



# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

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## Editor's Desk

Frank Hills

### A Short Course on CNC Pt. 2

I'm hoping that last month's article on CNC basics made this deep dark hole a little less scary, because this month I'm going to dim the lights a little bit. CNC as a concept isn't complex, but the devil is in the details. CNC allows you a whole new way of producing parts on your machine, but having this ability comes at a price; a necessary increase in your competence, and a clear vision of what you're trying to do. No CNC system is "plug and play". It is not a system for the machinist who works by feel. You must be able to calculate speeds, feeds and choose your tools in advance. You must know your material and its characteristics. You must become a "technical machinist". You must also understand the pros and cons of CNC. Its value is in producing parts of repeatable quality, not in making them necessarily easier to produce. The more complex the part, the more likely CNC will save you time, but not effort. If you're considering CNC to make life easier you're making a big mistake.

## Next Meeting

Thursday, Oct. 1, 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 .....	3
President's Corner.....	3
Miscellaneous Ramblings.....	3
For Sale.....	7
NEMES clothing .....	7
Upcoming Events.....	8



## **Editor's Desk**

-continued from page 1

There is more work to do, not less. Still interested? Then let's delve into more detail.

As I stated last month, the name CNC can be misleading. Many systems aren't really CNC. NC is the more common small shop type. It will move the tool from point A to point B as instructed without regard for how many vises it crashes into. But it is relatively inexpensive and easy to use. Its accuracy is limited by the milling machine or lathe it controls. In this way, it is "add on" equipment. But keeping this in mind, it works well and allows for quick set-ups. It's common now for NC to have "package" programming functionality. This allows an operator to select many common operations from a menu. Hole patterns, o-ring grooves, recesses and bosses can now be machined by selecting the appropriate menu item. NC systems are intended to be manned machines. Though proven programs may operate autonomously for short periods of time, the system has no fail-safes other than the operator. Full CNC units, on the other hand, are more autonomous and self contained. As such, they are designed from the start for every component to cooperate and function as a unit. Their accuracy is frequently better than NC systems because they compensate for their own wear, automatically adjust backlash, way/jib compensation and tool home location. More expensive units will have higher quality, fully sealed way/jib systems with pressure fed oil. Tolerance control is frequently in the 0.0001" range. Software tracks the cutting tools position in space while probes locate and track the part being machined. These features help prevent physical tool crashes and determine the state of its processes. It's this automatic tracking and adjustment that makes the biggest difference between NC and CNC systems. From the beginning, the goal was to build a system that could be set-up, started, and the operator could walk away. It's not unusual for shops having such systems to leave them running alone overnight or over the weekend.

In addition to the differences between controlling systems, there are different types of drive motors available. The less expensive version are called stepper motors. Depending on their size and type, the stepper may have hundreds of poles (electro-magnets) which are actuated in "step" to turn the motor shaft. Steppers are accurate, powerful and, in terms of the electronic controls required, simple and inexpensive. But the stepping nature of these motors can be a problem when trying to create very smooth features. Each minimum step is the width of the pole divided by the ratio of your lead screw. On cheaper systems, it's possible to see the facets left by these small steps. To reduce them you must play with speeds and feeds or try running the finishing cut program line several times. All this takes time. The alternative to the stepper is the servo-motor. Servo-motors have only three poles, but power is applied to them proportionally. Infinitesimal variations in power delivery to two adjacent poles can rotate the motor to any point in its rotation. There is no minimum distance. Servo-motors also have the advantage of smoother operation. Stepper motors can vibrate terribly, inducing chatter in delicate set-ups. In the final analysis, both steppers and servos perform their tasks well. Both can be purchased as original equipment on many systems. The decision to use one or the other depends on its final use and acceptable tolerance variation in profiling.

If all of this mumbo-jumbo has been overwhelming, don't fear. You don't need to know all of the details to enjoy working with CNC or NC. But with the cost of computer-operated machine tools coming down and increasing numbers of manufacturers getting into the race, there could easily be one in your future. From Sherline to complete units from Matsuma, they all work the same way. The more you know the better.

Next month..."The Race for the Ultimate Stirling".



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

<u>Issue</u>	<u>closing date for contributions</u>
Oct. '09	Sept. 28, 2009
Nov. '09	Oct. 26, 2009
Dec. '09	Nov. 23, 2009



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

Dick Boucher

### **The Meeting**

Those of you who were at the North Shore Old Car Club auto show this summer may have noticed the subject of this month's meeting. For those of you who weren't there, the subject is the "Raven", a custom automobile built by Arthur Bentas which was the winner of the 1959 National Champion Custom and restored by Joe Germann of Motorhead Extraordinaire. Joe will talk about the original construction of this car, how he found it in a chicken coop, and the work of restoration. Arthur had many unique innovations incorporated in the construction and the story of the car. The car is a driver that Arthur and Joe regularly go to cruise nights in during the summer. We may even have Arthur with us for the meeting.

### **Miscellaneous Ramblings**

Well the show season is upon us and the weather just hasn't cooperated. The Waushakum Live Steamers meet was a real washout Saturday with one of the members floating his model boat in the small lake in the parking lot. Friday was a fair day with a fair amount of running on the ground and on the highline and as I said Saturday was a total washout until about 9:00PM when the tracks came alive with night running. A couple of fellows even came in from my neighborhood, a 60 mile trip, at about that time to enjoy the night

running. The night runs are great, with a full approach lit signal system winking their colors through the woods and the trains coming into view then disappearing to reappear some other place. Sunday was the busiest day by far, with the weather fair and a lot of train movements.

The next event attended by the faithful was the Saugus Iron Works show that coincided with the Founders Day event in Saugus MA. The weather again miserable with the rain coming sporadically all day, but even with the rain, our members were gathered in a nice tent provided by Saugus Iron Works Chief Ranger Curtis White. There wasn't much public attendance that day, but those that did venture under the tent were showing great interest in our display not just meandering through.

The last event, which I have just returned from, was the Steam Weekend at Clark's Trading Post and the White Mountain Central Railroad. For this event, the weather was perfect. Cool evenings and warm days with rain not making an appearance all weekend. Once again, Dave Clark with the help of a few volunteers put on quite a show Saturday and Sunday. Items of interest included three standard gauge locomotives and a 12-ton steamroller all operating. The largest of the locomotives was a Baldwin 2-4-2 and the smallest was a Porter 0-4-0 with the Climax logging engine filling out the roster. The Heistler, locomotive that usually is under steam, is undergoing boiler repairs at this time and was on static display along with the ex Beebee logging company Shay locomotive.

Dick B.

**It's That Time of Year Again...Membership  
Renewal! Please renew your NEMES  
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## ***The Steam Man of the Prairies.***

BY EDWARDS ELLIS,

### **CHAPTER XX.**

#### **THE CONCLUDING CATASTROPHE.**

BALDY Bicknell, the trapper, was the first to discover the peril of himself and party.

When the Indians had completed their work it lacked only an hour of daylight. Having done all that was necessary, the savages took their stations behind the wall, lying flat upon the ground, where they were invisible to the whites, but where every motion of theirs could be watched and checkmated.

When the trapper opened his eyes he did not stir a limb—a way into which he had got during his long experience on the frontiers. He merely moved his head from side to side, so as to see anything that was to be seen.

The first object that met his eye was the boy Brainerd, sound asleep. Apprehensive then that something had occurred, he turned his startled gaze in different directions, scanning everything as well as it could be done in the pale moonlight.

When he caught sight of the wall stretched across the valley, he rubbed his eyes, and looked at it again and again, scarcely able to credit his senses. He was sure it was not there a few hours before, and he could not comprehend what it could mean; but it was a verity, and his experience told him that it could be the work of no one except the Indians, who had outwitted him at last.

His first feeling was that of indignation toward the boy who had permitted this to take place while he was asleep, but his mind quickly turned upon the more important matter of meeting the peril, which, beyond all doubt, was of the most serious character.

As yet he had not stirred his body, and looking toward the prison wall, he caught a glimpse of the phantom-like figures, as they occasionally flitted about, securing the best possible position, before the whites should awake.

This glimpse made everything plain to the practical mind of Baldy Bicknell. He comprehended that the redskins had laid a plan to entrap the steam man, more than to entrap themselves, and that, so far as he could judge, they had succeeded completely.

It was the tightest fix in which he had ever been caught, and his mind, fertile as it was in expedients at such crises, could see no way of meeting the danger.

He knew the Indians had horses somewhere at command, while neither he nor his comrades had a single one. The steam man would be unable to pass that

formidable wall, as it was not to be supposed that he had been taught the art of leaping.

Whatever plan of escape was determined upon it was evident that the steamer would have to be abandoned; and this necessitated, as an inevitable consequence, that the whites would have to depend upon their legs. The Missouri river was at no great distance, and if left undisturbed they could make it without difficulty, but there was a prospect of anything sooner than that they would be allowed to depart in peace, after leaving the steam man behind.

The trapper, as had been his invariable custom, had carefully noted the contour of the surrounding prairie, before they had committed the important act of encamping in the gorge or hollow. He remembered the grove at some distance, and was satisfied that the barbarians had left their horses there, while they had gathered behind the wall to wait the critical moment.

By the time these thoughts had fairly taken shape in his brain it was beginning to grow light, and with a premonitory yawn and kick he rose to his feet and began stirring the fire. He was well aware that although he and his companions were a fair target for the rifles of their enemies, yet they would not fire. Their plan of action did not comprehend that, though it would have settled everything in their favor without delay.

"I declare I have been asleep!" exclaimed Brainerd, as he began rubbing his eyes.

"Yes. You're a purty feller to make a sentinel of, ain't you?" replied the trapper, in disgust.

"I hope nothing has happened," answered Johnny, feeling that he deserved all the blame that could be laid upon him.

"Not much, exceptin' while yer war snoozin' the reds have come down and got us all in a nice box."

The boy was certain he was jesting until he saw the expression of his face.

"Surely, Baldy, it is not as bad as that?"

"Do you see that ar?" demanded the trapper, pointing toward the wall, which the youngster could not help observing.

"How comes that to be there?"

"The red-skins put it thar. Can yer steam man walk over that?"

"Certainly not; but we can remove them."

"Do yer want to try it, younker?"

"I'm willing to help."

"Do yer know that ar' somethin' less nor a hundred red-skins ahind them, jist waitin' fur yer to try that thing?"

"Good heavens! can it be possible?"

"Ef you don't b'l'eve it, go out and look for yerself, that's all."

The boy, for the first time, comprehended the peril in which he had brought his friends by his own remissness, and his self-accusation was so great, that, for a few moments, he forgot the fact that he was exposed to the greatest danger of his life.

By this time Ethan and Mickey awoke, and were soon made to understand their predicament. As a matter of course, they were all disposed to blame the author of this; but when they saw how deeply he felt his own shortcoming, all three felt a natural sympathy for him.

"There's no use of talkin' how we came to get hyar," was the philosophical remark of the trapper; "it's 'nough to know that we are hyar, with a mighty slim chance of ever gettin' out ag'in."

"It's enough to make a chap feel down in the mouth, as me friend Jonah observed when he went down the throat of the whale," said Mickey.

"How is it they don't shoot us?" asked Hopkins; "we can't git out of their way, and they've got us in fair range."

"What's the use of doin' that? Ef they kill us, that'll be the end on't; but ef they put thar claws on us, they've got us sure, and can have a good time toastin' us while they yelp and dance around."

All shuddered at the fearful picture drawn by the hunter.

"Jerusalem! don't I wish I was to hum in Connect'cut!"

"And it's myself that would be pleased to be sitting in the parlor at Ballyduff wid me own Bridget Maghlaghaghaghagh, listenin' while she breathed swate vows, afther making her supper upon praties and inions."

"I think I'd ruther be hyar," was the commentary of the trapper upon the expressed wish of the Irishman.

"Why can't yees touch up the steam mam", and make him hop owver them shtones?" asked Mickey, turning toward the boy, whom, it was noted, appeared to be in deep reverie again.

Not until he was addressed several times did he look up. Then he merely shook his head, to signify that the thing was impossible.

"Any fool might know better than that," remarked the Yankee, "for if he could Jump over, where would be the wagon?"

"That 'ud foller, av coorse."

"No; there's no way of getting the steam man out of here. He is a gone case, sure, and it looks as though we were ditto. Jerusalem! I wish all the gold was back in Wolf Ravine, and we war a thousand miles from this place."

“Wishing ’ll do no good; there’s only one chance I see, and that ain’t no chance at all.”

All, including the boy, eagerly looked up to hear the explanation.

“Some distance from hyar is some timbers, and in thar the reds have left their animals. Ef we start on a run for the timbers, git thar ahead of the Ingins, mount thar bosses and put, thar’ll be some chance. Yer can see what chance thar is fur that.”

It looked as hopeless as the charge of the Light Brigade. Young Brainerd now spoke.

“It was I who got you into trouble, and it is I, that, with the blessing of Heaven, am going to get you out of it.”

The three now looked eagerly at him.

“Is there no danger of the Indians firing upon us?” he asked of the hunter.

“Not unless we try to run away.”

“All right; it is time to begin.”

The boy’s first proceeding was to kindle a fire in the boiler of the steam man. When it was fairly blazing, he continued to heap in wood, until a fervent heat was produced such as it had never experienced before. Still he threw in wood and kept the water low in the boiler, until there was a most prodigious pressure of steam, escaping at half a dozen orifices.

When all the wood was thrown in that it could contain, and portions of the iron sheeting could be seen becoming red-hot, he ceased this, and began trying the steam.

“How much can he hold?” inquired Hopkins.

“One hundred and fifty pounds.”

“How much is on now?”

“One hundred and forty-eight, and rising.”

“Good heavens! it will blow up!” was the exclamation, as the three shrunk hack, appalled at the danger.

“Not for few minutes; have you the gold secured, and the guns, so as to be ready to run?”

They were ready to run at any moment; the gold was always secured about their persons and it required but a moment to snatch up the weapons.

“When it blows up, run!” admonished the boy.

The steam man was turned directly toward the wall, and a full head of steam let on. It started away with a bound, instantly reaching a speed of forty miles an hour.

The next moment it struck the bowlders with a terrific crash, shot on over its face, leaving the splintered wagon behind, and at the instant of touching ground upon the opposite side directly among the thunderstruck Indians, it exploded its boiler!

The shock of the explosion was terrible. It was like the bursting of an immense bomb-shell, the steam man being blown into thousands of fragments, that scattered death and destruction in every direction. Falling in the very center of the crouching Indians, it could but make a terrible destruction of life, while those who escaped unharmed, were beside themselves with consternation.

This was the very thing upon which young Brainerd had counted, and for which he made his calculations. When he saw it leap toward the wall in such a furious manner, he knew the inevitable consequence, and gave the word to his friends to take to their legs.

All three dashed up the bank, and reaching the surface of the prairie, Baldy Bicknell took the lead, exclaiming:

“Now fur the wood yonder!”

As they reached the grove, one or two of the number glanced back, but saw nothing of the pursuing Indians. They had not yet recovered from their terror.

Not a moment was to be lost. The experienced eye of the trapper lost no time in selecting the very best Indian horses, and a moment later all four rode out from the grove at a full gallop, and headed toward the Missouri.

The precise result of the steam man’s explosion was never learned. How many were killed and wounded could only be conjectured; but the number certainly was so great that our friends saw nothing more of them.

They evidently had among their number those who had become pretty well acquainted with the steam man, else they would not have laid the plan which they did for capturing him.

Being well mounted, the party made the entire journey to Independence on horseback. From this point they took passage to St. Louis, where the gold was divided. The party separated and since have seen nothing of each other.

Mickey McSquizzle returned to Ballyduff Kings county, Ireland, where, we heard, he and his gentle Bridget, are in the full enjoyment of the three thousand pounds he carried with him.

Ethan Hopkins settled down with the girl of his choice in Connecticut, where, at last accounts, he was doing as well as could be expected.

Baldy Bicknell, although quite a wealthy man, still clings to his wandering habits, and spends the greater portion of his time on the prairies.

With the large amount of money realized from his western trip, Johnny Brainerd is educating himself at one of the best schools in the country. When he shall have completed his course, it is his intention to construct another steam man, capable of more wonderful performances than the first.

So let our readers and the public generally be on the lookout.

**THE END.**



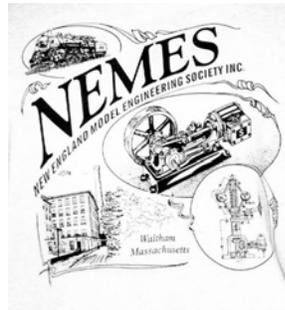
***For Sale***

***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

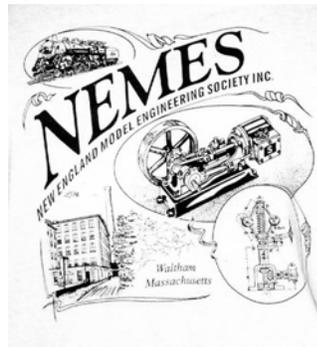


***NEMES clothing***

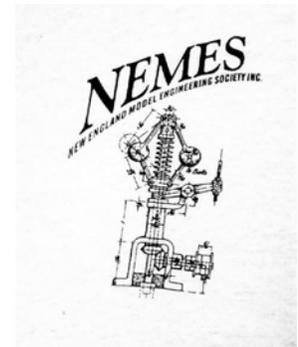
***NEMES Tee Shirts***

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
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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  
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[mdbouch@hotmail.com](mailto:mdbouch@hotmail.com)



**MARK  
THIS  
DATE**

## **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*

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 Original Yankee Steam-Up  
The New England Wireless and Steam Museum  
1300 Frenchtown Road East Greenwich, RI  
<http://www.newsm.org/index.html>

Oct 4<sup>th</sup> Noon-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 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



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

Nov 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>

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

Dec 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>