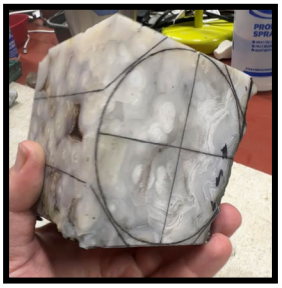
Sphere Making by Hand

By Corey Beer

I started by measuring this Luna agate from the shortest of the three dimensions to see what the maximum possible sphere size would be, and it came out to exactly 3½ inches. The other two dimensions were larger, so I picked the best spot from the center and roughly drew my cutting lines so I'd know what area to keep outside of. It didn't matter if my cuts were perfect because the final surface of the sphere is completely enclosed within this block, so I've got a lot of leeway on how I chop it up.

Once I had gotten the big block cut down into more or less a perfect cube, the first step was to measure out and find the center on four edges of one of the six faces so that I could draw that "X" across the face and find the exact center. Once I found that point, I drew the 3½ inch circle centered on it. I then drew four 45 degree angles on each corner of the cube that got as close to the circle as I could get them. Then using a ruler, at the points where that 45 degree angle came to the corner of the cube, I continued that line straight down the other 4 sides of the cube so I had could see exactly where I was cutting. Once I was happy how that was all laid out, I traced it all in a fine point Sharpie so it wouldn't just wash off in the oil.



The first cut was one of the harder ones because I had to cut that corner off in the vertical position, and it was just at the very top edge of my 10" saw. Once that cut was made, I could then lay it on that face, and make the next corner cut because it was 90 degrees to the 2 corners left to it. Then just rinse and repeat, and once I'm done, I have an octagon with all 8 sides about the same length. These corner cuts are great for cabbing by the way, so don't just chuck them out.

The next step was to start by rotating the shape 90 degrees from the side I first drew the circle on and repeat those same steps by finding the center, drawing a circle centered on that point, then drawing 45 degree angles on the corners and extending those lines down to show where my cuts would go. Once I sliced those 4 corners off, I rotated it 90 degrees one last time and just freehand guessed as to where to cut those last four corners were, using the other cuts as references on how deep to make those last four.

With all the planning and trimming done, I could finally start grinding the sphere to shape using one of the 8" grinding wheels. The first step is to take down any of the major corners on the sphere by using the diamond on the edge of the wheel to carve it away much quicker than it would be possible to do using just the front face of the wheel.

I ground on the piece for quite a while until I had the final sphere mostly isolated from where it started. All that was left were those four corners which, after using the edges of the wheels to lower the area around them, ground away pretty quickly. After that it was just a while of refining the shape, slowly removing material and getting it closer to where I wanted.

Once I was mostly happy with the shape, I moved over to the 220 grit wheel on my Genie where I kept smoothing it out further, getting it nearly perfect. The third wheel (280 grit) was by far the most grueling step of this whole process because there were still MANY small flat spots and scratches and bumps that weren't visible unless I looked closely, but they would have been major flaws in the finished piece if not sanded out. To remove them, I inspected the sphere with a strong raking light source and circled each scratch I could see with a sharpie, and then spent probably three hours just very slowly working the sphere down, getting rid of each and every one of those scratches.

Once that step was done, the 600, 1200, and 3000 grit wheels were a breeze, only eight to ten minutes apiece. The sphere was then finished off to a high polish using cerium oxide on a leather wheel.

Before I started this project, the rough was 6+ pounds and the maximum possible size of sphere I could have made was 3½ inches. After all the trimming and grinding, it finished out at 1.83 pounds and 3¼ inches in diameter, which I'd say is really quite a good outcome, considering it was all done by hand and the inaccuracies that come from that.