Revolutions

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Turning Ovals

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Oval or elliptical woodturning has traditionally referred to turning, where the axis moves during the course of each revolution, relative to the cutting tool, in order to directly form an oval profile, using specialist equipment. Such equipment is out of reach of most of us woodturners, so this article is titled 'Turning Ovals', since I am including several different ways of creating ovals based on normal woodturning, where the tool cuts a circular shape, based on a fixed axis.

'Oval Turning' has been carried out in Europe since the 16th century, mostly using a rose engine lathe. Mid 19th to 20th centuries were the heyday for oval turning and Germany in particular had many factories producing thousands of oval items, mainly frames for pictures, photographs and mirrors. Ovals can be turned on a rose engine, because the headstock pivots back and forth every revolution. Such equipment is very expensive, unless you make your own. In the UK, the Society of Ornamental Turners helps to maintain interest in this type of turning.

A second method of turning ovals is to use a normal lathe with a special oval or elliptical chuck. David Springett in his book 'Adventures in Woodturning' describes in detail how to make your own oval chuck. Vicmarc make an 'oval turning attachment', but the cost is at least £3,000!

An ellipse shape is a specific geometric shape with symmetry on two perpendicular axes, whereas an oval is more a general term and only needs one axis of symmetry, essentially a squashed circle. Strictly the 3-D versions are called ellipsoids and ovoids. The asymmetrical 'egg-shape' is a common version and many turners will have made an egg or egg box.

I describe below various methods for producing oval shapes using little more than a standard lathe and bandsaw.

The simplest method is to spindle turn a blank into an ovoid shape. If it is to be hollow, a spigot can be turned on each end, then the ovoid cut into two, and each half hollowed separately. For a box, a narrow half joint can be formed on each half, as in one of my egg boxes made from 12mm thick Corian offcuts glued together, photo 1. This half joint incorporates a cast and turned pewter ring.

Alternatively, the two halves can be glued back together again with the grain matched up, preferably with a small concealed half joint here too, to ensure the shape of each half matches exactly and provide some longitudinal surfaces for better glue strength, especially if wall thickness is very thin. See my pierced egg, photo 2.

Photo 1

For oval bowls, the method is usually modified. Start with the above method for eggs, including hollowing out and gluing back together – measures may need to be considered to ensure grain matching and to conceal the glued joint. The piece then needs to be sawn in half longitudinally; either by hand or on a bandsaw. This is easiest if a short length of the original square section is left unturned at each end to prevent twisting or rolling when sawing. The pair of bowls in photo 3 were produced this way. Decoration was by painting the inside dark blue, then dabbing on a light blue with a sponge. The second bowl had the dark and light blue reversed. To stand level, a simple flat base can be formed by sanding away a few mm. Allowance for this reduced base thickness needs to be made when deciding on hollowing wall thickness.

Photo 2

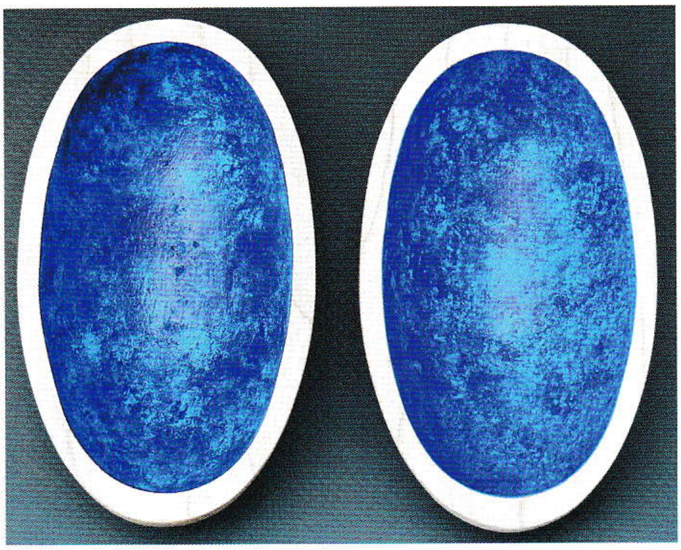


Photo 3

A simpler method is to miss out the transverse cut and the hollowing. After cutting in half longitudinally, the hemi-ovoid can be mounted on the lathe and a circular bowl shape formed inside, rather than the previous oval. An alternative is to first saw the square section in half, then glue together again with paper in the joint, before turning. The two halves can then be split apart at this joint, rather than sawing

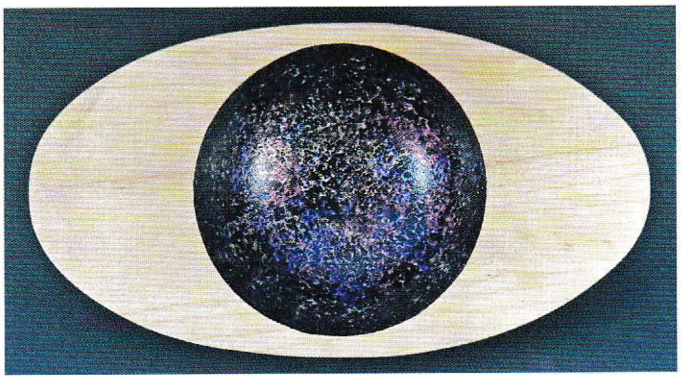


Photo 4

through the oval. Photo 4 shows a bowl made using the paper joint method. Internal decoration was with iridescent paints over a black base coat.

Instead of hollowing the inside as for a normal circular bowl, the inside can be carved out to an oval shape using power carvers, discs and burrs. The holly leaf bowl in photo 5 used this method, but the longitudinal cut was 15mm offset, to provide more slope on the rim. The oval rim was reformed as a scalloped edge using a drum sander.

Photo 5

For narrow ovoids, a simple method is to glue two bowls together at their rims to produce a hollow oval section. The turning is done cross grained and each bowl should be the same diameter, preferably from the same piece of wood and glued together with matching grain direction, mainly for appearance, but in addition if grains are not in same direction differential movement at the glued joint may well cause problems. A very narrow version with flattened centres that used this method is shown in photo 6, my pierced and coloured discus.

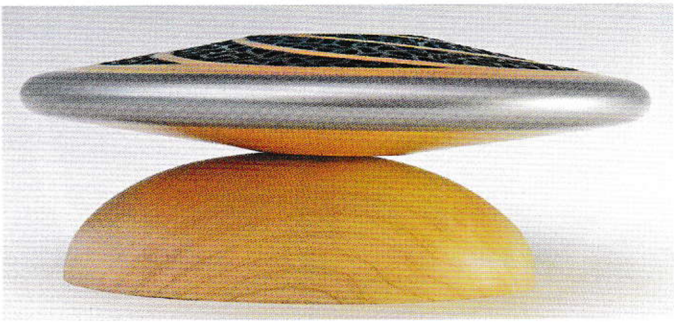


Photo 6

The 'lost wood' process is another way of producing an ovoid, but the ends will have a degree of pointedness, which can be rounded slightly by sanding if desired. The blank can be made up from 3 boards of appropriate thickness glued together with two paper joints, see diagram 7, which has a sacrificial central slice width of 0.2 x diameter. After turning to round and shaping, the centre section is removed and the two side pieces glued back together. An example is the boat box in photo 8. This is a more pointed oval than in the sketch, having a wider central slice thickness of 0.3 x diameter.

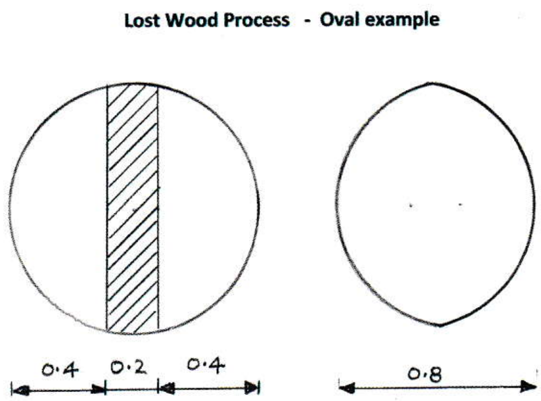


Diagram 7

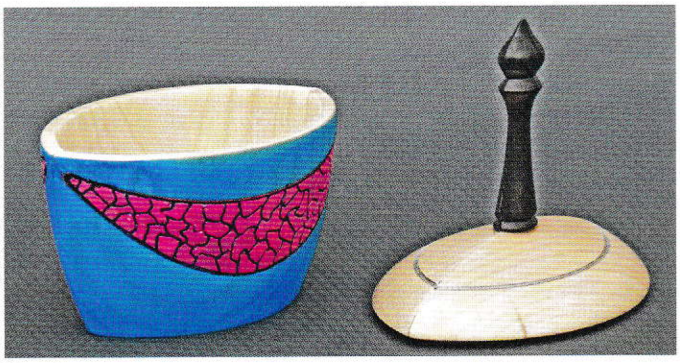


Photo 8

A better approximation of an oval can be produced using a multi-axis approach. The long sides are shaped using offset centres each side of the wood blank and the ends are shaped with a smaller radius arc centred at the centre of the piece. Diagram 9 shows a possible arrangement of the 3 centres and two different radii. This was a method I saw demonstrated online by the American Rod Raines. He showed how to produce an oval section box with straight vertical sides and a sphere as a lid. I developed the idea further and produced several lidded vessels or boxes with a new variation added each time; the decoration was also different for each one. Rather than his spherical lids, I used lids with finials that add interest and make them easier to lift up.

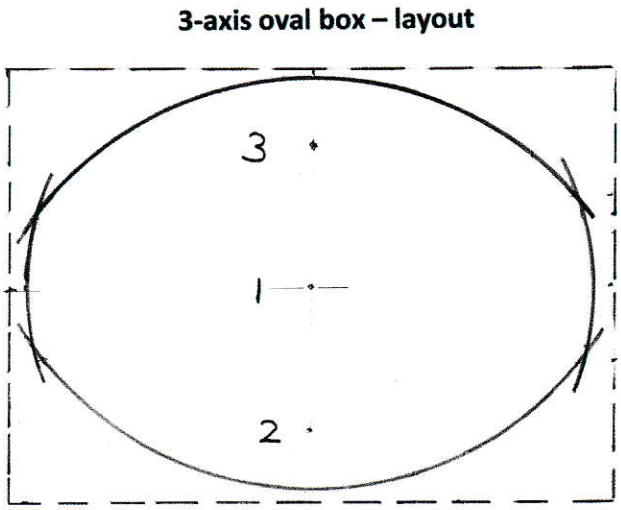
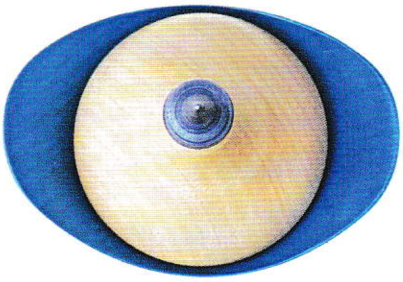


Diagram 9

Vertical straight sides. photo 10.

Photo 10

Tapered straight sides, photos 11a & b, which shows the oval cross-section more clearly.



Photos 11a & 11b

Tapered concave sides, photo 12.

Twisted tapered concave sides, photo 13.

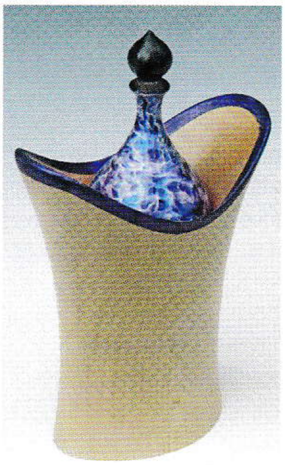


Photo 12

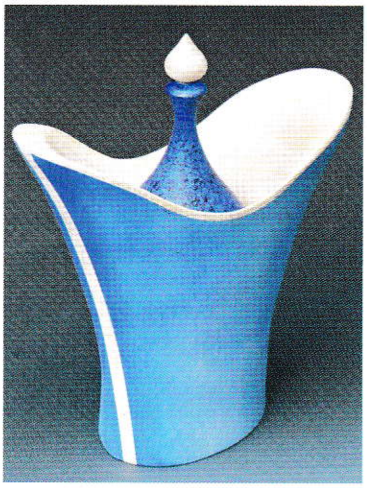


Photo 13

In each case the outside profile was sanded to blend in the two different radius arcs where they met, to create a better oval shape in section. The inside was hollowed out as normal with a circular profile. Increasing the internal diameter towards the top leads to varying rim profiles.

An ellipse shape can be formed directly when a cylinder or cone is cut through at an angle. The proportions of the ellipse are determined by the angle of the cut to the main axis. For cuts up to about 45 degrees, the oval is not far off circular, but as the angle becomes more acute, longer thinner ovals are formed, as shown in photo 14. The fluted pen pot in photo 15 has an oval rim, after cutting the top of the cylindrical pot at an angle.

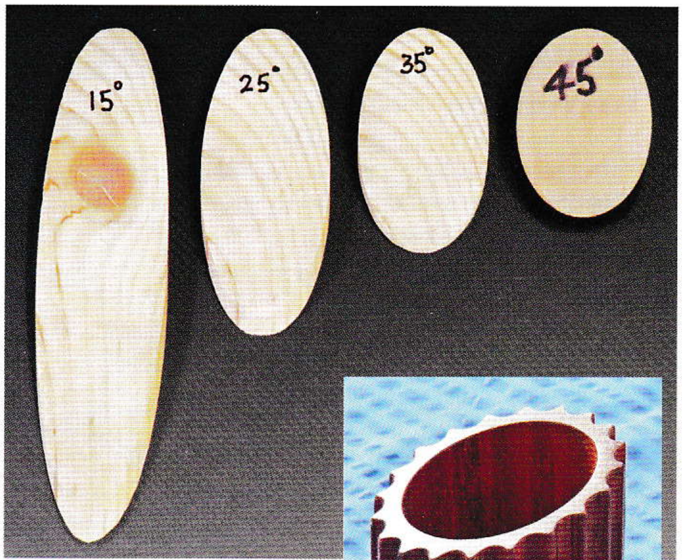


Photo 14

A composite piece can be made by combining oval slices. The teapot stand in photo 16 is made using slices cut at 30 degrees to the axis, four from a solid cylinder and two from a hollowed cylinder.

Photo 15

Photo 16

A popular way to make a natural edged bowl uses the same principle, when a round log with its bark on is mounted sideways on the lathe, usually on a screw chuck. The bowl is turned and shaped as normal, except that part of the cut will be intermittent, partly in air. Half the finished rim is effectively a slice angled down in one direction and the other half is angled up, thus forming an oval when viewed from the top. The bowl is circular inside and out, but the rim appears oval, see photos 17a & b. A longer log will produce a narrower oval. This type of bowl is often referred to as a butterfly bowl.

It is worth noting that in everyday life we perceive many ovals, which physically are not ovals, but circles. A round plate or bowl, when viewed from an angle by the eye or a camera, appears as an oval. The human brain is so used to this that it immediately realises that the apparent oval is in fact circular.

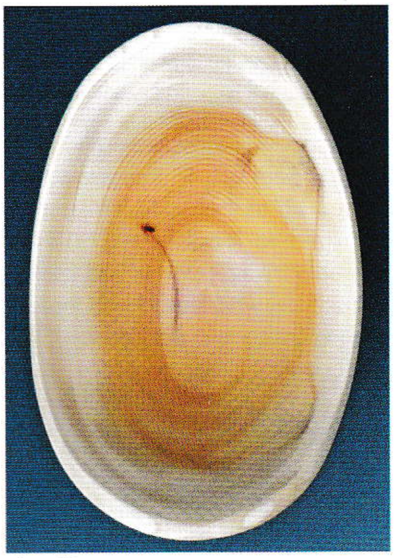


Photo 17a

In this article I have shown a number of ways of turning oval shapes – whether in outline, internal shape or cross-section - without the complications and expense of a rose engine lathe or a special oval chuck. It can add interest to incorporate ovals and ellipses into your turned pieces compared to the usual round shapes, so why not give it a try?

Photo 17b

All pieces shown were made by the author.