

### April meeting

Dave Bell gave us a complete tutorial on the casting and turning of a Bottle stopper utilizing small pieces of burl and Alumalite . The write up that follows is by Dave, with the same casting technique as demonstrated, but turning a candy bowl. There are several pictures of his stopper following the write-up.

### How to cast a small burl – by David Bell

Casting is a process that goes back nearly 6000 years ago. Let us take the casting process and give it a little twist to make something that is combined with some of Mother Nature's finest hidden artistic designs. This project is made possible with the use of Alumilite casting resin and a Maple Burl.

Before the process begins we need to understand that safety is the utmost important thing we have to follow during the entire process. Safety glasses, gloves, face shields, respiratory protection, proper foot wear and guarding need to be used. Some parts of this instruction may not have this due to the need to perform some of the actions to make this document possible. Please read and follow all of the manufacturer's instructions before using these products.

The following is a list of items that will be required to complete this project and they may differ depending on your location and resources available.

- Small Burl 3-4" in diameter.
- Alumilite Clear or Water Clear Casting Resin.
- Compatible dyes, pigments and paints.
- Mold material – pine
- Epoxy Glue, CA Glue and Wood Glue
- Face plates
- Paint Pot (Pressure Pot) with an approved working pressure rating.
- Electric or cordless drill
- Mixing paddle
- 18 – 20 oz. Plastic mixing cups
- Toothpicks/ popsicle sticks
- Shellac
- Electronic scale
- Compressor

### Casting – The Process

Many people over the course of 1000's of years have been casting and with this process it has included numerous mediums. The obvious medium that I and probably millions of other people relate to easily is most likely the steel industry. Based on this industry and my own experiences in metal fabrication, non-destructive testing and welding; I have been closely following the sand casting approach to my mold design and casting theory and how the items that make up this process all flow together.....no pun intended.

Basic mold construction is much like that of the sand casting mold with the use of a cope and a drag. Other items such as pouring spouts and runners and gating systems also come into play, but not in the exact same sense, but more along the lines of principle. We also cannot forget the other casting terms such as riser, mold cavity, flask, parting line and many other terms associated to the process.

There are no real items such as gating systems or risers to name a few, but more a relationship on the principles and what they serve as a purpose, especially when we place our particular casting medium under pressure. A part of the process not normally used in traditional casting with sand casting or many other casting processes for that matter. The purpose of the air pressure is for obvious reasons....we need to minimize or reduce the presence of air bubbles. Air bubbles in a normal casting environment are what they would refer to as *porosity*. Hence we add pressure to the equation and thus reduce the likelihood of bubbles. The higher the air pressure the smaller the bubbles.

The reason for not using vacuum to remove air bubbles is due to the wood itself. Wood is full of air or gas pockets within to be more specific. If we were to draw a vacuum on wood in a stabilizing medium, we know the result is thousands of champagne like air bubbles are drawn out of the wood and cause a foaming reaction. Not particularly an ideal situation for casting resins since the resins usually have a short open time. In this tutorial's case our resins have an open time of 5 – 7 minutes depending on the resin used. So we need to put the use of vacuum aside and only consider it where it is more useful to us.

Resins are not totally like molten steel when it comes down to solidification and the way shrinkage occurs. Resin cures throughout and shrinkage within a cast is hard to predict at this point, but it can be seen in one of the pictures at the end of this tutorial along the side of the casting. Metal on the other hand, solidifies first where it is coldest and remains fluid at the hottest regions. Resins in thin sections (coldest) require longer times to solidify. If we remove a casting too early from the pressure pot, this uncured resin will actually bubble. This bubbling region is caused by the pressurized air coming out of the wood grain itself, therefore causing porosity like defects in our casting. Regardless of what the manufacturer states in their literature, resins do not always react as stated.

Warming your mold ahead of time is always a good approach with Alumilite resins. Alumilite resin is a thermosetting resin which means one of the by-products of the curing process is heat. In our case this combined with pre-heating the mold and the casting within are always advantageous to the success of casting. Having a heating source large enough to do this is another story.

I hope these tips are helpful in understanding resin casting.

### The Process

Casting resins is no different in principle than casting metal. The difference with casting wood and resin in the manner that I use is to add wood (burl) to the mold. For this tutorial I am going to be casting a small burl of maple with Alumilite resin, dye and pigment. The mold material is going to be some pine that will be cut and turned to build the mold which is going to hold our maple burl. Once I have the mold built, I will add the burl and then follow up with mixing and pouring the resin that will then be added to the mold cavity. As soon as the resin has been poured into the mold, it needs to be placed under pressure immediately. After the resin has been allowed to solidify, only then can it be removed from the pressure pot to continue curing for at least another 24-48 hours depending on the burl's shape or complexity of the mold. Once the resin is cured the entire casting/mold can be placed onto the lathe for turning our project.

### Getting Started - Drying

There are a few things we need to consider with casting Alumilite resin and wood. The resin does not react well with moisture, so we need to remove moisture from our process to be successful. This is done by means of drying the products we will be using. To ensure our burl is dry I have always found that measuring the weight of the burl (grams) until it stops losing weight is the best method. This is down to the point that the burl has stabilized to atmospheric humidity. This may seem to be low enough, but depending on your climate and humidity, this is in my opinion not low enough. So to further reduce the moisture content we need to seek out an oven to help reduce the moisture content further. By cycling the wood through the oven a few times we can continue to weigh and monitor the moisture within the wood. At some point the weight is going to stop changing and this will depend on the wood density and the rate of drying at a given temperature. I do not like to heat the wood above the boiling point of water.....that's just a personal choice. If you find that the wood has cracked or split.....that's why I got into this whole process of casting. We can now make something otherwise useless into something useful for turning.

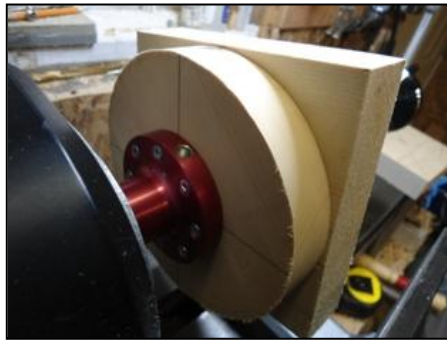
As for the mold material being dry, this isn't as crucial a requirement as it is for the burl we want to cast. I have found that air drying in the shop for a few weeks seems to be sufficient enough to get the mold material ready. The mold material (pine) is going to be sealed anyway, but there is going to be heat generated in the casting process and we don't want that heat to draw moisture out of the mold material.

### Preparation

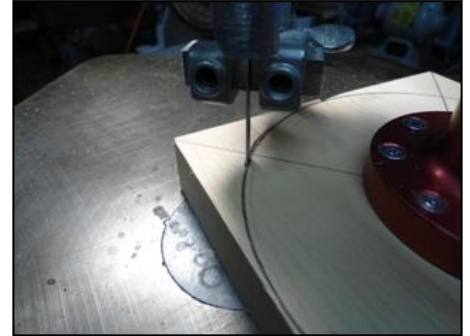
Once we have the materials dry enough for use we need to plan the project. Burl size versus mold size and after that it's pretty simple planning. So for this tutorial I have chosen a rough maple burl about 4 + inches in diameter. That burl is then going to need to be trimmed down to make it round. We also need to remove any loose debris and bark as well. Once the burl is turned to size we do the finishing touches to get it ready for the mold cavity. We know that we are going to be casting a 4" diameter maple burl by 2.5" in height.



With the burl ready, we now turn our attention to the mold itself. I use the 3" face plates available at Lee Valley ([Don Pencil Aluminum Face Plates](#)) to mount the mold material. The mold material is pine and I use construction grade lumber because it's affordable and readily available. I prepare the mold pieces into square blanks and lay out the sizes for the inside diameter and the outside diameter. I determine the number of pieces I am going to require to ensure the height of the mold is sufficient enough to hold the burl and extra resin. We will require a backer plate (waste block) and 2 layers to give us a 3" deep mold cavity for the 2.5" burl.



Attach the face plate to the backer plate (waste block), then mount the backer plate to the lathe and turn the face of the plate flat for the first mold segment/layer which will become a ring. Now draw the outer diameter on the backer plate so that it can be cut off on a band saw.



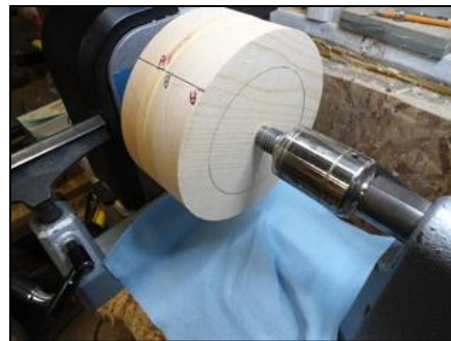
Now the backer plate can be trued up on the lathe and a center point placed on the flat side to locate our inside diameter reference for drawing the circle with a pencil compass. Draw a 4 1/8" diameter circle on the flat surface. This diameter will now be the Inside diameter of the mold and all of the remaining layers added to it. **(Note: This diameter is 1/8" larger than the burl to allow room for the resin to flow around the burl and encapsulate it. Do not make the inside diameter of the mold any larger than required or there will be an excessive waste of resin.)** With the circle drawn, now turn a flat recess into the backer plate @ 1/4" deep to gain extra depth in the mold cavity overall, provided your backer plate allows for this. Remember that there are wood screws coming in from the face plate. Having extra room in the mold height/depth is a good thing because of the possibility of mixing more resin than required for the cast.



Add the next layer to the mold and hold it in place with the tailstock and transfer the outside diameter to the first side of the layer.

Now turn the front side of the layer flat so that it can be placed against the backer plate once it's cut round (oversize). Go to the band saw and cut the layer out. Place the layer against the backer plate and turn it round and then flat.

The next step is to flatten the layer before adding the second layer. Repeat the layer building process until the desired depth of the mold is reached to hold the burl.





With the mold deep enough to hold the burl, we need to seal the inside of the mold to prevent any of the resin, dye and pigment from being forced into the mold material. For this it's as simple as adding a couple of coats of hellac and allowing it to cure for 24 hours.



Once the shellac has cured, it's time to put a couple of toothpicks on the bottom of the burl and then glue the burl to the bottom of the mold.



### Calculating Resin

We now have lots of room above the burl to add extra resin if our calculation for the resin quantity is not correct. It's better to have more resin for a cast than not enough. So what's the easy method of calculating resin anyway? For the most part, filling the mold with something small like rice works well to figure out just how full the mixing cup is going to be. Before doing this though, you need to know just how much resin is going to fill your mixing cup. So here's a pretty safe method to help get you going down the right track. Place the empty mixing cup on the electronic scale and weight the cup. Now zero the scale and it should read zero. Pour only the A-side resin into the cup until you have 100 grams in the cup. Mark the side of the cup. Continue adding resin until the cup is @  $\frac{3}{4}$ " from the top. Pour all of the A-side resin back into the jug again.

With the cup graduated in 100 gram increments, we now have a scale to use for reference. If you wish to use 50 gram increments that's fine as well. Transfer the scale onto a new clean mixing cup. This will now be the graduated scale for mixing future resin amounts. This scale combined with the rice will allow you to do very close calculations for resin amounts. You still need the digital scale to verify the correct amount of resin is being poured. (**Note: Alumilite resin is measured out in equal parts of A & B by weight only.**) If you need a bigger mixing cup, use the rice and the scaled mixing cup to figure out the resin levels in the new cup. An 18 ounce plastic cup holds 500 grams or mixed resin comfortably.

When calculating resin volume for casting you need to add a few other considerations into the equation. Is the wood your casting very dense or very porous? What pressure are you going to be pressurizing the resin too? Are there any voids or holes that restrict you from calculating the proper amount of resin?

Scenario.....if you cast something like Spalted maple or Buckeye burl that is very porous and your pressure pot will accept 80 psi. pressure, you are going to find out in a hurry that your resin level will fall well below the required amount of resin needed to cast. Now ask me how much more resin it will require? The short answer is.....Trial and error will be your best reference. The experienced answer is.....add about 10% extra resin, but please do not hold me to that figure.

One last note on mixing and casting is about air pressure and what it is we are trying to achieve. When I first started casting Alumilite, I was only concerned about air bubbles in the resin after mixing. Now don't assume that I am not worried about this any longer because it's still the first priority. The next thing I found is that when casting porous materials (common sense) there is a lot of air being compressed inside the wood. It's actually quite impressive to see how much the level drops in the mold after the cast is completed. When I have cast Manitoba Maple/Box Elder Burl (BEB) the resin levels have dropped more than 20% especially when Spalting is present. The next interesting part of the BEB casting is the amount of dye that permeates through the wood itself. By altering the pressure and the amount of dye in the cast, one can achieve varying amounts of staining or bleaching in BEB.

I hope that all made some sort of sense.

### **Let's Cast a Candy Dish**

Now we need to get down to the part that needs to be executed without delays. This last part is all about being prepared, any one part not set up and waiting will delay and possibly cause the casting process to go wrong. If everything is done systematically and properly you will have quite a bit of time left over after the cast is completed. So relax and don't panic.

- Get the digital scale ready, have the required amount of resin calculated, have the mixing cup on the scale, have the dye ready, have the pigment ready, have your paper towels ready, have your latex gloves ready, have the resin ready, have your mixing device ready, have the pigment spoon ready, have the pressure pot ready, have the air pressure ready, have the baffle plate ready and have work space ready for any sort of spill or mishap.
- Put on your latex gloves and have a couple of paper towels set aside.
- Place the mold into the pressure pot.
- Place the empty cup on the digital scale. When the scale is turned on, it will read zero grams.
- Turn on the digital scale.
- Add the A-side resin to the cup until the desired weight is reached.
- Add the B-side resin to the cup until the desired weight is reached. Turns milky.
- Mix the A and B sides together until the resins turn clear.
- Add the dye and the pigment.
- Mix the resin and pigment until the pigment has dispersed into the resin completely. The pigment usually takes longer to mix in than the dye. It should not take longer than it did to mix the A and B sides together.
- Pour the mixture into the mold. If excess resin was made, fill the mold right to the top, but not enough for the baffle plate to touch it due to capillary action.
- Place the baffle plate onto the top of the mold.
- Place the lid on the pressure pot and secure it.
- Pressurize the pressure pot, but do not exceed the rated capacity of psi for the pressure pot.
- Allow at least 90 minutes for the resin to cure in the pressure pot.
- After the 90 minutes, depressurize the pressure pot and remove the items within.

### **Note: Pictures of this casting follow at the end of the tutorial.**

Once the cast has begun to cure, use this time to clean up your tools and put them away. It's also a good time to go have a coffee or take break.....but not so fast yet! Did you remember to set your alarm or record the time the casting started? Did you record all of your casting information into some sort of log book for future reference?

Here is a list of the things I record for future reference.....in my Casting Log Book.

- Time on and off for the cast.
- Shop temperature.
- Shop humidity.
- Resin amounts....should be equal right?
- Dye colour and amount.
- Pigment colour and amount.
- Pressure used.
- Material cast.
- All information regarding preparation of the wood and the mold material.
- The Results of the cast.

Every cast should be documented so that a re-creation can be done to repeat the process right down to the smallest detail within the parameters of the material being cast.

I hope this tutorial has been an educational and informative to everyone.

I want to add a special Thanks to Curtis Seebeck for all of the help when I began casting pen blanks.

Now a few pictures of the tools I used to perform this cast up to and including the pictures of the casting being turned into a Candy Dish.....Enjoy

Dave Bell,

Be sure to check Dave's web site at <http://www.stickermetimbers.com> More tutorials by Dave can be found on [penshop.net](http://penshop.net), an online penmakers forum (registration required)

Ed



*Digital scale*



*Alumalite casting resin*



*Paint pressure pot*



*The burl/mold placed in the pressure pot.*



*Alumilite dye and pigment with my pigment spoon*



*Cordless drill and mixing paddle*



*Nitrile gloves*



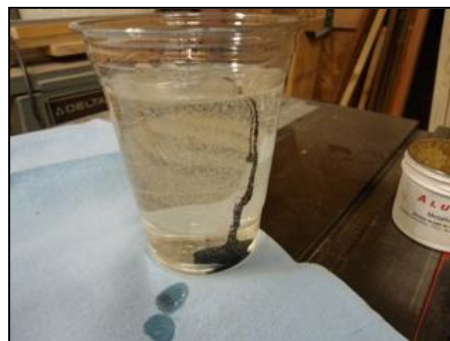
*Pour in Part "A" first.*



*Add Part "B" and it gets cloudy.*



*Mix resins until they turn clear*



*Add the dye to the mixed resins, then...*



*Add the gold pigment*



*Mix the resin, dye and pigment.*



*Pour the mixture into the mold.*



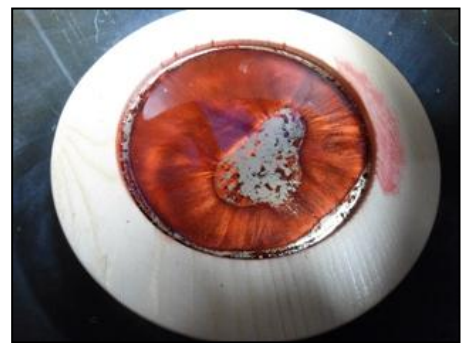
*Place a "baffle" plate/r board over the mold and put the lid on the pressure pot.*



*Pressurize the pressure pot to 40-50 psi.*



*Close the valve and let the cast cure for @ 90 minutes.*



*Apolished beauty!*

*Pictures and write-up by Dave Bell*



*Ready to tap hole for metal stoper*



*Turning is no different than, just be sure to have sharp tools!*



*Polished and buffed*



## **April show and tell**



*Mike Malone, Sheoak bowl*



*Carl Durance, segmented vessel, (more than 400 pieces)*



## **More of something new and different “Hands-on drop-in night”**

- Hands-on drop-in nights is exactly as implied,
  - Drop-in, no agenda, talk, discuss ideas or techniques;
  - Hands-on, again you do it, try it, show it, and ask for help if needed.
  - Chat about turning
- We will have at least 3 lathes plus the sharpening center available.
- Coffee and soft drinks will be available.
- Who is invited? The membership (you can bring a visitor, but hands-on is for members only due to our insurance regulations).
- Tools? Bring your own tools and get some tips on sharpening too...
- It is felt that some casual less structured hands-on time between members of various skills levels and members, with techniques to learn and share, would be beneficial to all.

If the “Hands-on drop-in night” proves successful we will plan further sessions during the 2013 season.

There was a better turn out for the 2<sup>nd</sup> “Hands-on drop-in night” and the consensus is to do another in the new year.

***To this end we have scheduled another session on May 16. Come on out and join us for some fun.***

*Ed*



**2012-2013 season of scheduled meetings and other events. There may be changes as the year progresses. Your input is valued in the development of our program.**

Date	Meeting or events	Shows/events/comments	
October 4	Monthly meeting	Ruby Cler will demonstrate airbrushing turned wood	
November 1	Monthly meeting	Three sample ornaments to be demonstrated	
November 22	Woodturners "Drop-In" Night	Bring your own wood, bring your tools to sharpen, practice and use. Free to members and ANYONE is welcome. Members only may turn, not guests.	
December 6	Monthly meeting	Christmas social and ornament exchange	
January 3, 2013	Monthly meeting	Eric will replace John as demonstrator, floor style candle sticks made with storyboard(s).	
February 7	Monthly meeting	Finishing – a discussion	
March 7	Monthly meeting	Paul Jackson - on architectural turnings	
April 4	Monthly meeting	Dave Bell demonstrates bottle stoppers and his use of Alumalite	
May 2	Monthly meeting	John Calver and Gary Miller Dueling 'wobble' chucks	
May 16	Woodturners "Drop-In" Night	Bring your own wood, bring your tools to sharpen, practice and use. Free to members and ANYONE is welcome. Members only may turn, not guests.	
June 6	Monthly meeting	Pres challenge? A pair of "somethings" - based loosely on Eric's duplication/storyboard demo in January. Gary miller – lost wood process	
September 5	Monthly meeting	John Calver turns his winning treen challenge scoop	
October 3	Monthly meeting	A visiting turner from another guild Bring your entries in for the People's choice (Guild sponsored) or Show competition (\$20 entry fee)	
October 4 - 6	Woodstock Wood Show	We plan to participate this year.	
November 7	Monthly meeting	Christmas themed turning –decoration or other	
December 5	Monthly meeting	Christmas social and ornament exchange. Photo night for a Guild photo-roster	
	Program ideas and suggestions for guest turners. Member input is always welcomed by your committee	<ul style="list-style-type: none"> <li>-Hand thread-chasing.</li> <li>-Guest turners or seminars.</li> <li>-Design? What makes a "good" turning into an "outstanding" turning?</li> <li>-Metal spinning</li> <li>-A safety night (discussion/panel)</li> <li>-Future challenge ideas: a pair of</li> </ul>	<ul style="list-style-type: none"> <li>"something",</li> <li>-A seed pod turning.</li> <li>-Shear scraping</li> <li>-Turning a ring</li> <li>-Inlace</li> <li>-Basic drying of wet wood</li> <li>-Wine stoppers</li> <li>-Make a home drying cabinet</li> </ul>

**Note:** Meetings start at 7:30, doors open at 7:00. The open period from 7:00 and 7:30 is a great time to discuss problems or successes at the "Show and Tell" table and converse with other members. Raffle tickets, the library, and the Round Table critique are available between 7:00 and 7:30 and the break period.



### Items wanted and for sale

Ads are free for members and run until you sell your item or withdraw your advert. To run an ad or to remove one, call or email Bob at 519-457-6555 or [66.bobhewson@rogers.com](mailto:66.bobhewson@rogers.com). Members can support other members by **buying: good deals and at good prices!**

**Please note:** The Guild provides a means of connecting buyer and sellers through these ads. It is up to the buyer to ensure the item offered is as stated and the two parties should agree between them as to warranty/guarantee.

We print on a non-date-specific schedule, generally every two months. Our newsletter can be found on the internet at <http://www.thamesvalleywoodturners.com/> for viewing in glorious **colour**.

#### **For Sale**

My neighbor is selling her lathe and accessories listed below. It would make a great starter lathe for someone getting started.

King variable speed lathe with stand

- 12" swing over bed plus outboard turning for larger faceplate work.

-36" between centres.

-includes a faceplate, spur, live centre, knockout bar, spindle wrenches. \$25.00

OneWay original Vari-grind jig for sharpening gouges; asking \$45.00

-Oneway wolverine grinding jig with 2 bases, one platform and one vee arm \$80.00

-skew grinding attachment \$25.00

-brass bevel gauge \$5.00

-1/4" spindle gouge \$35.00

-box set tools include 1/2" spindle gouge, 1/2" skew, parting tool \$125.00

-roll up tool pouch \$22.00

-fundamentals book \$20.00

Contact me through email ([info@sandingovation.com](mailto:info@sandingovation.com)) or call my cell; 519-274-9694. Everything is at my shop if you wish to give it a test run. Can sell as a complete unit or separate.

Paul S. Jackson

Sanding Ovation Wood Products

5557 Line 36, R.R. #3

Mitchell ON N0K 1N0

[519-274-9694](tel:519-274-9694)

[www.sandingovation.com](http://www.sandingovation.com)

#### **Custom work:**

I Have a vertical mill & metal lathe to make different turning tools (cutters, sharpening jigs, supports etc.) you name it, similar to the Hunter Tool for hollowing in two different sizes 1/4" & 3/8" round, also a square end cutter (all carbide cutters).

-If you want a curve put in rod it can be done too. You will have to make a drawing if you want a bend put in the rod. Price: \$50 straight, \$70 bent or curved.

-Aluminum handles to accept the tool is also available (you choose the size).

-See my sharpening jigs at the next guild meeting or call me.

-**New item** Custom vacuum chuck \$95

-For any custom work, please see me.

**Call:** Al Johnston at 519-679-8718

**For sale:** I make and sell cutters for the Stewart system and or boring bars. They are made of hi-speed steel. Available in three sizes, prices are \$15, \$20, & \$25.

Call Mario Moran at 519-336-0550, or see him at the Guild meeting or email [mario.ada@sympatico.ca](mailto:mario.ada@sympatico.ca)

#### **For sale:**

This is a list of tools belonging to Gord Woods, he is clearing out his workshop and most of his tools appear to be in good shape.

Radial Arm Saw, 10" Dewalt \$175.00

Trademaster 16" floor model drill press \$130.00

4" steel vice \$40.00

Mastercraft orbital sander \$20.00

Craftsmen 10" compound miter saw with laser (new) \$120.00

Kreg jig & clamp \$50.00

B & D worm drive Skilsaw \$35.00

Root-Zip \$45.00

Mastercraft rotary tool kit \$90.00

7 1/4" Skilsaw \$15.00

B&D 1/4" router \$15.00

Call: Gord Woods 519-376-2826 prices are estimates, offers will be considered.

#### **For Sale:**

-Taig miniature lathe designed for small jobs. (Can also be converted to a small metal working lathe).

-Woodworking version with motor

-Set of 8 high speed turning tools

-Micrometer.

Available through Lee Valley the above are valued at \$549.50

Price: \$300.00

Contact: Bruce Cooper at 519-433-3385 or [bml.cooper@sympatico.ca](mailto:bml.cooper@sympatico.ca)

Located in London

#### **Wanted:**

A Oneway 1640 lathe

Contact: Joe Wallace 519-285-2843 or at [Elle.Wall@sympatico.ca](mailto:Elle.Wall@sympatico.ca)