

# The NEMES Gazette

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*The Newsletter of the New England Model Engineering Society,  
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**Our Next Meeting is at 7:00 PM on Thursday  
November 4, 1999 at the Museum, 154 Moody  
Street, Waltham Ma.**

*Annual dues is \$20.00 - Please make checks payable to "NEMES" and  
send to the NEMES Treasurer: Kay R. Fisher 80 Fryeville Road  
Orange, MA 01364*

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## **From the Editor's Desk:**

Last month I mentioned that I was looking for info on calliopes from the June 1977 issue of Live Steam, hoping that someone might have a copy from back then. Well, I got several copies of the article and there was a lot of good info in it on how to get the whistles to play the right notes. So, thanks to all of you who helped me out with the info. One of these meetings I'll have some whistles to bring in and show.

With this issue I've been editing the NEMES Gazette for over three and a half years. It hardly seems possible, but I guess that it proves time flies. When I started out I wondered if I could manage to produce a monthly newsletter, and what I'd put in it. I was figuring that as time went on people would contribute material for me to sort out, I'd print it, and we'd have a newsletter. The first issue was a single page, but the second issue pretty much established the pattern. I wanted to have more than the first issue - it was supposed to be a newsletter not a postcard reminding you to come to the meeting. So since there was nothing else to put into the newsletter I decided that in order to have something to put in it I'd write up what happened at the meeting. I was surprised when my meeting reports turned out to be popular. I figured you'd all be bored by them. After all, you were there and had already heard it once. Things have evolved nicely over the years. Ed Kingsley writes an interesting and often humorous column every month, Ron Ginger has contributed the President's Corner every month to let us all know where the club is headed, and Bill Brackett has taken over the Calendar of Events so we all know what's going on. Kay Fisher provides a Treasurer's Report, and Bob Neidorff, backed up by Max ben-Aaron and Norm Jones, takes care of the distribution. In short, we've built up a pretty good team to get the Gazette out every month and I think I can say that yes, I can

produce a monthly newsletter. I would like to continue writing up the meetings, but would like to pass the job of editor along to someone else by the start of the fifth year. Whoever takes over the job will be taking on a fairly smoothly functioning publication. Right now it all functions by email. People email me their material, I put it into the file for the issue, play with line spacing and things to make it come out the right amount of pages to fit the format of the issue. Then I email the final file to Bob Neidorff who prints it, gets copies made, and mails it out. So, if you think you might like to try your hand as an editor, this is your golden opportunity to take over a going newsletter.

See you next Thursday night - slc

## **President's Corner by Ron Ginger November Meeting**

As usual we want to encourage everyone to bring in some show and tell items. Everyone tells me how much they enjoy seeing and hearing about the projects our groups is doing, but its still hard to get most of you to bring in something.

For the speaker we will have another member talk, this time Max ben-Aaron to talk about the process of telescope mirror making. This is another of those subjects I was always going to get into, so I'm anxious to hear a bit about it.

## **Cabin Fever Trip**

It is just about time to get serious about the plans for this trip. I have not called the bus company yet, but I assume we will follow the same plan as in the past years. We should leave on Friday, Jan 28, 2000 about noon from the T-station off rt 128. We will also be able to make a couple pickup stops along the route down through Connecticut. We will return on Sunday evening.

I talked to Gary Schonely, the promoter of this show, and he has lots of good expansion plans for this years show. He has managed to add space for about a dozen additional vendors, so there will be that much more 'good stuff' to buy. He has also arranged for a hospitality suite at the Ramada Inn on Friday and Saturday night. This will be just an open meeting room, with a cash bar, where people can just sit around and chat. It should be nice to have a place to talk without that loud music we had last year. He is also trying to organize some seminars or demos for the show. It should be another great show.

I will have a signup sheet at the next meeting. If you are one of our remote members that doesn't

get to meetings and want to go, let me know either by e-mail at ginger@ma.ultranet.com or by phone at 508/877-8217.

**NAMES- Detroit Trip, April 2000**

I have the feeling we can get enough interest in another trip to NAMES. I have talked to several fellows that are interested, and if we make it just a bit more of a vacation trip we may be able to encourage more of you to consider making it and even bringing along your wife/girlfriend/SO.

The basic plan would be to leave Boston on Thursday morning and go to Niagara Falls. We should be there by about 4:00PM so you would have a nice afternoon to see the falls, and time for a nice evening dinner. On Friday morning we can stop at either the Hamilton Museum, or the Canadian War Birds air museum. I will also see if we could arrange a tour of an auto plant. We will have some kind of visit on Friday, and get into Wyandotte in the early eveing. Saturday and Sunday we can be at the show, with maybe a side trip for those interested to either Henry Ford Musuem or Greenfield Village. We will leave Sunday after the show, but only come as far as Niagara Falls, where we can again spend the night. Monday we can finish the trip home.

This schedule will make the bus ride much more pleasant, we should be less than 8 hours on the road either day, and will save us some money since we won't need the two shift drivers we had last time. We should be able to find a reasonable price hotel in Niagara falls, since that is ahead of the prime season.

I'm willing to make some detailed plans and reservations for this, if I have at least 20 names by the December meeting. I assume it will be about \$150 for the bus, about \$50 each night for the Niagara hotel and about \$70 a night in Wyandotte. A total of about \$400, less if you want to double up and share rooms.

**Rudy Kouhoupt Workshop- March 2000**

I will have the signup sheet out for this workshop at the next meeting. It will be first come first served on this, so if you are interested get your name on the list now. I still could use some suggestions on the topic you would like to see Rudy cover.

**Saturday Seminars**

At Rollies great swap meet last weekend I noticed a small group got together around his lathe and spent quite a while discussing the fine points of knurling. I have been thinking about trying to organize that kind of event and this made it clear there is interest. The basic idea would be to determine a topic of interest, find a place to gather, and get a group together. Among the topics Ive heard interest in is the use of shapers, and member Jay Stryker has sent me some suggestions for such a seminar day.

I think this can be done, but I already have all the events I want to organize. If someone thinks this would be fun and usefull, step forward and offer to set one up. I think it could be a good activity for the group.

--Ron

**Calendar of Events**

**Nov 4, 1999 Thur 7PM**

NEMES Monthly club meeting  
Waltham, Ma.  
Charles River Museum of Industry 617-893-5410

**Dec 2, 1999 Thur 7PM**

NEMES Monthly club meeting  
Waltham, Ma.  
Charles River Museum of Industry 617-893-5410

**Jan 6, 2000 Thur 7PM**

NEMES Monthly club meeting  
Waltham, Ma.  
Charles River Museum of Industry 617-893-5410

**Feb 3, 2000 Thur 7PM**

NEMES Monthly club meeting  
Waltham, Ma.  
Charles River Museum of Industry 617-893-5410

**Feb 19 Sat**

NEMES show  
Waltham MA CRMI Moody St.  
Ron Ginger 508-877-3002

For a listing, please sent name and brief description of event, time and place and a person to call for further information to.

Bill Brackett at wbracket@ultranet.com or 508-393-6290

**Oct 1999 Treasurers Report**

Previous balance -----	\$3940.24
Correction to last balance-----	10.00
Correction for deposit error----	-80.00
Dues Deposit -----	40.00
Interest -----	1.58
Bob Neidorff (newsletter exp)--	-100.86
Harry Schoepf (Speakers Fee) ---	-50.00
Dues Deposit -----	120.00
New balance -----	\$3880.96
=====	

Two mistakes to report this month. The first one is easy. If you do the arithmetic on the last treasurers report you will see the total was off by exactly 10 dollars. The second was when I made a deposit for dues I double counted some guys and filled out the deposit ticket wrong. The bank caught it and deducted \$80 from the deposit. When I got the mail my first thought was - I knew that \$400 seemed too high.

Obviously I'm getting too old for this stuff. If someone would be kind enough to volunteer to be the next NEMES treasurer please let me know.

I would really like to pass this job on to someone else and I think I can contribute to the club in

other ways in the future so please do a little sole searching and consider stepping up to the bat.

Respectfully

Kay R. Fisher

### **The Meeting, October 7, 1999**

At the time of the October meeting the program for the November meeting was still up in the air. Since then Ron has come up with a program, Max ben-Aaron on Making Telescope Mirrors. I've heard from Max and he wants people to know that making the mirror is just where his talk is going to begin. The mirror is where he'll begin, but from there it's on to all sorts of other engineering considerations for the rest of the parts of a telescope.

Ron went over upcoming events and possible bus trips, but he's covered them in his column so I won't repeat things here.

Don Strang came across some new info on tool holding. Albrecht now have a chuck with diamond on the jaws so it can get a good grip on carbide tools. Frey Research Inc. has come out with a new process where they coat metal with a thin layer of small carbide particles to grip tools more firmly than a plain metal surface can. He also found a sheet showing the heat rise in 3 phase motors when they are running out of balance. The saving factor for most of our motors is that we run them in cooler environments than they are specified for and that they aren't fully loaded.

Ron Ginger had a new set of Castings from Jerry Howell along with some very nice CAD drawings. The castings set is limited to 50 sets, but there may be some left. Ron has heard from people making the engine that the drawings have very few errors, but there are a few. Ron ordered his kit quite a while ago and has finally received his castings. It's a Ryder Ericson Hot Air engine and the castings are all lost wax in a "Zinc Alloy." John Rex has a full size version of this engine and says that the full size one needs a lot of heat to run, just like the model. For \$225 you get all the castings, graphite for the piston, brass tubing, etc. in a kit to build it. Norm Jones has a friend in New York who has started his model and found the three mistakes Ron has the info on. He also says there are a couple more mistakes. Jerry recommends buffing the graphite piston with plain typing paper to get it smooth and with a good fit.

Leon Schiff saw the Aloris style toolpost and holders for sale in the Harbor Freight catalog and decided to try them since they were so cheap. The steel is soft, the workmanship and threads are coarse, and the holders won't fit on a real Aloris Brand toolpost. You get a toolpost, 5 holders, and a chuck you can throw away. He says it's not a be deal for the price, and since the holders were soft he put them in the mill to open them up a little and now they work fine with the real tool post. Dave Piper added that leaving the toolholders soft isn't necessarily a

bad thing. Hardinge tool holders are soft, and the first time you run one into your chuck you'll be glad they're not hard.

The Main Speaker for the night was Harry Schoepf. Norm Jones ran into him at a show recently and asked him if he'd be willing to talk to us about his model, which is a 1/4 scale version of a 1913 Model T Ford chassis. He's been fascinated by the Model T since he was 12 or 13. His uncle had a 1926 T, and after a lot of convincing and a few years Harry finally got it. Then he totally restored it. He bought and restored a couple more, but his career kept him moving around and his cars spent a lot of time in storage. Since he didn't have space for his full size Model Ts he decided to build a model to keep his hand in.

He also began work on a Model T book. By May of 1990 his book had evolved into: *How to Build a Model T*. In 1992 he decided that he'd better build a Model T to give himself credibility. So work on the detailed model began. His goal is to be able to take a full size 1913 Model T chassis built by Ford and his model out to a parking lot, then to disassemble them as a pair, part by matching part into two corresponding sets of parts - One full size and one quarter scale..

He started with the frame, since it's the part that everything else is bolted to. A real 1913 T frame is 100 inches long, and is about 4 feet wide. The side rails are a C section and taper to each end. He started with two pieces of brass 3/4 x 1/2 x 25 inches and milled them to the correct channel shape. When he unclamped the frames after milling they twisted out of shape. He straightened them and had the first parts to his model.

Most of the model is brass, with some steel parts. He had a 1913 car in pieces to work from. He drew everything in CAD, piece by piece, then used the CAD system to be sure that what he had drawn would actually fit together properly. He likes this aspect of CAD that let's you check the fits of things before you actually cut the metal. (The parts were old and some of them were worn and/or corroded so that if he had drawn every part exactly 1/4 scale from what he had things would not have all fit correctly.) Once he had things drawn to his satisfaction he carved them out of brass at 1/4 the original size.

The basic parts of the chassis are the frame, the front axle assembly, and the back axle. After the frame was finished he moved on to the front axle. He started with the king pins. Then he measured and drew the axle itself and carved it from the solid. He used his mill, but ended up doing more hand work than milling on it because some of the shapes on the end of the axle were more complicated than he could mill.

To connect the axle to the frame he needed springs. In 1913 the spring leaves were tapered and rounded at the ends. In addition they varied in thick-

ness. The scale springs are 1/16 thick in the center and taper down to 15-20 thou at the ends. He used a grid to set up the curve of each model leaf, with big squares to match the big springs and small squares to use when bending the model leaves. The leaves are brass. The grease fitting holes in the front end are 1 - 72 size. He hasn't made the fittings yet.

The crankcase goes below the engine block and provides the bottom half of the transmission case as well. He has made his out of fiberglass. He considered making it from brass but decided the composite would look better on the finished model. He figured that a metal one would look crumpled with all the bend it would have in it. He'll bond metal to the existing fiberglass crankcase at a later stage of construction.

There are three or four hundred parts in the rear axle. The differential case is round, but has lots of bosses protruding from it that keep you from being able to turn it in a lathe. He ended up turning it and then silver soldering the bumps and bosses back on. The two sides of the housing are a friction fit to each other. He built a ring and pinion gear and an entire differential. The goal is to have an authentic model, so since the correct gears and bearings weren't commercially available he decided to make his own rather than to change the design to use parts he could buy.

He made the races for the bearings and bought the balls to go into them. The gears he laid out on his computer from the originals. Then he made the cutting tool for the teeth and cut the gears in the dividing head. When he got the first of the gears assembled and they meshed nicely he felt very good about things. The ring gear went well but the pinion gave him some trouble because with the small number of teeth the teeth have a funny shape.

The torque tube is tapered, and the original has brazed on castings at each end. He worked out a method to turn the ends on the lathe and then to machine in the recesses to match the original shape.

He made the radiator to match the original. It has 95 vertical tubes and 74 fins. Which means that there are 7300 holes for the tubes to go through the fins. Each fin is made from 3 thou brass shim stock, with 95 holes punched in it and with the front and back doubled over. All 95 tubes are soldered to the bottom support piece. Tubes are 1/16 OD and 1/32 ID. He used brass "combs" 47 thous thick to provide a heat sink between the fin being soldered on and the ones already soldered. One in from the front and one from the rear provided the heat sink and the spacing for each fin as it was added on.

Ten thou brass forms most of the rest of the radiator. To emboss "Ford" on the front of the top tank he laid the brass sheet onto a piece of aluminum and tapped on the outline of the letters he'd printed out backwards on his computer and fastened to the back of the metal to serve as a guide for his embossing.

The label for the radiator he printed out in black ink on gold mylar brand polyester film. I've always wondered how a radiator got made, and now I know.

The wood he used to turn the spokes for his wheels came from actual Model T spokes that he took from some non serviceable wheels he had. He cut the spokes into quarters and turn them on the lathe. Then he milled the ends. He had to get the wood to within 1 thou at the most to make a tight wheel. The fellows in the wheel are made from birch veneer and the metal clincher rim is a brass strap. The rim has a riveted and soldered but joint and a rolled up edge to clinch the tire bead. He annealed the brass then rolled the rim in, tapping it by hand. To build his wheels he needed 48 spokes, and managed to eventually get them all done.

The tires are what he's worked on lately, and are cast from a two part white polyurethane material. Black is available, but Ford offered smooth white tires as an option and that's what he wanted. The urethane has a 15 minute pot life at room temperature. So, to get some extra time he did some last winter with the windows open and a 50 degree room temperature that gave him 25 minutes pot life. He cast them in 2 piece plaster molds. The mold started as poplar patterns (one for the front and one for the back as the 1913 Model T had 3 1/2 by 30 tires in the back and 3 by 30 in the front.) The patterns are done in pie segments for continuous grain and were sanded and polyurethane varnished. The plaster molds made from the patterns were sealed with shellac, sprayed with a non-silicone mold release and then clamped before pouring the tire. He had to use ejector pins to get the patterns out of the plaster. He poured the molds at night, let them cure over night, and opened the molds to see what he had before work the next morning. The as cast tire has a solid disk in the middle. He cuts that out with a wet X-Acto knife. The urethane sands nicely so removing the flash is easy.

The transmission was easier to make than the rear axle and differential. All the parts are there. There are three drums: brake, clutch, and reverse. You control a Model T with 3 pedals. There are three speeds forward and one in reverse. Or, if you put the ring gear of the differential in on the other side of the pinion you have 2 speeds in reverse and one forward. He used primarily the 1913 car as a reference for his model, so there is no ring gear on the outside of the transmission. Later models with electric starters had a ring gear for the starter motor to engage.

All the screws and nuts in the model are hand made to the standard size nearest to 1/4 of the actual size fastener.

He has used Mini-Cad 7 to do his work. He's currently working on drawing the pistons and connecting rods. His book will cover building the chassis including the engine. He wants it to all be mechani-

cally accurate and is not expecting to fire up the engine.

From 1913 to 1925 all Model Ts were all black. Before 1913 they came in colors, and after 1925 there were 25 colors. 1915 was the last year with the shiny brass radiator.

He cut the gears using a single point flycutter. He made 3 or 4 cutters for the gears. It took some experimenting to get the heat treating on them right.

In 1913 the parking brakes were in the rear wheel, but the brake you used when moving was the brake drum in the transmission.

When Harry's book is out, I want a copy.

### **Tips and Techniques** by Ed Kingsley

#### **TOOLS NEAR THE EDGE OF THE WORLD**

I spent the weekend of Oct. 9th, in Cornish, NH, with friends, as I have for the past several years. Cornish is just across the river from Windsor, VT, home of the **American Precision Museum**, which I have praised effusively in the past, (and will again, in the following article).

I have seen the add for **Plaza Machinery**, in Bethel, VT, for years, and thought about dropping by each trip. This year, I decided, was finally the time. I emailed the owner, Joe Bergamo, to be sure they would be open, and to get directions.

First surprise - they aren't open Friday, Saturday or Sunday. Monday was Columbus Day, so things were looking grim. But, several other folks wanted to visit, and Joe opened Friday to satisfy popular demand. I got up earlier than usual and, armed with maps from "*Streets98*", I headed north. Bethel is three exits beyond NH, on Route 89, about 2 1/2 hours from my home, in Saugus, MA.

Joe's place is on Back River Road, a narrow, serpentine path that follows, uh, the river. He said that he was about 3.5 miles down, on the right and, after what I thought was over 4 miles, I saw a car pulling out of a driveway and stopped for directions. I approached the car, and the driver leaned across and rolled down the passenger side window. I said, "Hi, can you tell me where I can find Plaza Machinery?" He leaned a bit closer, and said, "Nope, but did you know your car is rolling backwards!"

I turned to see my car heading for the river at about 5 mph. Good news/bad news - I hadn't put it in Park, but I had left the door open. The problem was that I had to catch up to the car, get past the door, pirouette, and leap sideways into the driver's seat. As I ran wildly after the car, I flashed on the time I was helping my girlfriend jump-start her Karmen Ghia, backwards, and how, as I turned around to hop into the car, I got my lights punched out by the door. She had to dive through the passenger window, crawl across the seats, and stop the car before it rolled

across Park Drive and into the Fenway. My personal tour de force gave her cause for reflection, which, I believe postponed our wedding for at least a year.

Practice makes perfect, I guess, and I stopped the car, without getting dope-slapped by the door. I drove back up to the driveway, and asked the fellow if he lived there. He did. I thanked him, turned and flagged down a couple driving a big pickup, and repeated my questions. Yes, they lived on the road, and no, they hadn't heard of Plaza Machinery, either.

I got back in the car, and drove no more than 100 feet, when I spotted three, 55 foot trailers, side by side, with a 3 foot square sign on the closest one that read, "Plaza Machinery". Jeez, talk about keeping a low profile. Maybe I should have asked Joe whether he was wanted for anything.

Once inside, I discovered a conglomeration of at least 5 rooms of machinery, and tooling, and Joe Bergamo, who proved to be a most personable host, (despite his apparent transparency). In addition to more South Bend, 10" Lathes than I've ever seen in one place before, Joe's got pretty much every other machine any HSM might need, or crave, and one room just crammed full of them nifty, and oh, so irresistible, machine "accessories".

Joe spent more than two hours with me, that afternoon, one on one, all very pleasant, and left me with the impression that he was someone you could deal with, with confidence. My 'finds' included a "new", #5 Jacobs Chuck Key (this key is REALLY big); a "new", 7/8", Fowler, R8 Collet (a hard size to come by) and a "like new", 4 position, indexing, carriage stop, for my South Bend. This gives me four additional chances to run the cross slide into the chuck.

Joe is an authorized 'rep' for a host of machinery manufacturers, such as Delta and Rockwell, and offers discounts on parts and accessories. Joe's wife, Amy, is currently preparing an updated, mailing list of the Inventory. [Visits are by appointment only - Monday through Thursday](#). Joe can be reached at (802) 234-9673, FAX (802) 234-6325, and PO Box 14, Back River Road, Bethel, VT, 05032. Or, by email at: [Plaza@quest-net.com](mailto:Plaza@quest-net.com).

*"I'm sorry. This is just the Caboodle.*

*The Whole Kit doesn't come with it anymore."*

*Joe Martin - aka Mister Boffo*

#### **PRECISION MUSEUM, REDUX**

This year, the Special Exhibit is, "[Carriage Wheels to Cadillac: Henry Leland and The Quest for Precision](#)". Henry M. Leland founded the Cadillac and Lincoln automobile companies, and was a man "obsessed with precision". In 1908, he shipped 7 Cadillacs to France, where 3 were selected and completely disassembled. The parts were scrambled and reassembled. The 3 "new" cars were then driven 50

miles, to the total consternation of the French, who thought little of American automobile manufacturing. Leland was awarded the Dewar Trophy, for the "most noteworthy automotive performance of the year" - the first time it was awarded to an American.

Leland was an apprentice machinist during the Civil War, and worked for the Springfield Armory, Colt and Brown and Sharpe, before he began starting his own businesses. The Leland exhibits include a 1903, single cylinder, and a 1915, V-8 Cadillac.

Note that the 1912 Cadillac, 4-Passenger Coupe sold for a mere \$2,250. Leland said that he wasn't trying to build an expensive car, it just cost more to make them "right".

The Leland exhibit will continue through next year. Also featured is the Precision Linear Dividing Machine, invented by Joseph R. Brown (B&S), to engrave accurate scales. The museum is open 10AM - 5PM, seven days a week, and closes for the season on the 1st of November. This was my fourth visit. The American Precision Museum is a MUST for HSM's.

*When trouble arises and things look bad,  
here is always one individual who perceives  
a solution and is willing to take command.  
Very often, that individual is crazy.*

## WHERE, OH WHERE ...?

I was talking with Jay Stryker, at Rolly's open house (which, if you didn't go, was great), and he commented on my column on "finding things", in last month's Gazette. When confronting a confusing array of things to sort through, Jay searches with a penlight flashlight, which he finds helps to focus his attention on each item as it's being illuminated. The bigger and messier the "array", the more he finds that this helps. I'd try this, but I can't find my flashlight.

**Metal Shaper Fans:** Jay has tentatively agreed to conduct a "Shaper Clinic", either at his shop in Deerfield, MA, or at the Museum, if there is sufficient interest.

*"If you give a man a fish, he will eat for a day.  
If you give a man a stick of dynamite, there  
will be little unidentifiable fish parts all over  
the village." --Jack Handy*

## WWW.freeS&H.com

J&L is offering (for the present, at least) free shipping and handling on all items, sale or otherwise, (up to 70 pounds) that are ordered on their website. If you can't get by the Woburn store to pick up your needs, give the Web a try. <http://www.JLindustrial.com>

*"Instant gratification takes too long."  
-- Carrie Fisher*

## *The NEMES Gazette*

newsletter of The New England Model Engineering Society  
c/o Stephen C. Lovely  
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