

# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 108

April 2005

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## Editor's Desk

Victor Kozakevich

Living in the age of multitasking, I am bidding on a collet set on ebay as I'm finishing up on the Gazette. Shopping while editing. These are indeed remarkable times.

On a related note, Errol has made some big changes to the NEMES web site. With the addition of video and more to come, we're ready for the new millennium. Say, maybe we could hold tool auctions too...just kidding, Errol.

Bob Beecroft dodged those California raindrops and sent an article about the machined-wood tool case he made in his shop. I'm sure some of my tools would appreciate such a fine home. The Gazette is always looking for project articles. I imagine there are many more out there, just waiting to be shared.

We have an interesting speaker coming, to talk about a mechanical restoration project at a local landmark. I hope everyone can make it. See you Thursday.

## Next Meeting

Thursday, April 7, 2005

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

## Membership Info

Annual dues of \$25 (via checks made payable to "NEMES" and mailed to our treasurer) for the calendar year are due by December 31<sup>st</sup> of the prior year.

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

Addresses are in the left column.

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

Norm Jones

### **The Meeting**

Our speakers for the April meeting will be David and Ross Hochstrasser. David and Ross operate The Clock Shop in Hanover Mass. Their subject will be about the restoration of the tower clock on Boston's Custom House. Their web site: [www.clock-shop.com](http://www.clock-shop.com) contains a number of interesting newspaper articles about the project. We are in store for a very interesting talk and slide show.

### **NEMES Annual Model Engineering Show**

Our annual model engineering show held on February 19th was once again a great success. I would like to thank everyone who helped set up tables in the morning and take them down in the afternoon. Many hands make light work! Special thanks are extended to Gail Martha and her crew: Sue Brackett, Cindy Schoppe, Bea Boucher, and Leslie Jones for providing great refreshments throughout the event. I very much appreciate the generosity of: Richard Sabol, Harvey Noel, Steve Peters, Errol Groff, The Tool Shed of Waltham, The Tool Shed of Worcester, New England Brass and Tool, Wholesale Tool, Cordpro, Home Shop Machinist Magazine, Brothers Machinery and an "anonymous donor" for graciously providing exhibitor door prizes, and to Sue Cushman for organizing the exhibitor registration. Museum director, Dan Yeager sent us a very nice letter, thanking NEMES for once again hosting the show. He stated that The NEMES Model Engineering Show continues to be a very important annual event for the museum.

### **February Vacation**

Leslie and I managed to squeeze in a trip to Florida between the show on February 19<sup>th</sup> and the March meeting on March 3<sup>rd</sup>. While at the Cabin Fever Expo back in January, Gayle and Clarence Myers (Rider Ericsson Hot Air Engine

casting suppliers) invited us to go for a ride with them on their steamboat, "The Lady Gayle", should we happen to be in Tavares Florida sometime during February or March. We were fortunate to be able to do so on Tuesday March 1<sup>st</sup>. The day was warm and picture perfect. We left "Dead River Vic's" at 9:00AM and headed into Lake Eustis. After a few minutes we entered the Dora Canal. The Dora Canal is an incredibly scenic area lined with cypress trees and teaming with: Great Blue Heron, Ibis, Egrets, Pelicans, Wood Ducks, and Bald Eagles just to name a few. The Dora Canal is the site that was used to film the movie, "The African Queen".

We then steamed into Turtle Creek which is about a mile long and features a pine forest with more fantastic wildlife. A U-turn and return to the Dora Canal led us into Lake Dora, where a stiff breeze was whipping up the water. We traversed the lake to stop for a great lunch in the town of Mount Dora, (the highest elevation in Florida). The wind picked up considerably while we were enjoying our lunch, creating whitecaps on the water. We headed straight into the wind for the return trip. The Lady Gayle handled the weather with ease. Clarence mentioned that our fuel consumption of type WA wood (Whatever is Available) was running about triple of the normal amount for our return trip. We were operating at 65# into the engine compared with the usual 30# to 40#. Stack temperature was a toasty 900 degrees which yielded plenty of steam. Clarence elected not to use the condensing mode of operation during the windy crossing part of the trip. The water returned to calm again once we reentered the Dora Canal and a more leisurely pace was resumed. We were on the water for about five hours. Thank you to Clarence and Gayle for a most enjoyable experience.

See you all on April 7<sup>th</sup>.

*Norm*



## ***The Meeting***

Max ben-Aaron

### **The March Meeting**

#### **WIRE ELECTRIC DISCHARGE MACHINING**

Our speaker was Bob Bouley, who is a wire EDM specialist at Methods Engineering. Before specializing in EDM, Bob was a toolmaker.

EDM (Electrical Discharge Machining) was invented in Russia. The earliest use for EDM was removing broken taps.

Bob explained that EDM is one of the most accurate manufacturing processes available for conductive materials. For creating simple or complex shapes and geometries within parts, EDM is a great technique. EDM manufacturing is economical and a very desirable when low counts or high accuracy is required. No tooling is required so delivery times are short. Turn around time can be fast unless the manufacturer has a considerable backlog. A wire EDM machine can be configured for mass production using a robotic loading/unloading system.

EDM works by generating electrical arcs between an electrode (the tool) and the part, eroding material in the path of the arc.

An EDM system consists of a shaped tool or wire electrode, and the part. The part is connected to a power supply. The work piece is immersed in a dielectric (electrically non-conducting) fluid which is circulated to flush away debris. Deionized water is the dielectric of choice.

The cutting pattern can be CNC controlled, so very intricate shapes are possible. Multiple electrodes can rotate about three axes, allowing for cutting of internal cavities.

EDM comes in two basic types: wire and probe (also called die sinker). Wire EDM is used primarily for cutting shapes through a selected part or assembly. For internal shapes with a wire EDM machine, a hole is first be drilled in the material, then the wire is fed through the hole to complete the machining.

Sinker (die sinking) EDMs cut complex geometries using a precision machined graphite or copper electrode to erode the desired shape into the part or assembly. Sinker EDM can cut a hole into the part without having a hole pre-drilled for the electrode.

Wire EDM is a method to cut conductive materials with a thin wire electrode that follows a programmed path. Typical wire diameters range from .004"-.012" although smaller and larger diameters are available. Wire feedrate can be as fast as 590 inches/ minute.

The hardness of the work piece is immaterial and has no effect on the cutting speed. There is no physical contact between the wire and the part. The wire, surrounded by deionized water, is charged to a voltage very rapidly. When the voltage reaches the correct level, a spark jumps to the part and fractures a small portion of the work piece. The deionized water cools and flushes material from the gap.

Some EDM machines are fitted with adaptive controls that monitor the thickness of the part in real time and maintain the optimum discharge current and gap, cutting at the highest possible speed.

During machining, part temperature can reach 40,000 degrees, so dielectric cooling is necessary. The detritus resulting from the erosion must also be filtered out.

A hole has to be drilled, of course, for the wire to be threaded through. This is done with an electronic drill that can drill holes as small as .004". The wire is automatically threaded through the hole to start the cut, as well as being rethreaded in case it breaks. The wire (usually brass) is a consumable and costs approx. \$2/hour.

Positioning accuracy is .0001" or better. Wire EDM can be accurate to +/- .00005". Several passes may

be necessary if a fine finish is required. Surface finish can be as fine as 3RA. No burrs are generated. Since no cutting forces are present, wire EDM is ideal for delicate parts.

Maximum part size is 41" x 28" x 16". Pieces up to 16" thick can be machined. Parts are machined after heat treatment so parts are not distorted by heat treatment. Cutting speeds can be as high as 31"/hour.

To generate taper cuts, the CNC machine can independently move in four machines axes. Most machines are capable of achieving 30° tapers, and some are capable of 45° tapers. If squareness is required, the cavity in a 2" thick part can be held to .000004" per side.

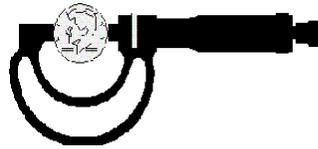
All EDM machines use the same principle. What is usually different is the power supply used to generate the arc. The pulse control technology used is proprietary and usually kept highly confidential.

**Design Considerations:**

- Relaxing the surface-finish requirements for the part allows the manufacturer to produce the part with fewer passes, at a higher current level and a higher metal-removal rate.
- Designing or preparing the part so that relatively small amounts of stock remain to be removed by EDM, by using traditional machining techniques to remove the bulk of the stock with only finishing operations to be performed by EDM. This significantly reduces the amount of time and cost for each part.
- The use of fixtures allowing multiple parts to be stacked and machined simultaneously also reduces cost.

The cost of a wire EDM machine starts at about \$120,000. Wire EDM is so reliable that unattended operation is normal. Optional software allows the machine to be monitored remotely via the Internet or with a cell-phone.

*Max*



# ***Treasurer's Report***

Rob McDougall

Balance as of: 1/31/2005	<b>\$7,965.36</b>
Dues Received	500.00
Cabin Fever Buffet tickets	20.00
Gift Received	7.56
Cabin Fever Cost	-423.99
Gazette Jan 05	-114.20
Gazette Feb 05	-131.15
NEMES Show Tables	-236.88
Guest Speaker Gift	-50.00
Balance as of: 2/28/2005	<b>\$7,536.70</b>

Our show was a raging success again this year. On behalf of the whole club, I especially want to thank the NEMES Ladies who put on another wonderful Café. Once again, they netted a very healthy amount to the club treasury (in excess of \$400) – **Thank You!**

*Rob*



## ***Project of the Month***

### ***Wooden Instrument Storage Box***



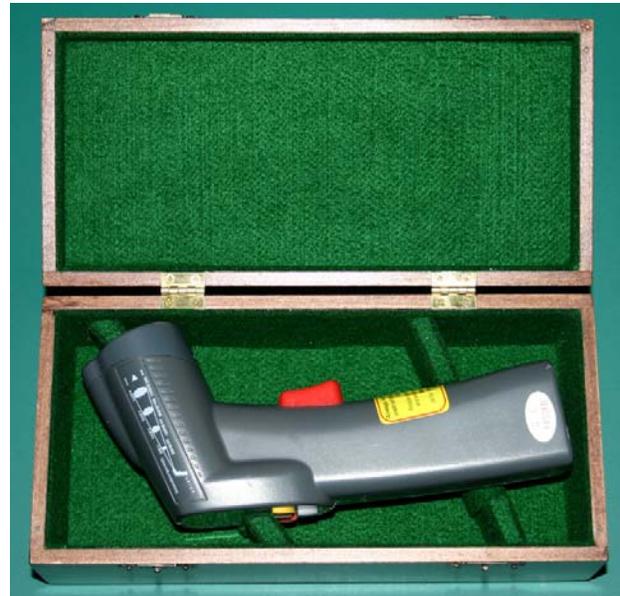
This little project was to keep me indoors and out of the rain. It didn't happen that way. My table saw is outside, under a circus-tent like car shelter. This is not recommended. Had the slab been damp, I could have electrocuted. Not a pleasant thought!

As usual, I get sidetracked on things that don't make the shop neater, cleaner, or more organized. I keep putting off things that should be done, like finishing the Bridgeport CNC, in favor of doing something for quick pleasure. I guess that I can't complain.

This little box measures 9½"x4½" and 3" deep. It's my first time trying making finger joints. The joint came out looser than I would have liked, but the glue (Titebond III) filled the gaps well. I either have to settle for less than optimum fit, find wood slightly thicker than ¼", get a new dado blade that gets to a quarter, or make/buy a router table and forget the table saw for this. The dado I have is a Craftsman, is very sharp, and cuts really cleanly, but doesn't go down to one-quarter inch as it is supposed to do.

Photos and descriptions/comments in general:

a) The wood is poplar – I won't use it again. Not a pretty, distinctive, nor interesting wood, and it didn't stain particularly well. This was a little practice for making a real tool chest, similar to a Gerstner. Next time, I will use attractive woods. Likely I will make most of the chest with high-quality aircraft 5-ply plywood and veneer it myself. I'm pretty good with epoxy and a vacuum pump to suck the stuff down, and really make it one with the ply. I used to be one of those who turned up his nose at anything wooden that wasn't solid wood. My wife, Linda, recently got an armoire that is solid wood...and it's all warped and split and generally pretty poor...but it IS an antique...and it IS solid wood...but it's not worth a hoot. Lesson learned.



b) The latches are poor quality, at least for now. These were all I could find locally, and they do work, but aren't the least bit classy. They are nailed onto the box. I located them using white, very low adhesive masking tape (Scotch-3M's Safe-Release™ Painter's Masking Tape) to get them where I wanted. The tape acts in place of a pencil mark on the wood; the latches came up to the edge of the tape to locate them. I used a tiny drop of thin CA glue (crazy glue, hotstuff, etc) in each nail hole to hold them for precise drilling. I measured the nails and used a number drill a few thousandths smaller and drilled holes just shy of the wood's thickness. The nails were a bit long, so I clipped them using the Shimano fishing pliers (photo). After that, I used these pliers to press the nails into place. The Shimano, or other similar pliers, are good for doing this. The hinges and

latches were installed after the box was stained and lacquered.

Next time I'm in San Diego, I'll stop at Rockler (a woodworker's chain store <http://www.rockler.com>) and find some really good quality latches. Likely I'll leave these on this box, as it's just a box to hold the temperature gage.

c) The finish is Krylon rattle-can Crystal Clear Satin. Several coats gave a decent fill and satiny finish.

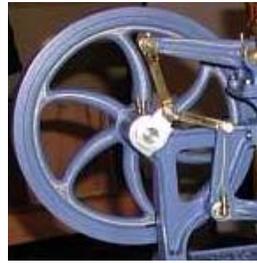
d) The topside close-up of a corner shows the less-than-stellar finger joints, and also the little music-wire pins I put in. They are to ensure the lid locates properly, as there is some pressure on the lid when it compresses the gage into the foam pads, which are hidden by green felt.

e) The decals are home-brew; printed to white decal paper on my handy Minolta LASER printer. The one on the back (green one) is there to hide a boo-boo. I was lucky that the boo-boo was on center!



f) The Shimano fishing pliers: If you don't have a set, or similar, you need them! These have jaws that open in parallel, i.e., they don't open into a V shape as most pliers do. They are very handy and worked nicely pressing the nails into place on the latches. I found these at WalMart for \$20.

*Bob Beecroft*



***NEMES Model***

***Show 2005***

Our spring show was even better than last year. Using two floors for the show worked out even better this year. Also, the large air compressor was a great asset. Our door prize process also keeps improving. This year, preprinted tickets and table numbers further smoothed the process.

Our regular commercial sponsors supplied us with a selection of prizes and our fabulous members donated a great assortment of additional prizes.

Thanks to everyone involved.

Tool Shed (Waltham)

\$25 Gift Certificate: Dave Bono

Tool Shed (Worcester)

\$25 Gift Certificate: Mike Boucher

New England Brass & Tool

Dial Indicator Set: Dennis Delicate

Dial Caliper: Rolly Evans

Keyless Chuck: Maria Cushman

Tap & Drill Set: Tom Richie

6" Rule: Ed Rogers

Wholesale Tool

Dial Indicator: Rollie Gaucher

Dial Indicator: Gene Martha

Dial Indicator: Paul Boucher

Dial Indicator: Rich Hubbard

Wrench Handle: Dave Dearborn

Wrench Handle: Leo Ayotte

Wrench Handle: Ron Ginger

Wrench Handle: Leslie Jones

Harvey Noel

Watch Repair Video: Harold Sharon

Errol Groff

Clock: Dave Robie

CordPro: Sue Brackett

Home Shop Machinist

1 year subscription: Bea Boucher

Richard Sabol

Tshirt: Eric Ludlan

Tshirt: Larry Urbanski

Tshirt: Phil Goodwin

*Steve Cushman*

## Scenes from the NEMES Show



Left to right: Sue Brackett, Gail Martha, Bea Boucher, Leslie Jones, Cindy Schoppe



## ***NEMES Web Site***

At the March meeting, I reported that our website had run out of space. After conversation on the club's mail list (if you don't subscribe to it you really should) and lots of research, I settled on a company called DreamHost.com as a possible new company.

We were paying \$9.99/month for 200 megabytes. For only \$6.00 MORE per month we are able to get an astonishing 7600 megabytes and many more features from DreamHost.com.

I proposed this to the membership at the March meeting and the membership agreed. One concern was whether all Gazettes should be available to anyone for download. Since our club goals include education and extension of our hobby, we agreed that our monthly newsletter should remain available to all interested in them.

I set up the new account. Since we elected to pay for 24 months in advance, we got the service at the \$15.99 per month price instead of the regular \$31.95 rate. That rate will be in force as long as our account is in good standing. In addition the set up fee of \$50.00 was waived and registration of a new URL (web name) was included in the deal.

After much thought, I settled on NEME-S.ORG. It uses our initials and is a lot shorter than our old web address. After the deed was done, Rob McDougall suggested nemesociety.org. Ah! Why didn't I think of that? With enough interest, we could also have that address but for now we will be neme-s.org.

The new registration went through and I started building the new web site. As it happened we had a number of snow days off from school this month and I have been able to spend a lot of time transferring.

The new web site is now fully (as far I as I can tell) functional and I have added back all the data that had been removed from the old site. In addition, I restored two picture sets, one of Bill Brackett's Cup Wheel Cover Casting project and the other about the

Model T Ford Snowmobile Rally a couple of years ago in New Hampshire.

I have a number of other ideas for the web site. If there is ANYTHING that you don't like about the site or want improved, please let me know your thoughts. I am trying very hard to balance things for people with slow and fast internet access. So, if you are fortunate enough to have that DSL or cable hookup and would like to see photos with much more detail, keep in mind that not everyone has the luxury of almost instant download and pictures have to be sized with those fellows in mind.

The new hosting company also provides the ability to have streaming audio and video. This allows you to watch video clips without having to download the entire file to your computer. I added a number of Mike Boucher's video clips, and would appreciate your feedback. This is new technology for me. I tried very hard to follow the directions, but I may not yet have it right yet. Let me know. Those files may be found on the NEMES Annual Show 2005 page. [http://neme-s.org/NEMES\\_2005/NEMES\\_2005.htm](http://neme-s.org/NEMES_2005/NEMES_2005.htm) Again, any comments, suggestions or criticism are welcome.

*Errol Groff*

### **John Alden**

John F. Alden, a fellow NEMES member, died Friday March 18, 2005, unexpectedly at his home.

Born in Bath, Maine, he was a resident of Framingham for more than 75 years. He was a U.S. Army veteran of World War II. John retired from the Mosler Safe Company of Waltham, where he was a time lock repairman for more than 20 years. He was president of the Massachusetts Watch Makers Association of Boston from 1961 to 1963 and was a member of the Oddfellows.

John spoke to NEMES several years ago about his adventures as a safecracker (the legal kind) and joined the group on a bus trip to Cabin Fever. He will be missed by all who knew him.



***For Sale***

### ***Lathe, Grinder***

Unfortunately for me, due to eyes/back etc. I have to get out of the hobby. My Logan 10" lathe has to go. It began life as a Model 200, and I've added the QC box and the matching saddle with fine power feed, clutch, etc. It cuts really, really well and accurately over the entire length of the bed, and I'd hate to end up parting it out. The drive was converted to serpentine belt. It runs off a three phase motor and has full VFD variable speed so it runs from 110V single phase. It includes a couple of older chucks and a set of bearings I bought from Scott Logan. The current bearings didn't/don't need to be replaced, I just figured I'd get them while the getting was good for the future. I'm sure there will be other doo-dads and gegaws thrown in as I find them. Note: You have to get the lathe yourself. That means you need you and one other person to take it apart, and get it up a set of four stairs from my basement and out the door. Though one guy can use a dolly to roll the components, it's a two man disassembly, and I can't help. It's south of Boston. The price is \$500.

I also have a small tabletop Sanford Grinder with quite a few wheels I'm looking to sell for \$650. I'll include a new electronics setup from the Sandford factory I never got around to installing; my ginned-up one works fine but this is factory hardware.

I also have two Derbyshire 750s with every attachment ever made for them, in excellent working shape, and an Aciera F1 (well equipped) milling machine. I'm almost ashamed to say what I'm hoping for in pricing for the machines, and chances are that they'll go in bits and pieces on ebay.

If the Sanford or Logan does go to a NEMES member, I'd be happy to "tithe" 10% of the purchase price back to NEMES as a donation. Finally, I also have a ton of books that would be of great help to new or even intermediate machinists. I'm testing some on ebay but doubt that they'll go because of Amazon and whatever; and if there's room somewhere for them at NEMES I'd be happy to donate them, also.

Bob Adkisson  
 617-525-6815 Work  
 617-76305510 Cell  
 781-821-1677 Home; no messages, please.

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

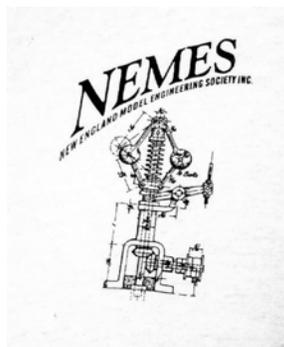
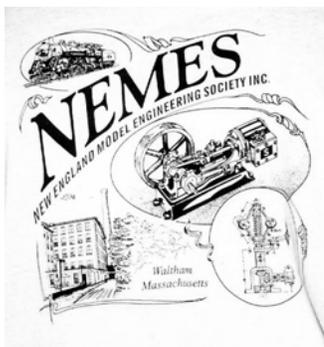


## ***NEMES clothing***

### ***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.

### ***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

## ***Shaper Work CD***

Put out in 1944 by the New York State education Department this 326 page manual is chock full of valuable tips and information on using the King of Machine tools....The Shaper. Covered is everything you need to know about the care and feeding of the shaper, use of the shaper, even how to sharpen tools for the shaper. Scanned and saved in Adobe Acrobat format. \$5.00 shipping included.

Errol Groff  
180 Middle Road  
Preston, CT 06365 8206  
[errol.groff@snet.net](mailto:errol.groff@snet.net)



## ***Web Sites of Interest***

The new NEMES website:  
<http://www.neme-s.org>

Sign up for the NEMES mailing list at:  
<http://groups.yahoo.com/group/nemes>

The "falkirk wheel" is a piece of civil engineering to raise canal boats from one canal to another, a lift of 35 meters, using a Ferris wheel type of mechanism.  
<http://www.thefalkirkwheel.co.uk/index.asp>



## ***Upcoming Events***

Bill Brackett

To add an event, please send a brief description, time, place and contact person to Bill Brackett at [wbracket@rcn.com](mailto:wbracket@rcn.com) or (508) 393-6290.

April 7<sup>th</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA. Call 781-893-5410

April 17<sup>th</sup> MIT Flea Market  
Albany Street Garage, Cambridge MA.

April 23-24 NAMES Expo Southgate MI  
[www.modelengineeringsoc.com](http://www.modelengineeringsoc.com)

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

May 5<sup>th</sup> Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA. Call 781-893-5410

May 15<sup>th</sup> MIT Flea Market  
Albany Street Garage, Cambridge MA

May 21<sup>st</sup> 9:00AM-2:00PM  
Jim Paquette's open house  
114 High St. Uxbridge MA 508-278-2203

May 24-26 EASTEC Eastern States Exposition  
W Springfield, MA USA <http://www.sme.org/eastec>

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

May 29 Owls Head Transportation Museum  
Fiddleheads Antique Car Festival & Antique  
Aeroplane Show

*Bill*