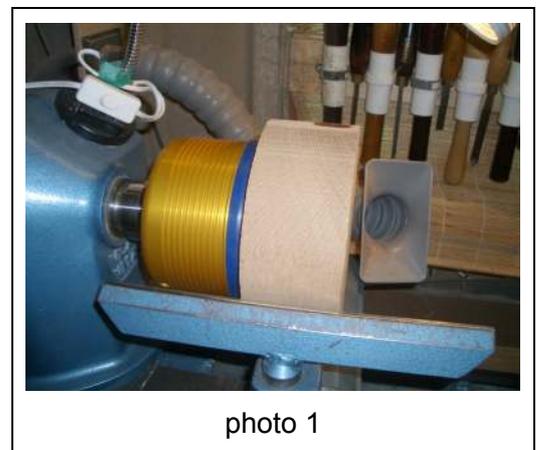


When the Air Press Company lent me one of their vacuum chucking systems to test and review for *The Woodworker and Woodturner* I was very impressed with the quality of the 150mm (six inch) chuck they sent. This chuck is larger than my home-made chuck and should hold the workpiece much more securely. I wanted to really put the chuck through its paces so I decided to try making a bowl from start to finish on the vacuum chuck. I was sceptical about this, and although I've been told it can be done, it's not something I had ever tried before.

I started with a piece of oak roughly 7" diameter by 3" thick. This was rough sawn, straight from the sawmill and when brought up to the chuck, the surface contact was not good enough to make an airtight seal and so the vacuum would not form to grip the piece. However, from experience of my own chuck, I knew that the rubber seal on the chuck is flexible for this very reason. By using pressure from the tailstock to force the blank onto the chuck, the rubber distorts and a seal is eventually formed. The vacuum grips the wood and the tailstock can then be withdrawn leaving the blank held on the chuck by vacuum only (**photo 1**).

The gauge was showing a vacuum of minus 15 inches of mercury, worryingly low for what I had in mind, but this was a test after all, so I put on full-face protection, just in case, and carefully carried on. All went well for a few minutes until I had a dig-in which immediately knocked the blank off the chuck and sent it bouncing around the workshop. 'Ah! I was right, it doesn't work', I thought, but no great harm was done, either to me or the blank (**photo 2**), so I replaced it and tried again. I did, however, take the precaution of sharpening the gouge and marking the centre of the blank with a pencil so that, if it came off again, I could re-centre it easily, using the tailstock revolving centre.



Well, I am pleased and a little surprised to report that, taking care to keep the cuts light, the remainder of the outside of the bowl was turned without the slightest mishap. The chuck held the work satisfactorily and it was sanded, sealed and polished in the usual way, *including the foot* (**photo 3**). This was very different for me, as I would normally turn a spigot on the foot to hold the bowl when I reversed it. It felt quite strange finishing the outside completely without leaving any visible means of holding it in order to hollow it out.



The bowl was reversed and its lower part set in the chuck (**photo 4**). There then followed a lengthy trial and error session to try to get it centralised and turning true. This is essential because otherwise the walls of the bowl will vary in thickness around the circumference of the bowl – a bit of unintentional off-centre turning. What makes it difficult is that, even with the air-inlet partially open to reduce the vacuum, it's hard to get smooth movement of the blank. To get it moving at all, you have to apply just a little more force than was strictly needed – and then the blank suddenly moves more than you wanted it to. You end up giving it little nudges with the heel of your hand, backwards and forwards in little jerks until you eventually get it where you want it.

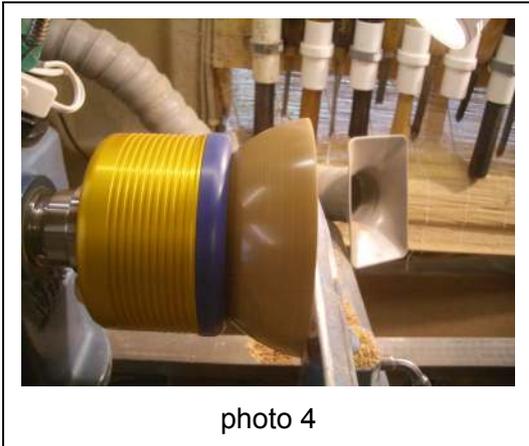


photo 4

To help solve the problem I brought the tool rest up close to the edge of the bowl and made continual adjustments until the gap between bowl and rest remained the same when the bowl was rotated by hand. It took several minutes to get it right, and even then it was more by luck than judgement. Try as I might, I can't think of a better way of doing this than by trial and error. Thankfully, it is not normally a problem for me when I utilise my usual, spigot, method of workholding.

The polished part of the bowl was now against the chuck, so there was no problem with the seal, and the vacuum was much improved (now minus 17.5 in Hg). I approached it cautiously, not wanting to move the bowl on the chuck, and the hollowing went smoothly enough (**photo 5**).



photo 5



photo 6

To some extent the bowl sits *inside* the vacuum chuck and an advantage of this is that the bowl is supported by the chuck much further up the walls than if it had been held by a spigot in the conventional way. This extra support helped to keep the walls steady while the internal cuts were taken. However, I soon realised that, because the bottom of the bowl is inside the chuck, I couldn't get callipers, or fingers, anywhere near it to judge its thickness. This was an unforeseen disadvantage of the chuck. However, knowing that the blank was 3" thick to start with and 'guesstimating' how much of the thickness I had

removed already, I decided I could go to a depth of about two and a quarter inches (**photo 6**). This worked out reasonably well, but the bottom of the finished bowl is a little thicker than I originally intended. Sanding and polishing were uneventful and the bowl was soon finished (**photo 7**).

I was quite impressed with how well the vacuum chuck had held the workpiece, but was also conscious that the bowl was only an inch bigger than the chuck itself. Making a bigger bowl would be much more of a test.

Spurred on by my previous success, I selected a sycamore blank around 3" thick and 14" in diameter. It had a rather nasty crack in it but I thought I would be able to 'lose' this as I shaped the outside. This is the biggest diameter I can accommodate over the bed bars on this lathe



photo 7



photo 8

and represents a much stiffer test of the vacuum system's abilities. I held the blank, as before, directly onto the vacuum chuck (**photo 8**).

Again, I had to use the tailstock to press it onto the chuck until it gripped and again the gauge showed a vacuum of minus 15 in Hg. In view of the size of the blank, I didn't really feel very happy with this because my own home-made vacuum chuck normally operates at around minus 22 in Hg - about a 50% stronger vacuum. I was conscious that I was following what was to me a still unfamiliar procedure, with what I considered to be a possibly inadequate vacuum.

Nevertheless, armed with face mask, newly sharpened bowl gouge and nerves of steel, I pressed on.

Forewarned by the way the dig-in had unseated the previous bowl, I was very aware that this piece was now overhanging the chuck to a much greater extent. However, despite my misgivings, I intentionally took some quite heavy cuts. I wanted to know whether I could treat this blank in the same way as if it were held on a screw chuck, which is my normal method.

I feared that I might bring the blank off at any moment, but I needn't have worried. The vacuum held the blank securely through the heaviest of these cuts (**photo 9**). Of course, I didn't attempt to take a ridiculously heavy cut. I daresay I could have knocked the blank off the chuck if I was really trying to, but testing to destruction was not the aim of the exercise.



photo 9

The outside was finished and polished (**photo 10**) and the bowl reversed as before. Again a few minutes of frustrating trial and error were needed to get it running true (**photo 11**). An important point here – make sure the foot of your bowl will either fit completely *inside* the chuck or completely *outside*. If it sits *on* the rubber, you will have a problem centralising and gripping your work.



photo 10

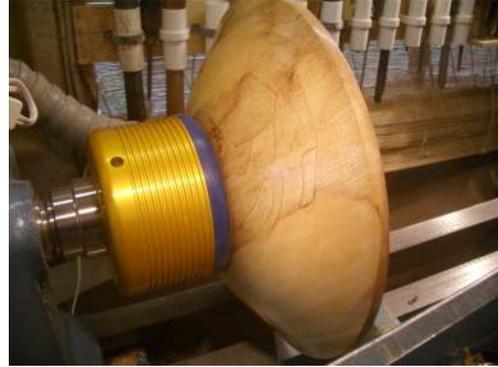


photo 11

Turning the inside of the bowl progressed with no problems (**photo 12**). In fact, I almost forgot that I was using a vacuum chuck and removed the waste as quickly as I would have if the bowl were held on a spigot. The bowl was soon finished, sanded and polished (**photo 13**).



photo 12

So, will I continue to make my bowls this way? Probably not, although I could find no fault with the vacuum chuck and it certainly held the blank securely enough for me to complete the bowls. As I've said before in these pages, I can't see the point in holding a heavy blank on a vacuum chuck. For hardly any extra effort, I can hold it much more securely on a screw chuck or a spigot and don't have to waste time trying to centre it. It's always fun, though, to try something new, and I have two rather nice bowls to show for it.



photo 13