

# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 161

Sept 2009

© 2009 NEMES

## Gazette Staff

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

## NEMES officers

President	Dick Boucher
Vice Pres.	Frank Dorion
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)

Dick Boucher, President  
130 West Main St  
Georgetown, MA 01833  
[rlucienb@juno.com](mailto:rlucienb@juno.com)

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

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

### A Short Course on CNC Pt. 1

Let's face it, the initials CNC are very familiar to most of us, yet for many they refer to a deep, dark hole. The idea is simple enough; a computer can be used to control a machine tool. The pair can work faster, repeat a process more consistently and, in theory, do it more accurately than a human operator. But how does it work? Be comforted. I've been working with CNC for almost 30 years and I still have trouble understanding it. It is, however, a simple concept.

CNC stands for "Computer Numerical Control." It differs from the older Numerical Control in that the computer allows for additional automated functions, like feed-back so the machine knows when it has actually reached a target point. It allows the system to reset itself based on the location of a "home" point between operations to improve accuracy when machining multiple parts. And more advanced versions automatically determine the location of related features before beginning the next operation.

-Continued on page 2

## Next Meeting

Thursday, Sept 3, 2009

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.

## Contents

Editor's Desk.....	1
NEMES Gazette Editorial Schedule .....	2
President's Corner.....	2
The Meeting .....	2
Miscellaneous Ramblings.....	3
Disaster Averted!.....	3
Professor Chaddock Would Flunk Me for this Project!.....	4
For Sale.....	7
NEMES clothing.....	7
Upcoming Events.....	8



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

-continued from page 1

Numeric control will simply move the cutter from point A to point B regardless of where the cutter actually is in space. Most common add-on systems are really just NC, despite how they're advertised. In addition to the machine being controlled, there are four components to a basic CNC system; the computer, the breakout board, the drivers, and the actuators (usually drive motors). Each has a part to play before the words you type on the key board can be understood by your machine.

The first component, the computer, runs the software needed to make CNC work. One piece of software creates a numeric model of the part you want to make. This is the CAD package (computer aided design). It looks like lines, circles, or even solid parts on the screen, but the computer only knows these images as numbers that describe these features. A second software package, the CAM package (computer aided manufacturing) takes these numbers and interprets them as locations in digital 3D space (X, Y and Z). Using this software you can write a program which works like a road map. This map has a starting point for the cutting tool and moves it step by step until it makes contact with the work piece and maneuvers it to make each cut. Each line of the program, each step, instructs the computer to send a positive or negative electric pulse; a signal to a motor, switch or valve on the machine tool. Combinations of these signals can move the cutter to make holes, slots, o-ring grooves and the like. There are also signals for tool speed and feed, and others for tool changes or turning the lubrication on of off, if you have them. The only things lacking now are a means to send each signal to the intended device and a method for giving the device a signal it understands...power.

Dividing the signals and delivering them only to the devices they control is the task of the breakout board. Variouslly know by other names, like controller and distribution circuit, the breakout board recognizes a computer signal as

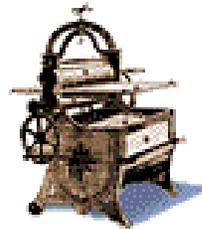
being intended for a specific device by its designator in the signal. A machine code "X" obviously means the X axis, and so on. Any instruction after that X will be sent only to the X driver, the next component in our CNC system.

Drivers control the motors that manipulate the machine. The motors don't recognize the pulsed signals coming from the computer. They only know "power off and power on", "power positive and power negative." The drivers read the computers electric signals and manipulate (re: adjust) the power sent to the motors. That's all they do.

Finally, the motors turn backward and forward the amount commanded by the drivers to turn the lead screws. Remember that the driver may also open and close a solenoid powered valve or perform some other function.

And if all this makes sense to you, you're smarter than I am!

That's the basics. Next month, part 2.



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

<u>Issue</u>	<u>closing date for contributions</u>
Sept. '09	Aug, 24 2009
Oct. '09	Sept. 28, 2009
Nov. '09	Oct. 26, 2009



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

Dick Boucher

## ***The Meeting***

As John Cleese used to say half way through a Monty Python show " And now for something completely different".

Our speaker this month will be another of our own members Dennis Nordin. In his own words Dennis will "*do my best to briefly share 45+ years of gardening efforts (primarily tomatoes) and tid bits of*

*experience along the way. I will also explain some of my most recent adventures into some unique forms of trying to achieve the 'Ultimate Tomato'! I will explain the principals involved and required for the best yields, and some of my cost cutting methods for creating the hydroponics units 'On the cheap' hoping there will be someone who will want to experiment with a system for next year."*

Knowing that the homegrown tomato crop took a big hit this year from the abundance of spring rain and blight, I am interested in Dennis sharing his knowledge with us, especially the part about growing them in water (hydroponics).

## ***Miscellaneous Ramblings***

Bea and I took in four great museums this summer. The first was the Maritime Fisheries Museum in Lunenburg Nova Scotia - a great museum with an aquarium of North Atlantic fish. It also had a large number of great ship models, mostly fishing schooners. The museum is located in a very interesting old ice storage house for icing up the fishing schooners as they headed out to sea to fish. Bea had an Uncle who was a dorry fisherman on the schooner fleet from Lower West Pubnico, Nova Scotia. That made the visit really interesting.

While in Nova Scotia, we also visited a museum called the "Village" in West Pubnico. It is like our Sturbridge Village but quite a bit smaller as it is only a couple years in existence now. They have moved some of the older buildings in the town to the site and it depicts the Arcadian culture of the 1920s, their houses and the work they did supporting themselves and the fisherman. There was a reproduction boat-building shop where they were building a lobster boat of the era which will be fitted with an Arcadia 3 hp engine which they are currently running with a propeller in a tank to demonstrate the starting and reversing procedure of the engine. It was interesting that one of the supporting activities that went on in the "Village" was carving lobster pegs. At the museum in Lunenburg, there was a machine once owned by a business in Pubnico that automatically carved the pegs from pine boards. I was so fascinated by the video of the machine operating I totally forgot to take a picture of the

machine itself. Lobster claws are now kept closed by a heavy rubber band but one of Bea's cousins told us that when the automatic machine was producing pegs, no one was allowed into the area the machine was running. Talk about propriety information!

Next we took in the Shipbuilding Museum in Essex Massachusetts. Many of you have been to the museum for their Steam Festival the past two years but when one has a boiler in steam and spends the day talking to the public one doesn't get to spend any time viewing the displays at the museum. Our tour guide was great sharing much knowledge of the trades involved in the building of the fishing boats in Essex and extended the tour to the old church building where there were a number of great ship models. They also had a video showing the steps taken from the time a customer came into a shipyard and ordered his ship to the time it was launched into the Essex River. If you are in the area, this is a worthwhile visit.

The last visit was to the Wenham Museum in Wenham Massachusetts. The local shipbuilding groups were displaying their models. Have you noticed a pattern here? There was a room filled with models from dories to the Constitution and many of them were outside cases, allowing a really good look at the craftsmanship. One interesting model was of the Evelyn Goulet the schooner that is at the shipbuilding museum.

Dick B.

P.S. the Virginia locomotive is very close to having a fire in its firebox again.



## ***Disaster Averted!***

By Earle Rich

As an amateur machinist, I've collected "stuff" over the years that might come in handy one of these days real soon. One of those was a can of Dykem Blue Layout Dye. I picked this up probably 30+ years ago and use it perhaps once a year.

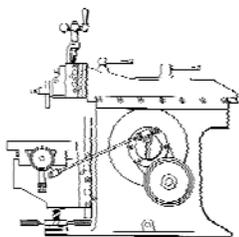
Recently I picked it up and felt the sides of the can buckle in slightly. What??? I held it over a nearby beaker and squeezed it again. This time, my thumb

went right through and the dye spurted out into the container. Fortunately, I had prepared for this and didn't have the experience of something like thin ink spread over my workbench and papers.

Over time, the can had corroded from the inside. Looking at the autopsy, there were lots of little pinhole spots where the blue dye was about to leak out. It was just a lucky chance that I didn't wind up with a cupboard lined with evaporating dye, cementing my measuring tools to the shelves.

Lots of hobbies use strange chemicals that, over time, can change form into something else. When I was doing a lot of darkroom work, I accumulated a lot of developers, stop baths, fixers and then a whole new set when I was doing color processing. The frequent hazardous waste collection events in Nashua and Milford have greatly helped to safely get rid of those now obsolete process chemicals.

If you've held onto any chemicals that are stored in metal cans, you might consider checking and perhaps transferring the contents into a glass container. Check the cover once in a while to make sure it isn't corroding. Baby food jars are pretty good since the covers have a plastic liner. Inspection once a year can avoid a nasty situation.



***Professor Chaddock  
Would Flunk Me for this  
Project!***

*By Bob Neidorff*

I needed two stainless steel knobs to tighten stainless steel bolts on outdoor equipment. The chemicals in ACQ treated lumber react with aluminum, so stainless is really the best choice. The knobs need to be large enough so that I can apply sufficient torque by hand. A wing-nut is would not be large enough, and I didn't have any stainless wing-nuts.

I found a bar of 416 stainless  $1\frac{3}{8}$ " diameter, so I started to make knurled knobs. I lopped off a chunk, mounted it in the lathe and

started to knurl. I was able to score a light pattern on the surface, but no matter how hard I pressed, the part refused to take a knurl. Perhaps the stainless steel was work-hardening from the high force. Perhaps the steel was already harder than the knurl or the knurl was dull. So I gave up that approach.

Years ago, I make a knob by milling two scallops into the perimeter of a round piece. It wasn't pretty and it had sharp edges, but it gave me something to grab onto. I found that old knob in my scrap box. I never liked it and never used it. So I didn't go with that idea either.



**A bad knob design – Easy to make, but unpleasant to use**

So I thought: "What would a true model engineer do?" My mind wandered to the ball-end handles of Professor D. H. Chaddock's Quorn. They are beautiful, functional, and can be made - with enough work.



**One ball handle from a Quorn**

Ron Chernich describes making these ball handles on the web:

<http://www.metalwebnews.com/howto/quorn/quorn.html>

I liked the principle. The handle gives lots of tightening torque. The screw axis is more than 90 degrees from the handle axis, so that the handle sits above, rather than flush with the material being clamped, to clear your fingertips and knuckles. But

it takes a lot of setup and turning to make each one. I set out to make something simpler.

I dug through my junk box and found a nice piece of non-magnetic steel (probably 304)  $\frac{7}{8}$ " diameter by  $5\frac{1}{4}$ " long. I turned each end to a smooth radius in the lathe. Next, I sawed the rod in half at a 45-degree angle with my bandsaw. Following that, I drilled and tapped perpendicular to the 45-degree face. The result is shown in the photo below. My knobs aren't as pretty as Professor Chaddock's ball-end handles, but they were completed quickly, are gentle on my hand, give plenty of tightening torque, and will last almost forever.



**A simple but effective knob, clamping treated lumber in outdoor equipment**

## ***The Steam Man of the Prairies.***

BY EDWARDS ELLIS,

### **CHAPTER XIX.**

#### **THE DOINGS OF A NIGHT.**

IT was soon found that the camping ground possessed another advantage which, during the discussion, had been altogether overlooked.

During the afternoon they had shot a fine-looking antelope, cooking a portion at the time upon the prairie. A goodly portion was left and they now had an opportunity of kindling their fire without the liability of its being seen, as would have been the case had they encamped in any other place.

This being agreed to, the fire was speedily kindled, and the trapper himself began the

culinary performance. It was executed with the characteristic excellence of the hunter, and a luscious meal was thus provided for all. At its conclusion, all stretched themselves upon the ground for the purpose of smoking and chatting, as was their usual custom at such times.

The evening whiled pleasantly away, and when it had considerably advanced, the question of who should act as sentinel was discussed. Up to this, young Brainerd had never once performed that duty at night, although he had frequently solicited the privilege. He now asked permission to try his hand. After considerable talk it was agreed that he might do. The trapper had lost so much sleep, that he was anxious to secure a good night's rest, and the careful scrutiny which he had taken of the surrounding prairie convinced him that no danger threatened. So he felt little apprehension in acceding to the wish of the boy.

At a late hour the three men stretched themselves upon the ground, with their blankets gathered about them, and they were soon wrapped in profound slumber, while Johnny, filled with the importance and responsibility of his duty, felt as though he should never need another hour's sleep. He was sure of being able to keep up an unintermitting watch several days and nights, should it become necessary.

Following the usual custom of sentinels, he shouldered his gun and paced back and forth before the smoldering camp-fire, glancing in every direction, so as to make sure that no enemy stole upon him unawares.

It formed a curious picture—the small fire burning in the valley — motionless forms stretched out before it, the huge steam man silent and grim standing near, the dwarfed boy, pacing slowly back and forth, and, above all, the moon shining down upon the silent prairie.

The moon was quite faint, so that only an indistinct view of objects could be seen. Occasionally Johnny clambered up the bank and took a survey of the surrounding plains; but seeing nothing at all suspicious, he soon grew weary of this, and confined his walks to the immediate vicinity of the campfire, passing back and forth between the narrow breadth of the valley.

As the hours dragged slowly by, the boy gradually fell into a reverie, which made him almost unconscious of external things. And it was while

walking thus that he did not observe a large wolf advance to the edge of the gully, look down, and then whisk back out of sight before the sentinel wheeled in his walk and faced him.

Three separate times was this repeated, the wolf looking down in such an earnest, searching way that it certainly would have excited the remark and curiosity of any one observing it.

The third glance apparently satisfied the wolf for it lasted for a few seconds, when he withdrew, and lumbered away at an awkward rate, until a rod or two had been passed, when the supposed wolf suddenly rose on its hind legs, the skin and head were shifted to the arms of the Indian, and he continued on at a leisurely gait until he joined fully fifty comrades, who were huddled together in a grove, several hundred yards away.

In the mean time young Brainerd, with his rifle slung over his shoulder, was pacing back and forth in the same deliberate manner, his mind busily engaged on an "improvement" upon the steam man, by which he was to walk backward as well as forward, although he couldn't satisfactorily determine how he was to go up and down hill with safety.

Still occupied in the study of the subject, he took a seat by the half-extinguished campfire and gazed dreamily into the embers. It had been a habit with him, when at home, to sit thus for hours, on the long winter evenings, while his mind was so busily at work that he was totally oblivious to whatever was passing around him.

It must have been that the boy seated himself without any thought of its inevitable result of doing so; for none knew better than he that such a thing was fatal to the faithful performance of a sentinel's duty; and the thought that his three companions, in one sense, had put their safety in his hands, would have prevented anything like a forgetfulness of duty.

Be that as it may, the boy had sat thus less than half an hour when a drowsiness began stealing over him. Once he raised his head and fancied he saw a large wolf glaring down upon him from the bank above, but the head was withdrawn so quickly that he was sure it was only a phantom of his brain.

So he did not rise from his seat, but sitting still he gradually sunk lower, until in a short time he was sleeping as soundly as either of the three around him.

Another hour wore away, and the fire smoldered lower and all was still.

Then numerous heads peered over the edge of a ravine for a few seconds, and as suddenly withdrew.

A few minutes later a curious sight might have been seen—a sight somewhat resembling that of a parcel of school-boys making their gigantic snowballs. The fifty Indians, the greater portion of whom had patiently waited in the adjoining grove, while their horses were securely fastened near, issued like a swarm of locusts and began rolling huge bowlders toward the valley. Some of them were so large that half a dozen only succeeded in moving them with the greatest difficulty.

But they persevered, working with a strange persistency and silence, that gave them the appearance of so many phantoms engaged at their ghostly labor. Not a word was exchanged, even in the most guarded of tones, for each understood his part.

In time half a dozen of these immense stones reached the edge of the ravine. They were ranged side by side, a few feet apart, so as not to be in each other's way, and the Indians stood near, waiting until their work should be completed.

Some signal was then made, and then one of these bowlders rolled down in the ravine. Even this scarcely made any perceptible noise, the yielding ground receiving it like a cushion, as it came to a halt near the center of the valley.

When this was done a second followed suit, being so guided that it did not grate against its companion, but came to rest very near it.

Then another followed, and then another and another, in the same stealthy manner, until over a dozen were in the valley below.

This completed, the phantom-like figures descended like so many shadows, and began tugging again at the bowlders.

Not a word was exchanged, for each knew what was required of him. Fully an hour more was occupied, by which time the labor was finished.

The bowlders were arranged in the form of an impassable well across the narrow valley, and the steam man was so thoroughly imprisoned that no human aid could ever extricate him.



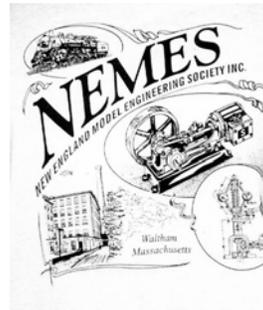
*For Sale*

*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

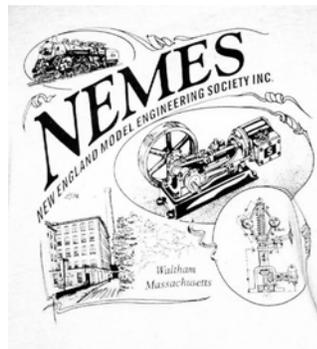


**NEMES**  
*clothing*

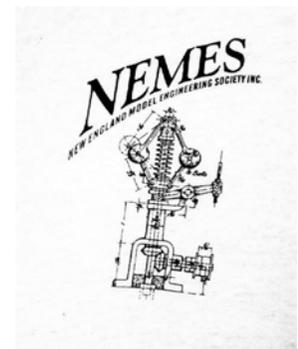
*NEMES Tee Shirts*

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:



Rear



Front

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  
[mbouch@hotmail.com](mailto:mbouch@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*

Sept 3<sup>rd</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA  
781-893-5410  
<http://www.neme-s.org>

Sept 12<sup>th</sup> NEMES booth at  
Saugus Iron works  
<http://saugusironworks.areaparks.com/>

Sept 12<sup>th</sup>-13<sup>th</sup> Dublin Show  
RT 101, Dublin, NH 603-863-4696

Sept 11<sup>th</sup>-20<sup>th</sup>  
Annual Lee's Mills Steamboat meet  
Lake Winnepesaukee Lees Mills NH  
<http://www.steamboating.org/>

Sept 20<sup>th</sup> Convertible Meet & Antique  
Aeroplane Show  
Owls Head Transportation Museum Owls ME  
<http://www.ohtm.org/>

Sept 20<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/>

Every weekend September-October 1PM-5PM  
'Yankee Siege' Trebuchet  
Greenfield, New Hampshire  
<http://www.yankeesiege.com/>

Sept 26<sup>th</sup> Innovations of Yesteryear  
Charles River Museum of Industry  
Waltham, MA 781-893-5410  
<http://www.crimi.org>

Sept 25<sup>th</sup>-27<sup>th</sup> Connecticut Antique Machinery  
Museum  
Fall Festival \$8.00 entry  
<http://www.ctamachinery.com/>

Oct 1<sup>st</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA  
781-893-5410  
<http://www.neme-s.org>

Oct 3<sup>rd</sup> 9AM-4PM The Original Yankee Steam-Up  
The New England Wireless and Steam Museum, Inc.  
1300 Frenchtown Road East Greenwich, RI  
<http://www.newsm.org/index.html>

Oct 4<sup>th</sup> Noon to 5PM - Roland's Shop visit  
90 S. Spencer Rd. Spencer Ma.  
508-887-2277

Oct 4<sup>th</sup> Foreign Auto Festival & Antique Aeroplane  
Show  
Owls Head Transportation Museum Owls ME  
<http://www.ohtm.org/>

Oct 18<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/>

Oct 31<sup>st</sup> 9AM-5PM American Precision Museum  
10<sup>th</sup> Annual Model Engineering Show,  
Windsor Community Center, Windsor VT  
[www.americanprecision.org](http://www.americanprecision.org) 802-674-5781.

Nov 6<sup>th</sup>-8<sup>th</sup> World Championship Punkin Chunkin  
East of Bridgeville, Delaware  
<http://www.worldchampionshippunkinchunkin.com/>

Oct 31<sup>st</sup> - Nov 1st The Great Fall Auction  
Owls Head Transportation Museum Owls ME  
<http://www.ohtm.org/>