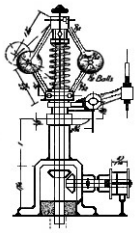

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 234 October 2015 © 2015 NEMES

Editor's Desk

Dan Eyring

During the long beautiful summer just ending, my wife and I RV camped all over upper New England and had the opportunity to visit some well known destinations for tool junkies – the Transportation Museums at Owl's Head Maine and it's neighbor, the Cole Museum on Mount Desert Island - and in Vermont, we had a great time at the American Precision Museum.

But we were also lucky enough to find a few perhaps less well known treasures (at least to me) that I would recommend to anybody with a free weekend.

Literally down the street from the Owl's Head Museum, you will find Captain Jim Sharp's Sail Power and Steam Museum. Captain Jim has led an amazingly adventurous life as a schooner owner and Captain.

http://www.sailpowersteammuseum.org/

And on the west coast of Vermont at the Shelburne Museum you can the steam side wheeler Ticonderoga, complete with a huge walking beam steam engine.
http://shelburnemuseum.org/collections/steamboat-ticonderoga/

Finally, if you're ever in VERY upstate New York, be sure to spend a day at the Antique Boat Museum in Clayton. You will be amazed at their collection.

http://www.abm.org/

Next Meeting

Thursday, October 1, 2015 7PM

Waltham Library
735 Main Street
Waltham, Massachusetts

Our speaker will be Robert Megerdichian, who's father Abraham was a machinist. During his spare time at work, Abraham made miniatures of daily household objects, tools, etc. There is a You tube video on his exhibit at the Attleboro Area Industrial Museum. It shows a small set of carpenter's tools.
https://www.youtube.com/watch?v=IMCZrurmF6Y

Membership Info

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

Deadline for submitting articles is two weeks prior to the next meeting.

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Shop Talk

Max ben-Aaron

Max returns with a new and very well referenced tech talk. All references are hyperlinks, denoted by blue font with underlining. If you're reading this on a computer, do a control/click to bring up the reference links.

ELECTRICITY

From time immemorial ancient Mediterranean cultures knew about shocks from electric fish long before any knowledge of electricity. They also knew about static electricity, that certain objects, such as rods of amber, could be rubbed with cat's fur to attract light objects like feathers.

Around 600 BC Thales of Miletus, who is considered to be the first known scientist, made a series of observations on static electricity. He concluded, from his experiments, that friction rendered amber magnetic, and the attraction was due to a magnetic effect, which was different in minerals such as magnetite which needed no rubbing. Thales was wrong, but later science would eventually prove that there really was a link between magnetism and electricity.

In 1936 the Baghdad Battery was discovered. It seems to resemble a galvanic cell, so, according to a controversial theory, the Parthians might have had knowledge of electroplating. It is uncertain whether the artifact was electrical in nature.

Electricity was little more than an intellectual curiosity until 1600, when the English scientist William Gilbert made a careful study of electricity and magnetism. Unlike Thales, he distinguished the lodestone effect from static electricity produced by rubbing amber and he coined the New Latin word electricus ("of amber" or "like amber", from ἤλεκτρον, elektron, the Greek word for "amber") to refer to the property of attracting small objects after being rubbed. This association gave rise to the English words "electric" and "electricity". Work by Stephen Gray showed the important distinction between conductors and insulators. Further work was conducted by Otto von Guericke, Robert Boyle, and C. F. du Fay.

In the 18th century, Benjamin Franklin conducted extensive research on electricity, as documented by Joseph Priestley (1767), with whom Franklin carried on extended correspondence. Franklin had to sell his possessions to fund his work. In June 1752 he attached a metal key to the bottom of a dampened kite string and flew the kite in a storm-threatened sky, showing that lightning was indeed electrical in nature when a succession of sparks jumped from the key to the back of his hand. He also described electrical charges to explain how a Leyden jar stored electricity. An amount of charge may be expressed as being either negative or positive. That charge carried by electrons is deemed negative, and that by protons positive, is a custom that originated with Benjamin Franklin. (Unfortunately, he got the definition wrong).

In 1791, Luigi Galvani published his discovery of bioelectricity, by getting a frog's leg to twitch when a metallic needle was inserted into it. Alessandro Volta's disputation with Galvani over the physical cause of this phenomenon resulted in the invention of the Voltaic pile (battery) in1800. Made from alternating layers of zinc and copper, it provided scientists with the first reliable source of an electrical current.

The presence of an electric current causes several observable effects. The decomposition of water by the current from a voltaic pile was discovered by Nicholson and Carlisle in 1800, a process now known as electrolysis. One of the most important discoveries relating to current was made accidentally by Hans Christian Ørsted in 1820, when, while preparing a lecture, he witnessed the current in a wire disturbing the needle of a magnetic compass. Current through a resistance causes localized heating, an effect James Prescott Joule studied mathematically in 1840.

The first recognition of the unity of electric and magnetic phenomena is attributed to Hans Christian Ørsted and André-Marie Ampère in 1819-1820.

Work on electricity was greatly expanded upon by Michael Faraday when he discovered electromagnetism, a fundamental interaction between electricity and magnetics. Michael Faraday's discoveries formed the foundation of electric motor technology; he invented the electric motor in 1821. Georg Ohm mathematically analyzed the electrical circuit in 1827. Electricity and magnetism (and light) were definitively linked by James Clerk Maxwell, in particular in his "On Physical Lines of Force" in 1861 and 1862.

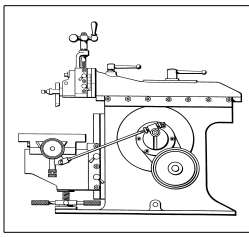
In 1887, Heinrich Hertz was trying to prove that the electrical waves through the ether, predicted by Maxwell's Theory, were real. He demonstrated their existence using a spark gap, discovering, incidentally, that electrodes illuminated with ultraviolet light create electric sparks more easily. Ironically, this discovery, which was the crowning work on classic electricity, was also the first observation of quantum effects. In 1905 Albert Einstein published a paper that explained the discovery and exploitation of the phenomenon of electricity is one of mankind's greatest achievements.

The 19th century would see the greatest progress in

electrical engineering. Electricity turned from a scientific curiosity into an essential tool for modern life, becoming a driving force of the Second Industrial Revolution.

Progress between the invention in 1800, of Volta's battery and the year 1900 was spectacular; generation, transmission and utilization of electric power for lighting and industrial use (the electric motor, in particular) were game-changers on an unprecedented scale. Electricity used in the invention of the telegraph and telephone, for communication shrank the world even more than steamships and railroads had. But the best was yet to come.

This brief discourse on electricity is intended to prepare the ground for discussion of the vacuum tube, invented early in the 20th century by Lee de Forest, when he patented the Audion tube. This is, arguably, one of the greatest inventions of all time.



Metal Shapers

Kay Fisher

R. G. Sparber's Gingery Shaper - Part 66

Casting A Ball Handle using Plastic Wrap

By "tiwonk" as told to R. G. Sparber

In a past article I made two copies of this ball crank. They came out OK but there is an easier and better way to do it that involves plastic wrap.

Atlas Lathe Crank Photo by R. G. Sparber

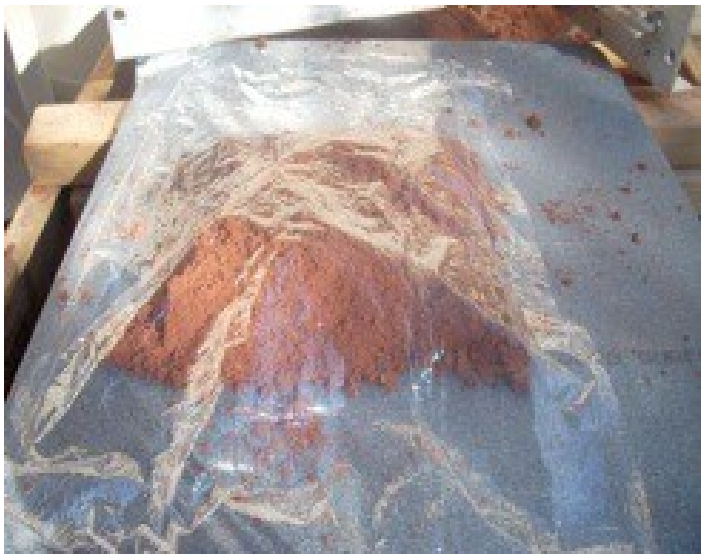
The traditional way to make an impression of a 3 dimensional object is to first make a "false cope". This means ramming the cope up with nothing in it. You then push the object down in the false cope and ram up the drag. Turn the flask over, throw away the false cope and ram up a "real" cope. The act of jamming the object into the false cope causes it to crack making it unusable for casting.

The following technique solves this problem in a rather elegant way.

First you put down the drag and riddle in just enough sand to support the part after it is rammed.

Drag with Loose Sand Photo by R. G. Sparber

The drag is lifted up and a sheet of plastic wrap is placed over the sand.



Plastic Applied Photo by R. G. Sparber

The drag is now placed over the plastic wrap, capturing the sand.

Drag Applied Photo by R. G. Sparber

The part is next pushed down into the sand until the top of the sand is at the parting line of the part. Sorry, but in all of the excitement, I forgot to take of picture of this step.

You then ram in the sand good and hard.

Ram Sand Photo by R. G. Sparber

The drag is now full and struck off. A sprinkling of sand is added on top and the bottom board worked into place.

The drag sandwiched between molding board and bottom board is turned over. I use a ratcheting strap to keep it all together.

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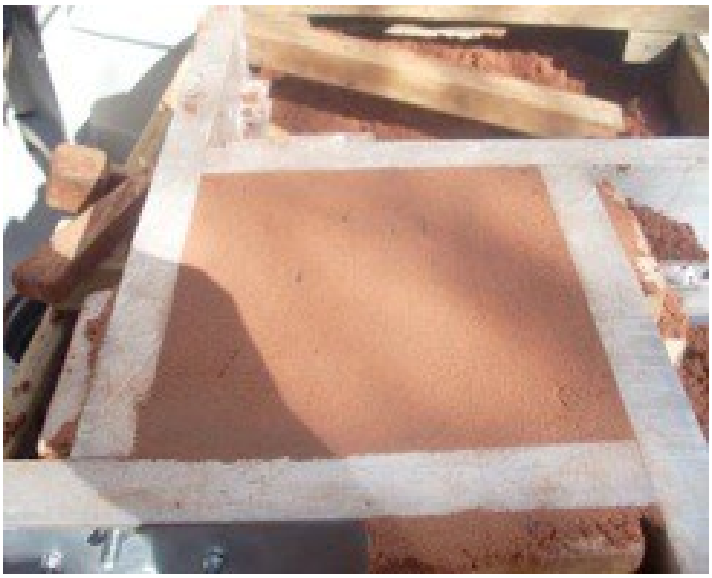

Struck Off Photo by R. G. Sparber

Flipped Over Photo by R. G. Sparber

With the molding board removed, you can see the small quantity of sand on top of the plastic wrap. It easily lifts out.

Part in Drag Photo by R. G. Sparber

You are left with the part very solidly supported by the drag. I had to do a small amount of carving to get right down to the parting line but since the sand was rammed so hard, it carved easily.

When satisfied, dust the surface, add the sprue, and ram up the cope.

Cope Sand on Drag Photo by R. G. Sparber

Well, this was my first try. When I lifted off the cope, the cope's sand stuck to the drag. I'm fairly sure this was because the parting line is not flat and smooth so there was a lot more adhesion. Lesson learned: don't ram up the cope as hard as the drag.

I was able to lift off this sand and still had a very solid drag imprint.

2nd Try Photo by R. G. Sparber

This time I tried to smooth out the surface a bit more. Then parting dust was applied and I tried again to ram up the cope. I rammed hard into the sides of the cope and hard directly above the part. The rest of the area was not rammed as hard. I don't know how to convey how hard to ram but experience should teach you.

Drag Photo by R. G. Sparber

This time it all worked. You can see the sprue pin's imprint in the drag. I have not cut in the gate yet.

Cope Photo by R. G. Sparber

The cope imprint came out nice and clean. All that was left was to pull the sprue pin and cut my funnel.

Gate Photo by R. G. Sparber

Here you see the tiny gate cut. I have not found that a riser is necessary.

The resulting casting came out fairly good except for an alignment problem I have with this flask. My alignment pins are not tight enough and I had about a 0.01" misalignment at the parting line. For a large casting this is not noticeable but this ball crank is small so it was obvious. A bit of work on the belt sander made things better. I plan to add better alignment pins before using this flask again.

Stay Tuned for part 67 from R. G. Sparber next month. Keep sending me email with questions and interesting shaper stories.

KayPatFisher@gmail.com

!!!Great Opportunities!!!

Have you stumbled on a great deal, a terrific museum or exposition, or maybe just a new shop technique or product? Well, here's the place to tell the rest of the NEMES membership about it.

From Ron Ginger, posted to the Yahoo NEMES group:

"I have just heard about a very interesting new 3d CAD-solid modeling software package- http://www.onshape.com/

It is totally web based. They really stress this on the website. In my experience, this means a tool is either very under powered or requires $$$ just for the computer to run the software, let alone whatever the software itself costs. Usually both. 3D CAD is processor-intensive. You want to be as close to the hardware as possible. Javascript inside a browser is not going to cut it. I'd be interested in learning more too, but I'd start out very skeptical that this is going to do much beyond show some pretty pictures."

But after trying it out:

"In short, I take almost all of it back. I was wrong, this tool is an amazing accomplishment. I'm still not convinced that working in the cloud is a good idea (for security of files but also for security of product--what do I do if the website goes down or out of business?). But it definitely works and works really well."

Upcoming Events

Errol Groff

To add an event, please send a brief description, time, place and a contact person to call for further information to Errol Groff at:

events@neme-s.org

Oct. 3-4 **Quinebaug Valley Engineers Assn. Fall Festival and Swap Meet**

Colchester Conn, 1-1/2 miles north of Colchester center off Rt. 85.

Contact:

Ed Bezanson, 85 Dayton Rd., Waterford, CT 06385

860-208-2422;

edwin_c_bezanson@sbcglobal.net

www.zagrayfarmmuseum.org

Oct. 3-4 **Boothbay Railway Village Family Harvest Days & Antique Tractor Show**

Boothbay Maine, Rt. 27, 7 miles south of Rt. 1.

Contact:

Margaret Hoffman, PO Box 123 Boothbay, ME 04537

207-633-4727

margaret@railwayvillage.org

www.railwayvillage.org

Oct. 3 **Yankee Steam- Up at the New England Wireless and Steam Museum**

8:00AM-4:00PM

1300 Frenchtown Road, East Greenwich, RI 02818

Contact:

Fred Jaggi

401-944-1389

flj@newsm.org

Oct. 4 **Open House at Rollie Gaucher's shop**

11:00 AM to 4:00 PM

90 S. Spencer Rd., Spencer MA

(this may change so check back closer to the date)

Contact:

Rollie Gaucher

508-885-2277

Oct. 3-4 **Waters Farm Engine and Tractor Show at Waters Farm Days**

Sutton MA., Rt. 146 to Central Turnpike, Sutton to Douglas Rd. to Waters Rd. or Rt. 395 to Sutton Ave., Sutton to Douglas Rd. to Waters Rd

Contact:

Ken Ethier, 404 Leicester St., Auburn, MA 01501

508-832-6678;

krethier@aol.com

www.watersfarm.com

Oct. 4 **Railfan III, Presentation on "The Hoosac Tunnel"**

Noon-5PM

Rowe Historical Society, 282 Zoar Rd., Rowe, Mass.

Show Flyer HERE

Contact:

413-339-4238

Rowehistoricalsociety.org

Oct. 11 **ATHS Pioneer Valley Chapter Truck Show**

Westfield, MA, Mestek Field, 260 N Elm Street, Rt. 10 and 202

Rain or shine. 8a.m to 3 p.m.

Old antique trucks and pick-up Music and food, 50/50 raffle, door prizes

Entrance fee: Dry goods for the food pantry or unwrapped toys for tots item.

Contact:

Donald Prifti

413-569-3666

Nprifti@aol.com

Oct. 10-11 **Swamp Yankee Days**

Washington County Fairgrounds, Route 112, Richmond, RI

Rain or shine, 9AM-5PM

Show flyer here:

http://www.rcfd.org/SYD/SwampYankeeDaysflyer2015.pdf

Contact:

401-487-0050

carolinachief601@yahoo.com

Oct. 24 **American Precision Museum's Model Engineering Show & Maker Space**

Windsor, VT 05089, 196 Main Street, PO Box 679 Model Engineers, Kids Engineering Activities, Maker Space, Presentations and Demonstrations.

Exhibits at both APM and around the corner at the Windsor Rec Center

9AM – 4PM

Show Flyer here:

http://americanprecision.org/2012-01-18-16-22-51/model-engineering-show

Contact:

802-674-5781