

# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 180

April 2011

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## Gazette Staff

Editor	Frank Hills
Publisher	Bob Neidorff
Events Editor	Bill Brackett
Meeting Notes	Todd Cahill

## NEMES officers

President	TBD
Vice Pres.	Jeff Del Papa
Treasurer	Richard Koolish
Secretary	Todd Cahill
Director	Mike Boucher

## NEMES web site

<http://www.neme-s.org>

## Contact Addresses

Frank Hills, Editor  
464 Old Billerica Rd.  
Bedford, Ma. 01730  
[hills@aerodyne.com](mailto:hills@aerodyne.com)

Richard Koolish, Treasurer  
212 Park Ave.  
Arlington, MA 02476-5941  
[koolish@dickkoolish.com](mailto:koolish@dickkoolish.com)

Bob Neidorff, Publisher  
39 Stowell Road  
Bedford, NH 03110  
[Neidorff@ti.com](mailto:Neidorff@ti.com)

Bill Brackett, Event Editor  
29 East Main St  
Northborough MA 01532  
[thebracketts@verizon.net](mailto:thebracketts@verizon.net)



## Editor's Desk

Frank Hills

### No More Glass Eye

Are there any "Star Trek, Next Generation" fans out there? Remember Jordy LaForge? He was born blind but the technology existed (exists in the future?) to let him see with a pair of special glasses that make a direct connection to his brain. Imperfect, but blind no more, Jordy had what might be considered bionic eyes. In fact, later in the series, his special glasses would be replaced with implants and the ability to see, and look, just like everyone else. Wouldn't it be fantastic if that technology existed today? Believe it or not, it's in its infancy and showing promise. Yes, science is on the verge of building the bionic eye.

Of course, there are different causes for blindness. The research I'm referring to is limited to retinal damage; the retina is made up of receptors that signal the nerves behind them what to tell the brain. Some receptors define color and others black to white. Retinal damage can be caused by genetic factors, by flash blindness (welding without goggles and lasers), infection and many other things.

-Continued on page 2

## Next Meeting

Thursday, April 7th,  
2011

7:00 PM. Meetings held at:  
Charles River Museum of Industry  
154 Moody Street  
Waltham, Massachusetts

## Membership Info

New members welcome! Annual dues are \$25 (mail applications and/or dues checks, made payable to "NEMES", to our Treasurer Richard Koolish, see right) Annual dues are for the calendar year and are due by December 31<sup>st</sup> of the prior year (or with application).

Missing a Gazette? Send mail or email to our publisher.

Addresses are in the left column.

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## ***Editor's Desk***

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Without these receptors, the eye is like a digital camera without the CCD (charge coupled device; the image sensor). The picture gets in, but there's no nerve impulse to tell the brain to adjust the iris, focus the lens, or interpret the image. This kind of blindness doesn't give you a blur or light and shadow, it means complete darkness. Modern medicine holds so much promise for those with eye disease and damage, but this particular medical problem is daunting.

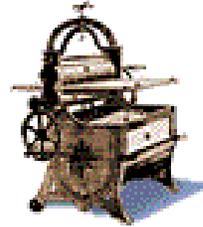
Part of the problem is that, unlike advanced artificial limbs or cochlear implants, the eye is actually part of the brain and more is going on than simple electric nerve stimulation. And this device is more than just an array of solar cells plugged into individual nerves. It's hundreds, thousands, potentially hundreds of thousand of solar cells and the micro-processors needed to convert the voltage signals they generate into something the nerves behind the eye can interpret. At present the technology is only black/white and limited, but to someone who is totally blind, it could be a miracle. There are several groups doing research. One has already implanted a prototype in a man's eye. With only a few pixels, he is able to identify the outline of a lamp and the shape of a tree, but no detail. It was like seeing runway lights in the dark. But he saw!

Another group is at the animal testing stage with a far denser pixel array. How they could tell, I don't know, but they were convinced the animal (whatever it was) was able to identify individual objects. Fantastic!

So how far off is a practical bionic eye? Well, there are multiple problems to overcome. First is the body's tendency to reject anything foreign. Though there are materials that are "body neutral", you can't make microchips out of them. Secondly, though nerve surgery is common practice now, it's still very crude as far as the human eye is concerned. It's still not completely effective at reattaching fingers and arms, which are far less complex. Third, and no one mentions this in their research, how do you power something like this? Stick you head in a

re-charger every night? I thought about this as I was brushing my teeth this morning with my rechargeable tooth brush. Well, maybe it's not so far fetched.

Next month, "Stanley Meyer's Machine". This one will make you think!



## ***NEMES Gazette Editorial Schedule***

<u>Issue</u>	<u>closing date for contributions</u>
May 2011	April 22, 2011
June 2011	May 20, 2011
July 2011	June 24, 2011
August 2011	July 22, 2011
September 2011	August 19, 2011
October 2011	September 23, 2011

## *2011 NEMES Membership Dues are OVERDUE!!*

Please send a check for \$25.00 made out to NEMES to our treasurer:

Richard Koolish  
212 Park Ave.  
Arlington MA 02476

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

HomePhone \_\_\_\_\_

Work Phone \_\_\_\_\_

email \_\_\_\_\_



## ***President's Corner***

Dick Boucher

### ***The Meeting***

Our speaker for April will be Ron Ginger, the founder of this group. For many years, Ron has been interested in building CNC machines to use in model engineering. Ron will talk about his "Adventures in Home Shop CNC".

He will describe a series of CNC conversions he has done, starting with a Sherline mill, and working through several small mills, a couple of lathes and a brownie cutter for a bakery. He will show photos of the details of these conversions and explain the hardware and software choices made in their building. Then he will detail a Jet knee mill conversion, complete with ball-screws and full 4 axis milling.

Ron will be showing a new development he is working on for Lathe software, which will become a part of the Mach3 Wizards.

### ***Miscellaneous Ramblings***

Wow, I am writing about April already. The snow has all but disappeared from my yard and I have slowly gotten started on spring yard work. Fortunately as the old blues song goes, the river stayed away from our door this year, though we did have a questionable time and the volunteers got everything they could to the high ground just in case the Charles decided to pay the lower level another visit this year.

This month is an exciting month as it marks the fifteenth year of our existence - a nice landmark for an organization such as ours. As you can see our founder, Ron Ginger, will be our guest speaker this month. Along with his talk on the home shop CNC work he has been pursuing in recent years he will give us a brief talk about his thoughts, reasons and hopes in founding our very successful organization.

Last Saturday, Bea and I ventured to Clark's Trading Post / White Mountain Central Railroad in Lincoln NH to participate in the semi-occasional running of the Lombard Log

Hauler. At eight o'clock AM we met up with friends both local and from as far away as Montreal Quebec for breakfast at the Sunny Day Diner on Route 3 and then we headed just up the street to the Trading Post. The crew from the White Mountain Central Railroad already had a fire in the belly of the beast when we arrived. Soon a full head of steam was ready to power the machine around the woodpile and onto the old roadbed of route 3 for a day of running back and forth along the old roadbed. The Lombard was the first ski mobile if you will, it utilizes a crawler track drive mechanism in the rear to power the machine along the snow and a pair of hardwood skis in front to steer the machine. It is mounted on a locomotive-style boiler. The engine is very similar to the arrangement on a Climax type locomotive.

All too soon, the sun was dipping behind mountains, but before it left it had done its melting damage to the running track so the front end loader was pressed into use transporting more snow onto the old road in preparation for Sunday's run. The reports I got back were that Sunday's run was just as successful as Saturday's.

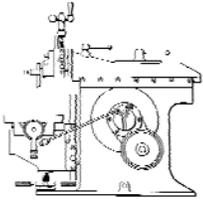
Sunday, Bea and I headed to Lunenburg MA for the baptism of son Michael's new daughter Ainsley. This was a great time of religious tradition and family gathering.

Last week I broke a long tradition and went back to work. I had totally forgotten about having to scrape a windshield before heading out to work in the morning. I will tell you all about it at the meeting.

Man, am I tired as I write this. Got a lot of sleep catching up to do. Fortunately it is rather chilly outside this morning so I won't feel bad about taking a couple naps today.

Dick B.





# Metal Shapers

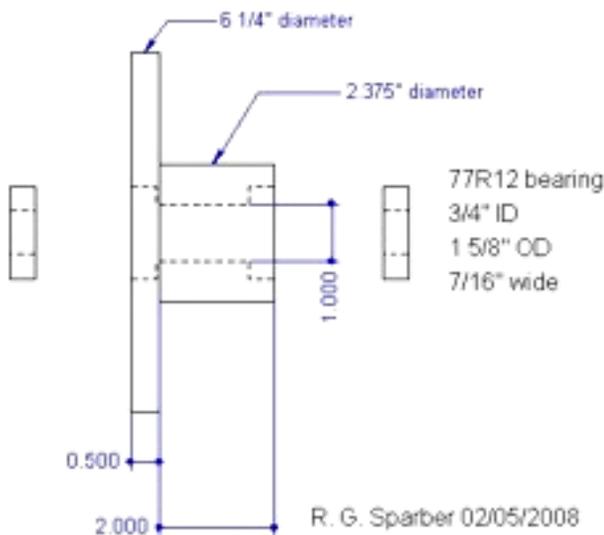
By Kay Fisher

## R. G. Sparber's Gingery Shaper - Part 13

### The Crank Bearing Support

This article starts with the casting process and continues through the complete machining of the part plus its attachment to the shaper's column.

Originally I had planned to use ball bearings to support the crank shaft but later had my mind changed by people on the "gingery\_machines" Yahoo group. The impact force of the cutter would be concentrated in a very small area within the ball bearings leading to premature bearing failure. A bronze bushing has far more contact area and can withstand impact force better. My original design is shown below.



### Crank Bearing Support Drawing by R. G. Sparber

I had already made the pattern assuming ball bearings and decided to just use it. The result is that the hub is larger in diameter than required. So far I don't see any harm in that. The only deviation from the above drawing is in the machining phase where I will bore the hole a uniform 1" diameter and not cut the ball bearing pockets.

### Casting the Crank Bearing Support

Here you see the pattern partially covered in finely sifted Petrobond. I use a flour sifter for sand that will contact the pattern. The large white cylinder is the hub. The smaller cylinder is part of the sprue and gate system.

On the left you can see some of my extremely sophisticated foundry tools. In tight spots, I ram the sand with the wooden triangle and the bar of CRS. You can also see half of my larger square-end rammer.



Casting in Petrobond

Photo by R. G. Sparber

After the drag was rammed up, I added my bottom board and turned it over. You can now see the flange's plate plus more of the gating.



Casting Turned Over

Photo by R. G. Sparber

The sprue has been fitted to the gate. I added a block of wood between the disk and riser to provide more space to hold molten aluminum in hopes of preventing a shrink void. I am not following Gingery's plan of placing the riser on the end of the hub. It seemed to be unnecessary effort. If my approach fails, I am out a bit of time. If it works, I have avoided hassle plus learned something new.



**Sprue Fitted to Gate** Photo by R. G. Sparber

It worked! There were no shrink voids at all. You can see the sprue still attached to the edge of the plate.



**Bearing Support** Photo by R. G. Sparber

I did have some crumbling of the edge between plate and hub but this will be cleaned up during machining.



**Sprue and Riser** Photo by R. G. Sparber

The sprue and riser are visible here. The sprue has a slight taper. This was formed with a tapered sprue cutting tool - 4 wires attached between two disks of different diameters. The top of the sprue has a larger angle taper and was cut after the body was cut.

The molten aluminum falls down the sprue and hits the bottom of the well. It then fills up the well and gently flows out into the disk, into the hub, and finally up the riser.

I cut the gate and riser off with my bandsaw. Sawing the block from the plate took a bit of patience but was not difficult.



**Support on Lathe** Photo by R. G. Sparber

The part is held in a 3 jaw chuck and the edge cleaned up first. I then faced the plate, removing the remnants of the riser. To my surprise, the plate was not all that flat. I ended up having to take about 0.04" from the face before it was true.



**Boring for Bushings** Photo by R. G. Sparber

After facing the plate, I step drilled the center until I could fit in my boring bar. Then I opened the hole out to 1.000". I ended up at 1.002" but still had a slight interference fit with the bronze bushings. Luck was with me. This boring bar has a lot of spring in it so it is very easy to open the hole too much.

Note that the face of the flange was machined along with the bore without disturbing the part. This insures that the bore is perpendicular to the flange's bottom. The shaft that runs in the bronze bushings should then be perpendicular to the flange.

I then turned the flange over and held the perimeter in the 3 jaw chuck with its jaws reversed. It was then possible to face the top side of the flange and the end of the hub.

The next step was to roughly lay out the bolt holes. Someone suggested using 6 screws rather than 4 because it looked better. As my good friend Ed used to say "If more is better, then too much is

just right". So I used 8 screws. I decided to use 1/4-20 screws given that the bolting flange on the side of the column is only about 0.4" wide and I wanted to stay in the center of it with plenty of metal on both side. Eight 1/4-20 screws are stronger than four 5/16-18 screws.



**Double-Checking Layout Photo by R. G. Sparber**

The flange was simply clamped into my mill vise. This is a first for me. I have never had a need to drill a bolt circle before. My Shumatech DRO has a bolt ring function built in. Enter the radius of the ring, number of bolts, starting angle, and stopping angle. The starting and stopping angle are equal which means that I want the 8 bolt holes to cover a full 360 degrees.

I did a dry run of the drilling sequence with a spud fitted to the drill chuck. Much to my surprise I was unable to move to the bolt position shown above. I needed 0.015" more travel in my Y axis, so I changed my start and stop angle to 22.5 degrees. As you will see below, this avoided the Y axis limitation.



**Bolt Holes Drilled Photo by R. G. Sparber**

The holes were all drilled with a #7 so I could spot through to the bolt ring on the column.



**Deburring Photo by R. G. Sparber**

I used a countersink permanently fitted to an old bit brace to deburr each hole top and bottom.



**Mounting Bearing Support Photo by R. G. Sparber**

This picture is a little deceptive. I started by clamping the flange to the column's bolt ring and drilling through with my Gingery drill press. After drilling 4 holes I realized that the flange had shifted a little. This is an old lesson I just relearned. The right way to drill a series of holes like this is to drill the first hole, follow with a clearance drill, and then tap. Fit the screw and move onto the next hole. Only then can you be sure the holes will line up. Once a few screws are secure, it is possible to drill the rest of the tap holes before changing to the clearance holes and tap. So here you see 4 screws installed and the remainder of the tap holes being drilled.

Not visible is a scribe line that indicates which hole is at the bottom. Although the holes should all be within a few thou of their ideal position, it is still best to keep the matched holes together. Once the oil hole is drilled, it will be obvious which face is up on the hub.



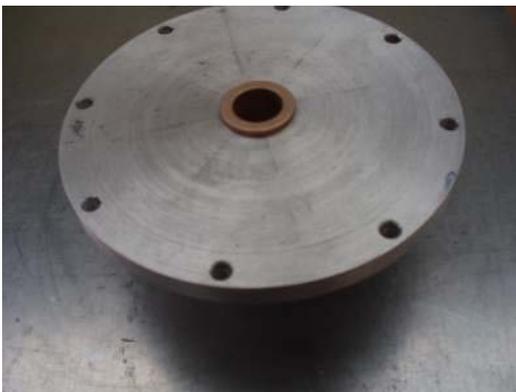
**Top View** Photo by R. G. Sparber

The outside bushing pressed in solidly. But the flange is not sitting on the surface plate.



**Bottom View** Photo by R. G. Sparber

The two bronze bushings were too long. Fortunately I was able to press them out and cut off about 1/2" from each one. I now have about 0.4" between the ends of the bushings that will be my oil sump.



**Bottom After Fix** Photo by R. G. Sparber

Maybe everyone else has smooth sailing during this project, but I certainly do not. There were no show stoppers, just a constant flow of minor screw ups and surprises.

There is one more machining step remaining. I need to drill an oil hole that feeds the sump. A strip of felt will go down this hole. Gingery calls for an oil cup but I don't have one. I might put in a threaded plug.

Stay Tuned for part 14 from R. G. Sparber next month.

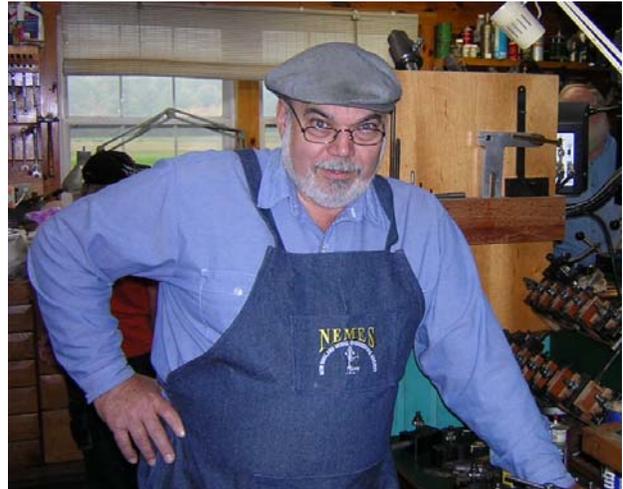
Keep sending me email with questions and interesting shaper stories.

My email address is:

[KayPatFisher@gmail.com](mailto:KayPatFisher@gmail.com)

Kay

### *NEMES Shop Apron*



Look your best in the shop! The NEMES shop apron keeps clothes clean while holding essential measuring tools in the front pockets. The custom strap design keeps weight off your neck and easily ties at the side. The apron is washable blue denim with an embroidered NEMES logo on top pocket.

Contact Rollie Gaucher 508-885-2277

### *NEMES Tee Shirts*

NEMES tee shirts and sweat shirts are available in sizes from S to XXXL. The tee shirts are gray, short sleeve shirt, Hanes 50-50. You won't shrink this shirt! The sweat shirts are the same color, but long sleeve and a crew neck. Also 50-50, but these are by Lee. The sweat shirts are very comfortable!

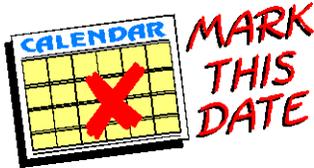
Artwork by Richard Sabol, printed on front and back:

Prices:

	Tee Shirts	Sweat Shirts
S - L	\$12.00	\$22.00
XXL	\$14.00	\$24.00
XXXL	\$15.00	\$25.00

Add \$5 shipping and handling for the first tee shirt, \$1 for each additional shirt shipped to the same address. Sweat shirts are \$7 for shipping the first, and \$1.50 for each additional sweat shirt. Profits go to the club treasury.

Mike Boucher  
10 May's Field Rd  
Lunenburg, MA 01462-1263  
[mdbouch@hotmail.com](mailto:mdbouch@hotmail.com)



## Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at [thebracketts@verizon.net](mailto:thebracketts@verizon.net) or (508) 393-6290.

*Bill*

April 7<sup>th</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA 781-893-5410  
<http://www.neme-s.org>

April April 30<sup>th</sup>-May 1<sup>st</sup> NAMES Expo  
Toldeo, OH  
<http://www.modelengineeringsoc.com>

April 16-17<sup>th</sup> Woods Hole Model Boat Show  
Woods Hole, MA  
(508) 548-7270  
<http://www.woodsholemuseum.org/>

April 17<sup>th</sup> 9AM The Flea at MIT  
Albany Street Garage at the corner of Albany and Main Streets in Cambridge  
<http://www.mitflea.com/>

May 1<sup>st</sup> NHPOTP engine show  
RT 113 Dunstable MA  
Robt Wilkie 207-748-1092

May 5<sup>th</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA 781-893-5410  
<http://www.neme-s.org>

May 6<sup>th</sup>-8<sup>th</sup> Steampunk Weekend  
Charles River Museum of Industry  
Waltham, MA 781-893-5410  
<http://www.crmi.org/>

May 15<sup>th</sup> Spring Steam-up  
Waushakum Live Steamers Holliston MA  
<http://www.waushakumlivesteamers.org/>

May 15<sup>th</sup> 9AM The Flea at MIT  
Albany Street Garage at the corner of Albany and Main Streets in Cambridge  
<http://www.mitflea.com/>

May 17<sup>th</sup>-19<sup>th</sup> 9AM to 5PM  
EASTEC at Eastern States Expo  
West Springfield MA  
[www.sme.org/eastec](http://www.sme.org/eastec) 800-733-4763

May 28<sup>th</sup>-29<sup>th</sup> Bernardston Show  
Rt 10 off Rt 91 Bernardston, MA  
Vickie Ovitt 413-648-5215

May 28<sup>th</sup> American Precision Museum opens  
<http://www.americanprecision.org/>

