises the pitch. Frequently, hydrofluoric acid is used to bring down pitches when cutting away the neck is not enough.

Next, the cups are flame polished. After polishing, the sharp notes are carefully painted inside the playing edge with liquid gold, which is then baked on at high heat.

Now, the cups are ready for corking. Often, even after trimming the cups to offset the out of round, they are still in need of more help. In those cases, we create corks with slightly off-center holes to offset the out of round. We strive to have minimal “bouncing” of the cups as they rotate, so that musicians can more easily maintain contact with the playing edges.

The remaining assembly includes many steps. The most important step is checking the tuning of all of the cups once they are nested on the spindle. Nesting changes pitches, typically bringing them down. Sometimes, we have to de-cork a cup and re-tune it.

There is no perfect prediction for what a cup’s final tone will be when it is surrounded by other cups. Note that for this reason, no glass harmonica ever has all perfect pitches. If we strove to achieve all perfect pitches, the instrument would never be finished. To guide our tuning practices, we have calculated the

average frequencies of pre- and post-nested cups from multiple glass harmonicas.