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DERIVATION OF THE STRADIVARI CORNER BLOCK

Just where and how large a corner block should be isn't really a problem we think of until we have to make a new mold working backwards from an existing violin. In the course of developing a system that would be easy to communicate to my workshop students I started more closely examining how Stradivari dealt with this problem. When I started, makers didn't have much to go on, but now with Francois Denis' excellent book on outline design and Stewart Pollens' book about Stradivari forms, it's possible to access full-size reproductions of 12 separate Stradivari forms, with 21 surviving corner block templates (out of the possible 48) available for those forms.

In the past, I had noticed several things about the workshop realities of corner blocks. First, it's easier if the block span only includes a single curve. That means that it shouldn't reach so far north and south into the upper or lower bouts that the curve starts to change. This single-arc shape makes the block easier to shape, and the counterform used to clamp the rib to the block is a simple curve. In my first forms, I used this as my guide for where to place the boundaries of my blocks, but something was still not quite right--the place to end the block was not well-defined, especially when working from outlines of old instruments, and I sometimes ended up unequally-sized blocks and with ribs slipping when they were glued and clamped to the form..

This led to my second realization: in order for the rib not to slip when clamped to the block it's desirable that the bottom of the curve should be in the middle of the block, and clamping should be in line with that. This was not happening with my forms. Of course, when I realized the problem, I also realized that it was easy to fix in new forms, and make the curve symmetrical to the clamping center by choosing how large the block should be, relative to the curve. So the block wasn't necessarily the size of the whole concave curve--just enough of it to center the clamping force on the block and rib. (It wasn't until the end of my analysis that I realized that working from instruments had obscured that the block did encompass the full curve, and that the curve was symmetrical, as well. We'll get there in a couple of paragraphs.)

The third realization came when I started thinking of the curves approaching the corners in a new way, and that was to consider the location of the deepest part of the curve relative to the end of the corner. Considering how this relates to the shape of the block, in

looking at finished violins, it's best to look at the line of the inside of the purfling as a rough guide. I soon realized that the upper curve of the c-bout, over the block, is not very far from the end of the corner, and the curve doesn't turn back down much, but the mirrored curve on the bottom of the c is deeper, and bottoms out farther in from the corner.

In my new way of thinking of balanced clamping, this implied an upper block that was slightly narrower than the lower block, and, indeed, the surviving Stradivari molds indicate that Stradivari was doing this. This conclusion also gave me the idea of a symmetrical curve around the center of the clamping direction, which defined the size of block needed and also led to another interesting relationship. This idea of balanced clamping also implied that the outer corners of the block mortises in the mold might turn out to be level with the tips of the corners. Imagine my surprise in checking the 21 original Stradivari corner templates to discover that this is indeed the case, in a majority of the cases.

[The next three paragraphs are optional reading!]

The 21 original templates provide 42 references (each has a c-bout curve, and an outer bout corner curve). When measuring, I discovered first that the inner, c-bout, curves corresponded extremely well with this idea. Out of 21 examples, only two are not perfectly aligned, those two having the corner end less than one mm inside where it could be expected to end.

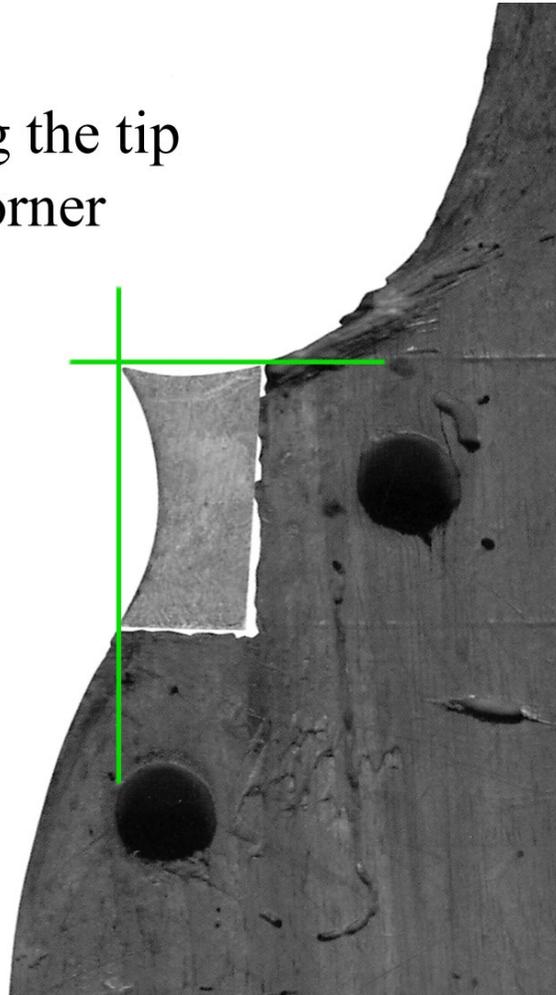
The situation with the outer curves is less clear, but still convincing. Eight have the corner ending precisely even with the corresponding edge of the mortise. Twelve fall outside, mostly within one mm, though, and one falls inside. When all of the variations are averaged, the result is a corner a few tenths of a mm longer than expected.

Of the forms available, the MS21 mold has three of its four outer curves extending beyond what was expected. The MS33 and MS49 molds each have only two corner templates, and both of those extend beyond the mortise. The stand-out in the other direction is Pollens' illustration of MS11, where the tip may project 3mm on one corner of two shown. The template is misaligned in Pollens' photo, making the actual error somewhat difficult to measure. That there is only this one outlier suggests that a very maximum of 1mm extra horizontal component of corner length isn't unreasonable, but that shorter corners would be. Remember, however, that the average length beyond the box defined by the block mortise is mere tenths of a mm. This distance may have been slightly sacrificed to favor more precision in the vertical direction, given how incredibly minimally that vertical dimension moves on the original templates.

With all of these observations in consideration, I can come to the conclusion that the

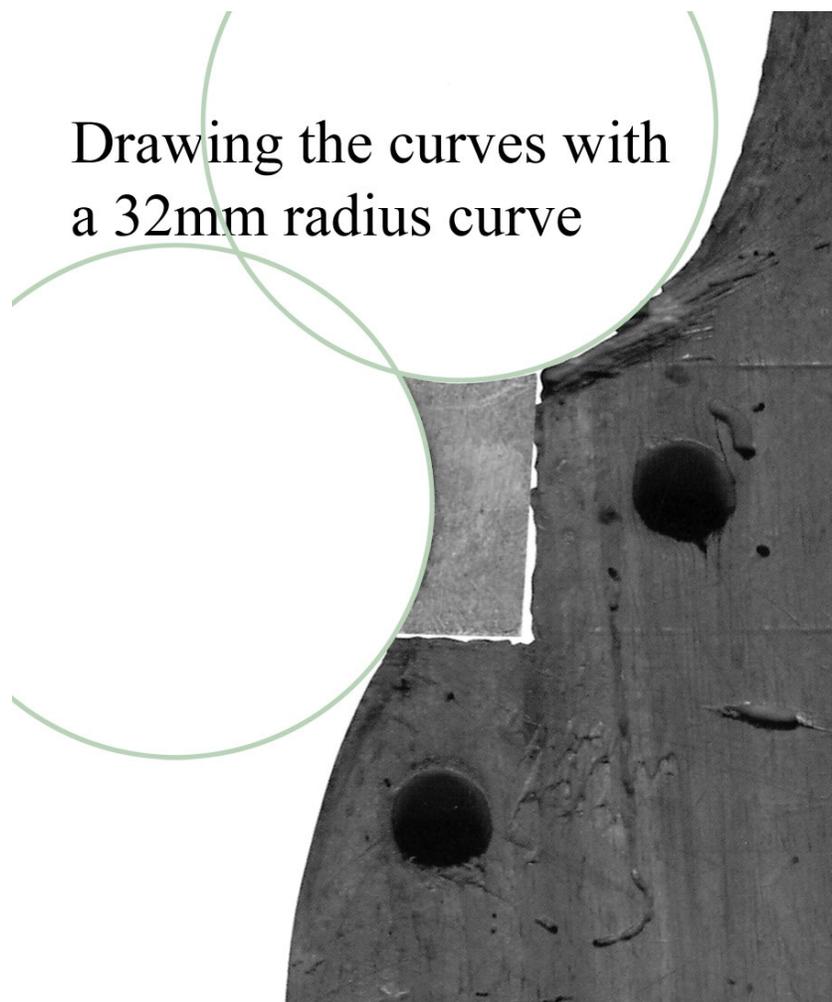
location of the very tips of the corners should be defined by the boundaries of the block mortises in the mold, extended out square or parallel to the mold's centerline. If an error is to be made, then according to what Stradivari had done, extra horizontal extension is the most likely direction to extend the corner if necessary to give the correct vertical orientation., but, conversely, the corner should certainly not be smaller in any direction.

Locating the tip of the corner



This leaves one further consideration for completing the corner block shapes, and that is the radius of the curves that make the corner block shapes. Using a small plastic circle template on the surviving Stradivari blocks, the answer becomes surprisingly direct. Remember those arcs that are scribed on the front of nearly every Stradivari mold,

representing distances between about 29.5mm and 30.5mm for the shorter arc, and 31.5-32.5mm for the larger? Neither Denis nor Pollens gives them any discussion at all, yet the average of the larger of the two arcs, ~32mm, appears all over the violin in various places beyond the rib height suggestion made decades ago by S.F. Sacconi. Well, they make an appearance here, too. The curves of all 21 existing Stradivari corner templates, 42 curves total, appear to be very close to the larger measurement, which is approximately 32mm in the average on the forms on which it is marked.



This makes developing a corner on a properly replicated Stradivari form extremely easy to do without any corner templates at all:

First, square off on the block, parallel or square to the form centerline, lines representing the corners of the mortise.

Next, hang a 32mm arc between the corner where the mold meets the block and the crossing representing the tip of the corner.

That's all there is to it!

There are a couple of further considerations in making a mold. The first is to observe that Stradivari's corner block cutouts are not at a right angle, but are obtuse by several degrees, in most cases. I believe the reason for this is that if squared blocks are glued to those tilted surfaces, there will be a tiny gap between the block and the upper or lower bout. This gap, about 2mm, makes removing the rib set from the form easier when the linings are in place. It's not necessary to observe this convention, though, especially if as much of the inside of the block as possible is trimmed away before attempting to remove the ribs from the form.

Another issue is Stradivari's placement of the holes used for clamping the ribs to the blocks. In virtually all cases, the holes for the outer bout ribs are directly in from the center of the block, making for the most stable clamping situation. In placing the holes for clamping the c-bout ribs, however, the situation is chaotic, at best. These clamping holes are located at various distances from the blocks, even on the same mold, and at different angles to the blocks, even on the same mold. For some reason, his procedure for clamping the c-bouts was more randomly arranged, which may imply a technique we don't, at this point, know, such as some type of a larger counter form for the c-bout. It does imply that the same method of blocks and ties that we're familiar with may not be correct or sufficient understanding how Stradivari actually clamped the c-bout ribs.