woodturners guild of ontario

Woodturner n. one who makes lots of chips and occasionally ends up with an object of art

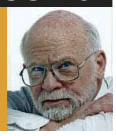
"ask not what your guild can do for you; ask what you can do for your guild— you get back what you put in"

NEWSLETTER

Click on http://www.wgo.ca/newsletters/Article%20Directory.pdf for complete directory of previous Newsletters

September 2010 VOLUME 6 ISSUE 3

Message from Jack Wallace, President



The new season is here and I am certain that you are interested in getting back to your lathe. I am delighted to say that we have an excellent program ready for the year and more challenges are ahead. Joe Houpt and Max Blum have been hard at work and we owe them a great big "thanks" for getting it all arranged.

I attended the AAW in Hartford this year. Such a pity we all could not be there but I will say that there was an excellent representation from the WGO (lots of Black shirts and the new WGO Logo) and Canada. There were many demos about half of which were Canadian. It was impressive for sure! Every year I go, the products appear to be much more advanced and this year was no exception. The AAW produced a thick handout book with some really excellent details on the demos. This book is now available from the AAW; I highly recommend that you buy a copy.

WGO was well represented by several children of members who had some excellent hands-on training during the events. Two of the children won lathes and associated tools; Congratulations!

In July we welcomed Eli Avisera from Israel who performed a well received demo at Humber. We had a turnout of some 40 people including a couple from Halifax, in town for a few days. This was followed by two days of Hands-on-Training which was sold out!

Table of Contents

We are now recording all our demos directly to DVD. By the following WGO meeting the DVD will be in the library ready for you to borrow. The first example of this was done during the Avisera Demo. I hope the members will find this new tool useful. In the past, demos have been put on tape and sometimes they were converted to DVD but this was spotty at best. I believe that this method will now be much more effective.

New Members

John Alari

I will be travelling during our first meeting this year as I have been invited to go to Vancouver for the West Coast roundup Symposium being organized by Bruce Campbell and the Vancouver woodturners club. I will have a report on that for our next newsletter.

In the mean time Do A Good Turn!

Woodturners Guild of Ontario
Website: http://www.wgo.ca

President: Jack Wallace jack@jkwallace.ca
Past President: Richard Pikul rpikul@sympatico.ca
Vice-President: Joe Houpt jbhoupt@sympatico.ca

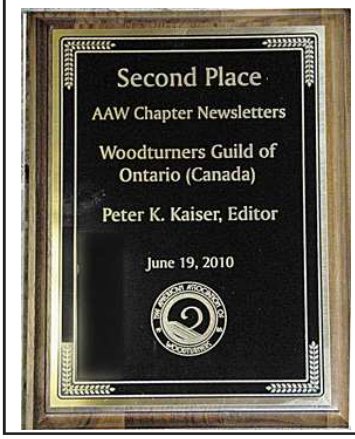
See page 15 for a full list of WGO Executive Officers and volunteers

IT's YOUR GUILD - BE INVOLVED !

Share your talent and learn from others at the same time.

Do you have ideas for us ?
Please tell us how you can help - e-mail the editor at:
WGOeditor@gmail.com

Mike Anderson accepts Best In Show award from Bonnie Klein at the 2010 Salon



On the left is the plaque that our President, Jack Wallace, accepted from the American Association of Woodturners on behalf of the WGO.

All should know that the WGO won this recognition primarily due to the excellent articles submitted by our members.

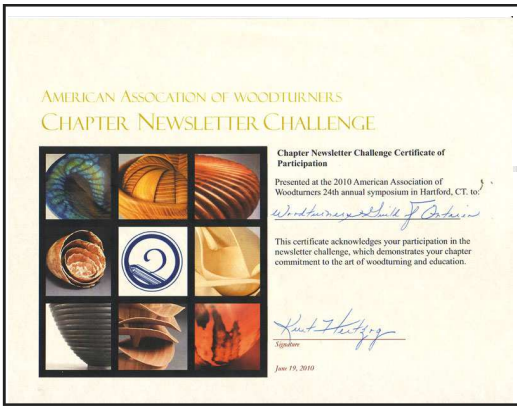
It should also be recognized that most of the Newsletter was designed by the founding editor, Michael Finkelstein.

Jack has asked the current editor to do what is necessary so that we win First Place next year. You can see some minor design changes in this issue which includes our new logo. However, the major factor that would promote us to First Place are more excellent articles. So let's go folks, get your pencils out and help lift us to #1.

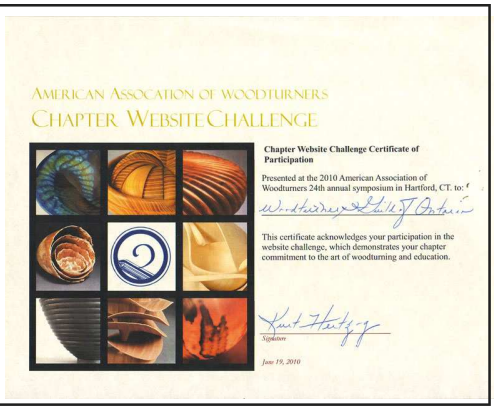
WGO
woodturners guild of ontario

Congratulations to **Jogi Makhani** for designing our new WGO logo.

In September, shirts and hats with the logo embossed on them will be available.



Jack brought these certificates back from the AAW Symposium. The one on the left recognizes the WGO participation in the Newsletter challenge; the one on the right recognizes participation in the Website challenge.



POLOYHEDRA EXPRESSED THROUGH THE BEAUTY OF WOOD** Part (2 of 2)

Robert (Bob) Weadon Rollings

Dodecahedra

The dodecahedron in Figure 7 came about when I made stickware for some spinning tops. Having enough left over for 12 faces, I decided to make this dodecahedron. I took the ten sided stick and clad it with five pieces of oak to construct the pentagonal stick. From this stick I cut 12 panels, each 3/16 inches thick, to make the dodecahedron. Is this dodecahedron more or less than the sum of its parts? There are 475 pieces on each of its 12 faces.

Figure 7**:** Stickware dodecahedron. Holly, cocabola, pear, white oak and maple, conforming to 6" sphere, 2007

Figure 8: *Piece-Peace Suspended. Ebony and holly, 7", 2004*

Figure 8 is titled Piece-Peace Suspended. This title is intended to be a play on words. As you can see, the dodecahedron box is suspended. Each face of the dodecahedron is a pentagon, which is a symbol of peace. The box was intended to symbolically contain George W. Bush's weapons of mass destruction but when you look inside, the box is empty. The web represents the web of evil. The handle, which is a dove, but not the white dove of peace, is made from the same black ebony. This dodecahedron and its web was my personal response to the war in Iraq.

Figure 9 is a stellated dodecahedron. The term stellated was coined by Johannes Kepler [4] and was the inspiration for this piece. Stellation is a process that allows us to derive a new polyhedron from an existing one by extending the faces until they re-intersect. The flat planes, which emerge from these figures, enable this piece to be produced using the lathe or the band saw; I opted for the latter. The first step is to create a sphere and then locate the 12 vertices. The compass setting is calculated using the diameter of the sphere times 0.526 [4] and an initial circle is scribed on the sphere. Choosing any point on the initial circle, a second circle is scribed creating two intersection points. Circles are drawn from each point where two circles intersect. Each point of intersection becomes a vertex. At the end of this process, the twelve vertices will have been located.

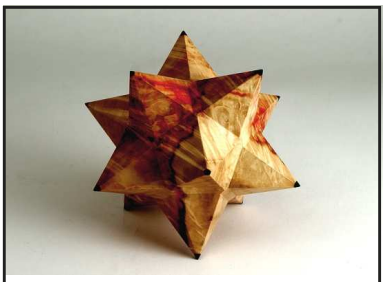


Figure 9:Stellated dodecahedron. Box Elder, 8" diameter, 2005

Holes were drilled at each of the vertices and a temporary rod was inserted to act as a pivot while cutting the faces on the band saw. A jig was used to control the depth of cut on all 12 axes and as the wood fell away a dodecahedron emerged. The holes were plugged using contrasting coloured wood for emphasis.

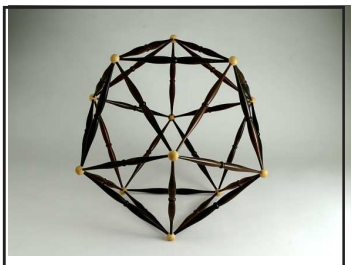


Figure 10: *Web icosahedron, Rosewood and boxwood, 12", 2005*

Icosahedra

The simple web of the icosahedron (Figure 10) emphasizes its symmetry and balance. The web is created using spindles and spheres for the vertices as previously described with the only difference being the angles at which they are drilled and the number of holes drilled. The spindles are made from rose wood and the spheres at the vertices are boxwood.

The sphere in Figure 11 was initially a faceted icosahedron. The joints have been emphasized with a laminate of black and white veneer. The vertices were drilled out and replaced with black inserts. Centered on each insert are hand-turned flowers of several designs and a variety of woods. The base was initially turned, and then hand carved prior to being painted black.

Figure 11: *Spherical icosahedron Curly maple and blackwood, 5"sphere, 9" height, 2006,*

****This paper has been accepted for publication in the JOURNAL of MATHEMATICS and the ARTS**

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Figure 12: Great stellated dodecahedron Madrone, ebony, painted walnut, conforming to a 8 ½ sphere, 2003

Figure 12 is a great stellated dodecahedron, (thanks again to Johannes Kepler) which began as a solid sphere made from madrone. The faces were then cut on the band saw using a similar technique described for Figure 9. In this case there are 12 pivot points of rotation located in the valleys, which can be seen as the black caps of ebony. The base is made of walnut and was made on the lathe, using a swing pivot router, then painted black. The finished piece is 9 inches high.

Figure 13 is a combination of a great dodecahedron and a great stellated dodecahedron. All of the panels used to make this piece are 1/8 inch thick. There are 120 flat panels required to construct the piece. It is about 8.5 inches from point to point. The panels are mitre cut using a template and then glued together. Kepler referred to stellated polyhedra as prickly polyhedrons as seen in Figure 12 and 13.

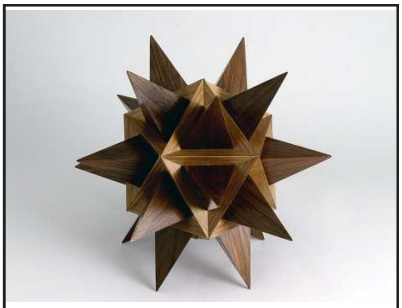

Figure 13: Combination of a great dodecahedron and a great stellated dodecahedron Walnut and oak, conforms to 81/2" sphere, 2006

Hybrids

In the following pieces I have used the solid faces of the platonic solids surrounded by web models. I call these designs hybrids. By using the term hybrid, I am inferring that I am using more than one technique, i.e., flat panel and turned spindles or in the case of figure 16 a solid core and spindles

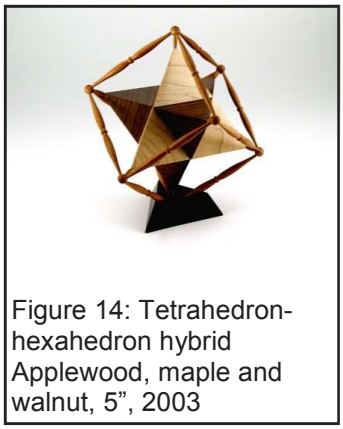

Figure 14: Tetrahedron-hexahedron hybrid Applewood, maple and walnut, 5", 2003

In Figure 14 we have compounds of two tetrahedra constructed from eight minor tetrahedra. Kepler called this Stella Octangula. One of the vertices of each of the eight minor tetrahedrons becomes the corners of a hexahedron. I have joined these together using spindles to reinforce the relationship.

The stellated dodecahedron in Figure 15 has been made from 3/16 inch panels; five panels for each pyramid with a total of 60 panels. The 12 vertices give us the framework for the web, which as you can see is an icosahedron. There are 30 spindles and spheres.

Figure 15: Dodecahedron-icosahedron hybrid Rosewood and babinga conforms to a 6"sphere, 2003

Figure 16: Totally Turned Honey locust and cocabola, 7", 2004.

The piece shown in Figure 16 was completely turned on the lathe. It was inspired by Wenzel Jamnitzer who was a German etcher/goldsmith and drew this piece in 1568 [2]. I can only assume it was never made and that it was only a graphic design as the main body only hovered above the base.

Web Models

Figure 17: *Great stellated dodecahedron Cocobola, conforms to a 12" sphere, 2006*

The following four pieces have been modeled using a web design. They consist of more artistic interpretations of the platonic solids and were done using webs so that the entire shape, as in line drawings, is visible from a single perspective. In these three dimensional models, we can appreciate the total space more easily than in a two dimensional line drawing.

This is a web model of a great stellated dodecahedron (Figure 17). It is interesting to see an underlying icosahedron and how its 20 faces are elevated to create 20 new vertices and we begin to see a relationship between the icosahedron and the dodecahedron. There are 12 planes where pentagons are formed. The vertices of the

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Great stellated dodecahedron are created by extending the edges of these pentagons. The ratio of the length of the spindles to the length of the base conforms to the golden mean.

Figure 17: Great stellated dodecahedron Cocobola, conforms to a 12" sphere, 2006

Figure 18: *Metamorphosis Ebony, boxwood, and black painted maple, 14", 2007*

After completing the work shown in Figure 17, I saw further possibilities and so created Metamorphosis (Figure 18). The relationship between the dodecahedron and icosahedron fascinated me. It began with a central dodecahedron. In the centre of each of the 12 faces, spindles were projected to create the 12 vertices of the icosahedron. Finally the icosahedron was elevated to create the 20 vertices of the outer dodecahedron. The web was then connected between these vertices completing the metamorphosis.

Johannes Kepler lived from 1571 to 1630, had a great interest in the platonic solids, and was the inspiration for this piece. It was his contention that the orbits of the planets are related to the platonic solids and planetary exploration was my inspiration

Figure 19: Kepler Theory Brazilian rosewood, boxwood, and black painted maple, 18", 2001.

In Figure 19, each of the platonic solids are contained within one another and each rotate on their own axis. From the centre working out we have the tetrahedron, hexahedron, octahedron, dodecahedron and then finally the icosahedron. Each rotates, as do the heavenly bodies. This piece has a total of 90 spindles and 40 vertices. The spindles and the circular frame are Brazilian rosewood, the vertices are boxwood and the base is black painted hardwood.

Figure 20: Transformation Pear, ebony, holly and satinwood, walnut and black-painted maple, 8", 2006

Figure 20 is an example of a progressive web transformation. The centre is an octahedron, which has been converted by making each of the eight faces into tetrahedrons. These not only express two major intersecting tetrahedrons, but also indicate the eight vertices of the hexahedron. . This piece has found a home in Donald Coxeter's showcase of models, at the University of Toronto's math department.

The following two pieces have been inspired by Luca Pacioli's publication of De Divina Proportiona, published in 1509 in which Leonardo Da Vinci drew illustrations of the regular solids. Leonardo's drawings are probably the first illustrations of skeletonic solids drawn with solid edges and as such lets one see which edges belong to the front and which belong to the back. Of course in three dimensional models it is self evident.

Figure 21 is similar to Da Vinci's model and my interpretation of the piece is constructed of 84 individual frames mitred together. The side angles had to be cut prior to assembly. After the first row of 12 frames had been glued together the other rows could be glued and assembled until the sphere was closed. All faces of the strips used for the frames were prefinished prior to assembly as all faces can be seen. The base has been weighted with lead shot to permit the piece to be shown in an offset position.

Figure 21: *Da Vinci Model #1 Babinga and walnut, 10" sphere, overall height 14", 2005*

Figure 22: Da Vinci torus Zebra wood, conforming to a 14" torus, 2008

The second of Leonardo's pieces is a torus (Figure 22). This is his mazzocchio which he drew in solid edge form. It consists of 32 sections around the circumference. Each section contains eight frames for a total of 256 frames, each with specific side angles.

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Figure 23: Vector equilibrium. Indian rosewood, boxwood and oak, 12", 2008

Figure 23 shows a web model of what Buckminster Fuller called the "Vector Equilibrium" [3]. It is a cuboctahedron with all the vertices connected to the centre. Credit for my understanding of this complex concept must be given to my grandson, David.

The cuboctahedron has many unique properties; it has 12 vertices, which lie on the surface of a sphere. It contains 24 edges as well as 14 faces. This "vector equilibrium" model shows how a cuboctahedron can be dissected into eight tetrahedra and six half octahedra. Finally, the distance between any two adjoining vertices is identical to the distance from any vertex to the centre. The piece rotates within its circular oak frame, which in turn pivots in the base.

This article has described many of the polyhedra and platonic solids I have worked on in the past few years and is also the result of much reading on the subject. The journey is endless and the variables infinite.

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[1] Cox, J. (1993). *Beyond Basic Turning*. Fresno: Linden Publishing Co.
[2] Cromwell, P. (1997). *Polyhedra*. New York: Cambridge University Press.
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[4] Lawlor, R. (1982). *Sacred Geometry*. London: Thames and Hudson.
[5] Rollings, R. (2009). Polyhedra through the beauty of wood, Bridges Banff Procceedings 2009, C. Kaplan and R, Sarhangi (eds), Tarquin Books, Hertfordshire UK, pp. 199-206.
[6] Springett, D. (1997). *Woodturning Wizardry*. East Sussex: Guild of Master Craftsman Publications Ltd.
[7] Wenninger, M. (1971). *Polyhedron Models.* New York: Cambridge University Press.

Editor's note. Take a look at this Newsletter's header and you will find a link to the **directory of previous Newsletter articles** which Richard Pikul established and maintains. This link, a new feature, was added in response to comments offered by Joe Houpt, requesting that the Newsletter articles be more accessible. Feedback such as this is what makes this Newsletter increasingly useful

Woodturners Guild of Ontario Newsletter is published quarterly.
The submission of woodturning related articles to this publication is encouraged. All rights to any submitted articles remain with the author of the article. Deadline for articles & advertisements is the 5th of the month prior to publication.

WARNING! Woodturning is an inherently dangerous active activity. Readers should not attempt any process or procedure described in this publication without seeking proper training and detailed information on the safe use of tools and machines.

A Report on Eli Avisera's Demonstration

Peter K. Kaiser

On Sunday, July 11, 2010 Toronto woodturners were treated to a day long woodturning lesson by Israel's premier woodturner, Eli Avisera.

This reporter will not go into detail about Eli's lessons and demonstrations because a DVD was made of the event. Jack Wallace set up two video cameras; one in front of the lathe which provided the view attendees received and one behind the lathe which shows the work more from the turner's perspective. These views were made available to the attendees by a good size video screen. WGO members will be able to borrow the DVD starting at the first fall meeting this coming September.

Eli started the day with a tool sharpening lesson. He has an interesting and different take on how to sharpen the various turning tools. Then during the course of his demonstrations he showed us how to use these tools to achieve his turning goals. Eli conducted an interactive turning lesson, being very responsive to questions, allowing us to approach the lathe for a closer look at his works and finally passing the finished products around so we could each inspect them.

Because a DVD of the event will be available and numerous photographs will be available in the Photo Gallery section of the WGO website, I will focus more on things that particularly impressed me.

Eli's tool sharpening technique starts out like many of the descriptions I had previously seen. But just when you think he was finished, Eli passed the tool over the grinder again making a narrow, more angled grind. It is hard to describe but can be clearly seen on the DVD.

He showed us how to make many unusual pieces, including a mushroom, square bowl, and finally a long very thin piece of wood art which contains a wine bottle, a wine glass and a captured ring as seen in Figure 1. What impressed me most about this piece is how quickly he made it. Bob Rollings brought similar turning pieces to our Show and Tells. I had imagined that Bob probably spent many hours making the incredibly thin work of art and perhaps he did. But Eli's piece see in Figure 1 took him less than 30 minutes.

Figure 1

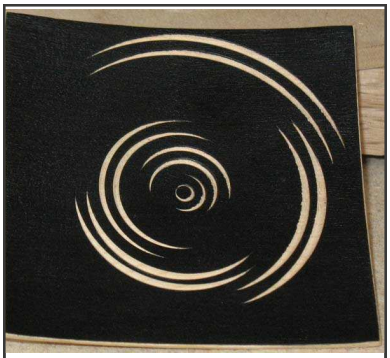

Figure 2

In Figure 2 you can see the square bowl Eli made. His technique was very interesting and seemed easy. I am anxious to try to make one. I would be willing to bet that my attempt will not go as simply as Eli made it seem. I was intrigued by his technique for decorating the bowl's inside. He accomplished this by tilting the piece in the jaws of the chuck and then etched the design while to bowl was rapidly spinning.

It was a thoroughly enjoyable and instructive day. Coffee breaks and lunch were terrific but placed rather great stress on one's will power. The fruit was plentiful as were the donuts. At lunch the sandwiches were healthy but oh my gosh were those cookies good.

Demonstrations at Upcoming Meetings

September 10, 2010	Bob Rollings	A short talk on mathematics
October 14, 2010	Malcolm Zander	Technique is important (hands on Oct 15)
November 11, 2010	Richard Pikul	Spoons
January 6, 2011	Robin Bryan	Inside Out Turning
January 23, 2011	Andre Martel	End Grain on Large Logs
February 10, 2011	Shawn Hermanns	Chinese Balls
March 10, 2011	Jack Wallace	Ring Turning German Style
March 27, 2011	Cindy Drozda	Delicate Turnings
April 8, 2011	Ron Katz	CNC Turning
June 10, 2011	Ray Prince	Hollow Forms (or Bowls)

Come to these events, you'll enjoy yourselves and learn a great deal

On May 12, 2011 we have our annual WGO Salon. It is never too early to start turning for this event.

Of course you do not want to forget the annual Christmas Party on December 9, 2010

WGO contingent at 2010 AAW Symposium. Click below for more AAW Symposium Photos.
http://www.wgo.ca/photo_gallery/WGO%202010%20Pics/2010_pictures.html

Fluids and Finishes…What Works With What

Mark Salusbury

Here I pick up where I left off in my article "Sanding ***Isn't*** a Four Letter Word," in the June 2010 issue of this newsletter. So now you've got a great piece that is sanded to perfection. What to do now to make it sing?

Some sort of finish is probably required and you may want to add a hint (or a lot) of colour somewhere in the mix. The following is a list of suggestions.

I've organized them generally in order of what can be applied over what. There are always some exceptions though and I'll pick up on them as we go. You have the option of applying dye, a colour glaze or simply building finishes as simply as you'd like to achieve your preferred affect.

Briefly, anything can be put on bare wood. However in order to get the best from your piece you need to determine what kind of wood it is, whether it has uniform figure or blotch-prone grain, whether a hint or a splash of colour will benefit it and the purpose of the piece; functional kitchenware, gift or art.

Here are my suggestions, in a nutshell, in case you don't want to read the good parts:

- Water penetrates and raises the fibres of the wood and needs to be sanded back.
- Dye may only be put over bare wood.
- Shellac also raises woods fibres initially and needs to be sanded back, but being alcohol based is compatible with water and itself.
- Lacquer is a substitute for shellac and like shellac may be topcoated with any other products but may not be put on top of any other product except cured dye or itself.
- Epoxy Resin may be applied coloured or clear over bare wood, dye, shellac or lacquer.
- Coloured Glaze is applied only over a pre-sealed wood surface, otherwise it's a stain or dye.
- Oil based finishes can be put over any cured, wax-free surface.
- Water based finishes can only be applied over dewaxed shellac or lacquer pre-coats/ sanding sealers or other water based products.
- Waxes cover everything once the surface you're applying it to is fully cured.
- Oils are generally used in lieu of any other finish with some exceptions as listed later.

The following is for those who crave more detail.
Read on and I'll explain, beginning with bare wood:

WATER: Always use distilled water; tap water may contain minerals or dissolved metals that could react with tannins in the wood causing black stain marks.

Application

- Lightly spray onto the wood to raise the grain during the sanding process and then sand the piece once it's dried
- Lightly spray on the wood to wet sand softened bare fibres or later to lightly abrade a finish coat
- As a base for dyes or pigments you might want to mix to colour wood
- As a factory base or for you to dilute water based paint, varnish or urethane

Once thoroughly dry, any alcohol, thinners or spirits based fluids are compatible.

DYE: Water or alcohol based

Application

- To colour a bland wood or to accentuate the figure in a uniformally figured wood.

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(Continued from page 9)

- If your next step is to coat with dewaxed shellac (alcohol based) use a water based dye to avoid the risk of causing an alcohol based dye to become reactivated by the shellac
- If you're next going to apply a water based varnish apply either a water or alcohol based dye but let them dry thoroughly to avoid interaction with the varnish
- If you're going to next coat with an oil based varnish or urethane you can use dyes with either base without concern after the dye has dried thoroughly

SHELLAC: Dewaxed only – Zinsser 'Sealcoat' or mix from dewaxed flakes (see http://www.**shellac**.net/ShellacFlake.html for mixing instructions).

Application

- Thinned 25%, applied uniformly and liberally to seal or unify the surface grain pores
- Thinned 10%, applied uniformly but lightly as a sanding sealer prior to top coating
- Un-thinned as a finish

Thinned 25% as a 'pre-coat', this makes an excellent base for adding a subsequent finish coat or a 'colour glaze', as it unifies the woods pores so all accept colour or finish equally. This is especially important in woods with undulating grain structure like pine or cherry which are prone to looking 'blotchy' of not sealed first.

As a sanding sealer thinned 10%, shellac will fill pores and act as a grain filler too. Let it dry completely according to manufacturers recommendations (this will take longer in hotter, more humid conditions) otherwise your sand paper will clog easily

Used as a finish, properly applied, it requires no sanding between coats as the alcohol base slightly dissolves the previous dried film permitting the finish to build readily.

LACQUER

Application

- See 'shellac' above

Notice that their names share the letters 'LAC' and thus may be used in lieu of each other for our purposes as a finish. I have no experience with lacquer as a sealer but I'm sure it would do a great job if applied un-thinned and allowed to cure fully prior to top-coating. Like shellac, lacquer is an excellent finish and will build on itself without sanding if recoated once its surface is dry but not left to cure. Once it has cured, a fine sanding is required to provide "tooth" for subsequent coats.

EPOXY RESIN

Application

- To offer a firm structural and/or chemical resistant finish to your work
- To thoroughly fill wood grain and pores.
- As a final finish and/or colourant (by adding Mixol, Transfast or artists oil colours).

Generally this is an extreme step for woodturners but if you want to take it, now's the time. Epoxy resins can be put over bare wood or a cured, dewaxed shellac pre-coat or lacquer but not over any water or oil based finishes or wax.

COLOUR GLAZE: "Glaze" is a mixture of varnish and a colourant (base compatible artists paint or commercial wood stain) mixed to a thin consistency and hue, which is applied over a *sealed* wood surface.

Application

To build a uniform colour on the surface of the wood or to accentuate the figure in a informally figured wood.

(Continued on page 11)

(Continued from page 10)

By sealing the grain of the wood with thinned dewaxed shellac or a thinned water based finish first, a 'glaze' will be received by the wood equally overall so no 'blotching' will occur. Applying a glaze is a much more controllable way to add colour; you apply it thinly and if it's not striking enough once its dry, add a second or third coat to build the colour up. You can also apply layers of different colours to create depth and custom hues in your finish

- Spirits based – artists oil paints or commercial wood stains (Minwax, Varathane etc.) may be thinned with a *gloss* oil based varnish (General 'Salad Bowl Finish works really well) to your preferred shade and wiped or brushed on *sparingly.* Several coats are usually way better than one. Topcoat with an oil based varnish only.
- Water based – artists acrylic colours or a water based commercial wood stain (as above) thinned with a *gloss* water based varnish (i.e. Emtech EM 2000WVX by Target Coatings) will work well if applied as above. Top-coat with your water based finish of choice or, once thoroughly cured (not merely dry) any oil based finish.

VARNISH: I include "urethanes" here as they are simply a high solid content varnish

Application

- To provide a non-porous barrier/coating
- Spirits based – may be applied over bare wood or dewaxed shellac or lacquer pre-coat/sealer, water based or spirits based products that you may have applied previously.
- Water based – may be applied over bare wood or dewaxed shellac or lacquer pre-coat/sealer or fully cured water based products you may have applied previously.

WAXES

Application

- To provide your preferred sheen and a surface that's easily maintained to control finger marks and manage moisture.

Waxes come in a variety of formulations and bases; beeswax (soft), carnauba (hard), blends of beeswax and carnauba to offer in-between hardnesses, coloured waxes (typically black for antiquing), microcrystalline etc. All may be applied over bare wood, or any of the finish coats discussed here *once they have fully cured*. Applying wax too soon will prohibit the curing process of anything you've applied it over.

OILS

Application

- To quickly fill the pores of the wood and/or build a soft coating that will need to be replenished often to keep looking fresh and offering modest protection to the wood.
- Spirits based – linseed, tung etc.
- Natural based – walnut, canola, sunflower etc.

I list 'oils' here last as its usually the only product you'll be applying in lieu of any other finish or colouring. That said, fully cured spirits based oils (they take forever to cure completely) may be top-coated with an oil based

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varnish and/or waxed while natural base oils may only be waxed with a natural wax i.e. beeswax, carnauba or a blend of these two.

Next time I'll expand on this and tell you how I apply my colours, finishes, and waxes to get rich tones, contrasting figure and satisfying sheen using only gloss finishing products.

Websites re: products noted above
http://www.woodessence.com/Dry-**Shellac**-P54C13.aspx
http://www.shella**c**.net/ShellacFlake.html
http://www.promega.com/pnotes/71/7807_18/7807_18.html **(Transfast)**
https://www.woodessence.com/**Mixol**-Pigments-C11.aspx
http://www.**mixol**.de/front_content.php?idcat=1&lang=2&changelang=2
http://www.rockler.com/product.cfm?page=10310 **(Zinsser Sealcoat)**
http://www.targetcoatings.com/emtech-2000.html **(water based varnish)**
http://www.getpainting.com (Dynamic Paintware sells **Sealcoat** in Canada)

LED LAMPS FOR ILLUMINATING YOUR WOODTURNING

Richard Pikul

I have found that good lighting is very important, particularly as I get older and need more light to see clearly. When I started turning, I thought that my workshop lighting was more than adequate, until I found that my work did not 'pass' close inspection. Concluding that I just needed more light, I installed adjustable lamps to illuminate my work. For adequate illumination, I found that one or two 100 Watt, 'cool white' incandescent flood lights worked until I realized that the light spectrum from these lamps was not anywhere near 'daylight'. To solve this I changed my lighting to quartz flood lights. This light was much better and I used it for some time – until – one of my quartz lamps started a fire when sanding dust trapped between the lamp and reflector ignited. I also burned myself a few times – quartz lamps get VERY hot!

At about the same time (around 2001), twist fluorescent lamps with "daylight" characteristics became available. These lamps had a light output (in my application) equal to a 100 Watt incandescent flood light and colour temperature over 4000 Kelvin (near daylight duplication). Bonus, a reduction in wattage – 42 Watts instead of 100 Watts and a bulb operating temperature that was much lower than either quartz or incandescent. Disadvantage; the lamp required a good reflector to direct light and about half of the lamp's light output is wasted.

There was also another problem with incandescent, quartz and fluorescent lamps. Light emitted to the side is significant, quite blinding when trying to inspect work closely. I had to always keep the lamp between me and the workpiece.

Now there is a new choice; LED lamps that fit into standard R20 sockets. The first lamp I found that is actually available, practical and within my budget is the Philips "7W LED R20 Cool White Indoor Flood AmbientLED". This lamp's shape is unusual (see pictures in 'specifications' paragraphs below) but it does fit directly into any socket designed for a standard 100Watt incandescent lamp.

This Philips bulb consumes only 7 Watts, but as it very efficiently directs the light produced into a clearly defined cone with very low side emission, my testing has found that it directs the same, or more light on a workpiece as a 100 Watt incandescent flood lamp, a 35 Watt spiral fluorescent with a reflector or a 75 Watt quartz flood lamp. Disadvantage? Well there is a small one. As this lamp's output is very directly focused, with almost no side emissions, one must 'aim' the lamp more accurately or place it further away to illuminate a workpiece. This has three great benefits in my workshop. One; the lamp may be placed up to 50% farther from the workpiece to give the same illumination. Two; one must look almost directly at the lamp before having light shine in one's eyes. Three; no need

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for any kind of reflector. In fact, I have removed the reflector from my long reach and my goose neck lamps (see pictures). The smaller lamp assembly works very well when turning as the lamp assembly is smaller and further away from the workpiece for the same illumination.

Left Photo: reflector replaced with a small diameter 'can'. Smaller size is less intrusive when turning.

Right Photo: reflector removed from goose neck lamp. No option here to make the shroud smaller.

The design of these LED lamps includes slots in the outer case to allow for air flow for cooling the lamp. Do not cover these slots, and DO make sure that there is adequate air flow around the lamps. Inadequate cooling will shorten lamp life.

The only local retail source that carries this lamp (at time of writing) is Home Depot. Read the packaging as there are four lamps that look the same – this article describes the R20 (standard screw base) "cool white" model, light output of 230 lumens. The other models include GU10 (pin base) styles and a R20 base "warm white", 155 lumens light output. The "cool white" (daylight) lamp output is 50% greater and is closer in simulating daylight. I'm sure that equivalent lamps from other manufacturers will soon become available as LED lighting will surely replace fluorescent, incandescent and quartz lamps in the near future.

OPERATIONAL PHOTOS:

The photos compare the LED lamp (no reflector) with a 35 Watt fluorescent with a good reflector. During my tests I found that my eye was easily deceived. In the shop, the workpiece illumination appeared comparable with the LED lamp fairing slightly better. The photos show that the illumination provided by the LED lamp is clearer, brighter and does not falsely colour the workpiece. Investigating further, I found that the LED lamp light output has far less ultraviolet and infrared than the fluorescent. The infrared content in the fluorescent lamp is responsible for the inaccurate colour tone of the pictures. I no longer have any quartz lamps to compare – banned from my workshop since the fire incident. I expect that the colour cast of photos taken with a quartz flood lamp would be closer to the LED performance i.e. 'better' than the fluorescent lamp.

There are other good LED lamps available, some with different beam spread and higher light output. The problem with these is that presently they are not readily available, sold primarily to industrial customers. Within the next year or so, start looking out for LED lamps and arrays that replace almost any present lighting fixture and some creative LED lighting fixtures that set their own standards. I have even uncovered LED arrays that fit in standard 'four foot' and 'eight foot' fluorescent fixtures! You won't be disappointed spending $30 (+tax) to buy this LED lamp. If you use the lamp 2,000 hours per year, lamps should last an average of 20 years.

Camera distance constant (30cm (12")), Lamp placement at 30cm (12") and 60cm (24"). The photos have not been altered, only cropped and resized to reduce file size. Shutter speed and lens opening chosen to show the best overall contrast, resulting in the "shop lighting only" photo appearing quite dark. I chose to photograph the flat face of a donut chuck made from MDF to show the best contrast and the 'real' colour is very well known by most turners.

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All photos taken at 1/300sec shutter speed and F3.3.

Shop lighting only | 7W LED - 60cm | 7W LED - 30cm | 35W Fluorescent-60cm | 35W fluorescent-30cm

Note that the colour of the subject with LED illumination (according to my camera) is closer to the real colour of MDF in daylight than the illumination by "daylight" fluorescent lighting.

A dimmable version of this lamp may be available by end 2010. I don't see the need for a dimmable lamp for turning unless using a lamp with at least triple the light output of this lamp, e.g. a 25 Watt LED lamp. Lamps of this higher wattage are available, but not easily sourced. We will have to wait a year or two before LED "standard" base lamps with light outputs over 800 lumens are readily available. Until then – and after – this lamp will keep my work brightly lit.

LAMP SPECIFICATIONS:

Philips Ambient LED™ R20 (NR-63) cool white indoor narrow flood LED lamp.

-Base / Shape: Standard Medium NR-63 (R20) (fits in same envelope as standard incandescent bulbs)
-Beam Spread: 25 Degrees (well-defined beam, very little light emitted to the sides)
-Colour Temperature: 4200 Kelvin (close to replicating daylight)
-Light Output: 230 lumens (same as full output of a 40 Watt incandescent)
Note: Light output appears to be equal to the usable 'cone' of 100 Watt incandescent flood lamp
-Power Consumption: 7 Watts (save $6.60/ year @ 0.10/KWH and 2,000 hrs / yr usage vs 40Watt lamp)
-Power Source: 120VAC (standard North American household power)
-Average Life: 40,000 hours (same as 40 incandescent or 6 fluorescent lamps)
-UV / IR output: almost zero (almost no ultraviolet or infrared light output – will not fade colours)
-Cost: $CDN 29.98 (present pricing at my local Home Depot store and on-line)
-Energy savings mean a 3 year amortization of initial lamp cost (using $0.10 / KWH for electricity)
-Contains NO mercury (minimizes environmental exposure at end of life disposal)
-No turn on delay (instant-on)

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