

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 Oct. 1, 1998 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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PARKING FOR THE MEETINGS UNTIL THE NEW GARAGE IS FINISHED

Thanks to Mike Boucher for the following info on where to park for the next few meetings, along with the map that's also in this issue.

The parking to the West of Moody St is on a one way street heading AWAY from Moody st. It outlets onto Felton St, another one way street heading AWAY from Moody st. To get out of Waltham from Felton St, travel to the first light. If you're heading North, turn right and in a few lights you'll be at a junction with Main St/ Route 20. If you're heading South, turn left and in a few lights you'll be at a junction with Moody St.

The other thing to keep in mind is that all this parking is metered. You don't have to feed the meters after 6:00 at night, however. All of it is about a 5 minute walk to the museum.

See the map on page 9

From the Editor's Desk:

September's gone by fast, but then there were only four weeks from the September meeting till the October one, so it was a short month too. The Show at the Topsfield Fair was a lot of fun, and the big Steam Show at Clark's Trading Post this weekend should be a big event also. Hopefully somebody will be able to tell us about it at the meeting.

Don't forget, the Gazette needs material for upcoming issues.

See you next Thursday night, scl.

President's Corner by Ron Ginger

October Meeting

Well, it finally happened, all the leads I was working for meeting speakers fell through and I don't have a speaker for the October meeting. So, it will be a 'Poster session' or everyone bring something to the meeting. If anyone wants to do a short talk, let me know, and we can have some general show and tell time.

Remember the parking lot changes for this meeting. Our regular lot is now a construction site, as they build a new parking garage, so for the next couple months its going to be a bit of a walk. PLEASE, PLEASE do not park in the reserved spaces around the mill building. I have been warned that if the building management thinks we violate the parking restrictions we will be REQUIRED to have a police detail for every meeting- at a couple hundred dollars per. Don't risk our meeting location by improper parking.

I would really like some help in meeting planning. I need more names for speakers. I need members that are willing to talk. I have a promise from one member to speak about his work in rocket science (I'm not kidding!) and other things mechanical. But I'm sure there are others out there that have interesting stories to tell. How about it guys? Lets have some good ideas! Please call me at 508/877-8217 if you are willing to speak at a future meeting, or if you know someone that would make a good speaker.

Rollie's Swap Meet

Since it seemed clear at the last meeting that the majority preferred Sunday, the date has been set for Sunday, October 4. That's just 3 days after our meeting, so you need to get hot and clean out your shop of that excess 'stuff'. Bring it to Rollie's and trade it for someones elses 'stuff', This is also an excellent chance to see Rollie's great shop, and I'm sure he will be demoing his CNC mill. There will be some tables in the garage to display the wares, and plenty of room- even if it rains, there is enough inside room.

Rollie lives in Spencer MA. From the Boston area the best route is to take the Mass Pike to exit 9 (the Sturbridge exit). After you pay the toll, stay to the right about 1/2 mile, and get onto Rt 20 EAST. About 1 mile on Rt 20 and turn LEFT, on rt 49, going North, back over the Pike. About 2 miles up rt 49, turn right onto Flag Road. Flag curves to the left just after you

get onto it, going almost parallel to rt 49. About 2 mile on Flagg, you enter Spencer, and the road is now South Spencer Road. Rollies house is #90, on the left. If you get to the small park with the artillery piece, or the railroad bridge, you just passed it!

See you Sunday, October 4, noon to 5PM, Rain or Shine.

Cabin Fever Show.

Its just 4 months to this show, so its time to start hustling up a crowd to go. Did you see the note in HOME SHOP MACHINIST by Joe Rice that mentioned our group from last year?

I assume we will make just about the same arrangements as last year. We should leave about noon on Friday, January 29. We will be in the hotel in time for dinner. It was quite a nice place last year, and a very pleasant evening of dinner and shop talk. We will be at the show all day Saturday, and until noon on Sunday. We should be back home Sunday evening.

Cost last year was \$110 for the bus, and the hotel was about \$120 for both nights. I will get exact numbers later, when I see we have enough interest. I will have a sign up sheet at the next meeting, we don't need any money yet, just names, so I see if we have enough to make the charter reasonable.

NAMES Video Tape.

Last month I mentioned this tape, and 5 of us ordered them. I have seen the tape now, and it is good. The video quality is very good, with enough sound track to be interesting. I don't ever watch TV, but this tape is worth watching. I can order more, but to get the \$20 deal (regular \$29.95) we must have a minimum order of 5 tapes. I'll have a sign up sheet, watch for it at the meeting.

Lego's For big boys.

I just bought myself a Lego set, and if it arrives in time I'll bring it to the meeting. The interesting part about this set is that it contains a computer- an 'embedded microcontroller' and it can make autonomous robots. The set has 700 of the usual Lego pieces, including gears, shafts, racks, and some motors. The computer can be programmed to control all this. It called Lego Mindstorms, and it should be arriving soon at toy stores. I've been reading about it on the Internet for a while. If you liked Erector sets (or Meccano) when you were a kid, this set has to be the greatest toy in years.

--Ron

Calendar of Events

Thursday October 1, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry,

154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday November 5, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday December 3, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

If you'd like a list of Engine Shows in the New England Area (and a few as far as Penn.) Send Dave Robie an SASE and he'll send one back to you. He's at PO Box 414, So. Weymouth, Ma 02190

Thursday January 7, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

The Meeting, 3 September, 1998

The visit to Boston Digital that was scheduled for 26 September has been postponed due to too many conflicts that weekend. It'll be rescheduled for a later date.

Mike Boucher has been handling the "official stuff" for NEMES in it's quest to become a 501(3)c corporation. NEMES became a corporation about 6 months ago and we now have an IRS Form 4 to apply for a tax number, which is the corporate equivalent of a Social Security number. It's a one page form with four pages of instructions.

Steve Cushman brought up the subject of a NEMES display within the Museum. The idea is that once the Museum reorganization has been completed there will be a permanent NEMES display. What's in the display will be constantly changing, with 2 or 3 separate members displaying items and one or two of the displays changing at meeting time each month.

Probably the biggest news coming out of this meeting was what greeted us as we pulled into the parking lot. The lot is going to be out of commission for the next couple of meetings as they are putting up a parking garage. Mike Boucher, who lives around the corner from the museum and is familiar with what's going on in the area has provided a map with suggested alternate parking that's printed in this issue.

Some Sunday in October there will be a swap meet at Roland Gaucher's shop. I need to call him and find out what day it's going to be.

The main speaker for the night was David Wilson from MIT. His two favorite subjects to talk on are Human Powered Vehicles and Gas Turbines. Tonight he's talking about Human Powered Vehicles, from the Greek Galleys to Daedalus, the Human Powered Airplane. He edits "Human Power" magazine.

Like everything else, the human body has optimum power output conditions. With a 5 man sweep in a galley the five men are all going to be pulling on the oar with a different velocity and for different distances during each stroke. The one closest to the fulcrum will be pulling maybe 6" and the one furthest away will be reaching several feet. The faster that a man pulls on an oar (or anything else) the less force that he can apply, while the slower that he pulls the more force he can apply to the oar. The power applied to the oar is the product of the force times the velocity. The result is an optimum velocity at which the power output is the maximum. With five men on a single oar it's obvious that the maximum power output of the five men could not be utilized. As time went on Galleys were rearranged in various ways to more efficiently match the rowers to the oars, but all the work was still done with the arms and the back.

Later, what we think of as the squirrel cage came into use for providing power. This was a real improvement in Human Power output because the hands can only produce about 1/3 the power that the legs can.

In 1817 Carl von Drie patented a frame with front and back wheels that you sat on and pushed with your feet. From 1818 to 1822 there was a craze for them.

If you want to change the world you need three things. A good idea, business sense, and you must be a showman.

Kirkpatrick MacMillan made the first bicycle that you could sit up on and pedal in 1860. He had a good idea, but was definitely not a showman and didn't influence anybody.

Pierre Michaud gets the credit for the pedal bike, but it's thought he stole it from someone else. A new craze developed, but in 1869 the Franco Prussian War broke out and Napoleon said no more, so the English started to build them. In 1869 the tension wheel was invented by Meier (sp?) in France. By 1875 the "ordinary" High Wheeler had evolved. It was a big, if dangerous, craze for 10 years. In 1885 the Rover Safety Bicycle came out and the modern bike had almost arrived. Starley's Safety Bike took off because he didn't patent it.

In 1888 Dunlop got a patent for a pneumatic tire, and since 1891 almost all bicycles have used them.

Bicycles advanced ball bearings and for a while during the years of their development were at the cutting edge of mechanical engineering.

Recumbant bicycles have been scorned since they first appeared, but most of the people who try them never go back to a "normal" bike.

Some Recumbant PROS and CONS

PROS

1. Safety - you don't go over the bars and hit head first, you impact feet first.
2. Comfort - absence of nerve damage in hands, neck, and crotch. (Less blood vessel damage also.)
3. Eliminate falls from pedals catching the ground.
4. Better braking, your hands are always on the brakes.
5. Better visibility. You can see better, except to the back (so get a rear view mirror.)
6. The rider is more visible - on a recumbant you're an inch higher than a Cadillac driver. (a flag is desirable)
7. Lower cost to manufacture - only one frame style since one size fits all as opposed to the multiple sizes on standard frames.

CONS

1. Not good for off road.
2. Not good in the snow.
3. Two sizes of tire.

The Cheetah, a recumbant with a fairing, did 68 miles per hour at 9500 feet altitude. They wanted to get into the Guinness Book of Records, but Guinness said that they had to be recognized by an international organization in order to be in the book. So, the International Human Powered Vehicle Association was formed to provide the recognition and the Cheetah made it into the book.

The Daedalus is a human powered airplane. It flew 119 kilometers from Crete to Santorini. Gallager, known for smashing watermelons and such with the sledge-o-matic, had a mini blimp built so that he could pedal around inside the Astrodome while he was telling jokes.

A human powered boat (on the cover of Scientific American a few years ago) has managed to go 20 mph, and the Decavimator, a 1 person powered boat with an air propellor does 18 1/2 mph.

There were three Human Powered vehicles at the meeting. The speaker, David Wilson, arrived on his recumbant. It has a small wheel in the front, with the handlebars under the seat and connected to the front wheel by a rigid linkage for steering. Bob Hicks brought his Lightning, with a homemade fairing that he says makes a big difference when he's riding. Jeff Del Papa had his tricycle here. It has two wheels in front, with hydraulic disk brakes as used on gokarts. He built it from plans and has had it up to 55 mph going down hill. He thinks he could have gone faster but there were cars in his way.

TIPS AND TECHNIQUES

by Ed Kingsley

A BRITE IDEA

If you're a user of Scotch-Brite hand pads, as I am, you probably either use them as a full size sheet or are forever tearing bits and pieces off to use for more frequent, smaller tasks.

If you use it full size, get ahold of the Scotch-Brite, Twist-Lok Hand Pad Holder, No. 961. It's a comfortable plastic thing that looks a bit like a concrete finishing trowel. It has lots of little sticky dodads on the bottom that poke into the fibers and grab the pad pretty good. It works well for use on large flat surfaces. And, it's especially good if you're using Scotch-Brite in conjunction with a cleaner or polishing compound. The handle's base is 4"x6", so it holds 1/2 of the standard 6x9 pad.

If you're a ripper, try cutting up a sheet or two, in advance. I have a plastic container full of pieces, from bandaid to driver's license size, in 7447 and 7448, along side the mill and next to the lathe. It's much handier than searching for a pad and gnawing off a chunk at the moment of need.

If you're neither of the above, and haven't a clue what I'm talking about: Scotch-Brite is a 3M, non-woven nylon material, impregnated with "abrasive minerals", that comes in several forms including the 6"x9" pads referred to above, rolls of various widths, belts and wheels. I will focus on the pads. They are available in several "grits" including the following:

- 7445 - Light Duty Cleansing (old coins, teeth, etc.)
- 7448 - Ultra Fine Finishing (gold heirlooms, butterfly collections, etc.)
- 6448 - Light Duty Cleaning (small arms, skateboards, etc.)
- 7447 - General Purpose ("does anything" pad - BEST BUY)
- 6444 - Extra Duty (decontaminating hazardous waste, etc.)
- 7446 - Blending (stainless steel, margaritas, etc.)
- 7440 - Heavy Duty (cleaning coral reefs, dulling barbed wire)

Yeah, well their descriptions are worse, but, the product is excellent. Confused? Try the "Hand Pad Trial Pack, No 961S". It has all (7) grits listed above, a sponge mounted pad and the Twist-Lok Pad Holder - \$13.75.

I use the 7447 (with water) to finish the edges of metal and plastics after filing or sanding, or often right out of the mill. It's quick and easy and leaves a nice surface finish. It's excellent for rust removal and for preparing a surface for painting or soldering. Your

wife will like the way it cleans the sink and BBQ grill, too, especially if YOU do it.

Norton Abrasives markets a similar material they call Bear-Tex. In looking through several catalogs, none seem to carry both. A friend believes that 3M's policy is not to distribute through dealers that carry competing products, ergo, MSC does not carry Scotch-Brite because it carries Bear-Tex. Coke or Pepsi (?) I hate that

Q. Why do Scotsmen walk briskly when playing the bagpipes? A. To get away from the sound.

SCREW IT

If you have to work on the threaded end of a screw, say to face it square, drill an axial hole, turn a dog point or just shorten it some, here's a tip. This is not a new idea, but I've used it several times recently and it's well worth relating, in case you haven't come across it yourself.

Getting the screw (or bolt) to run concentricly in a chuck, or a collet, is tough when you've only got it by the head. Try putting the threaded end into the tailstock chuck first. Then slide the tailstock down the ways until the head of the screw is inside the chuck or the collet, where you want to hold it. Now, tighten the chuck (or collet), release the screw from the tailstock, and proceed with the operation.

This is especially helpful if you have to drill the end of the screw. When the screw is running 'true', you can exert a fair amount of side force without knocking it out of alignment. It will, however, deflect fairly easily, so use sharp tools and light cuts.

WARNING: This is not a good thing to do with carbide tooling. If the screw climbs up on the cutter, it can whip around and chip the edge off. Bad screw!

EXTENDED SHOPPING HOURS

I spoke with the managers of both J&L Tools and Metal Source (formerly Admiral Metals Tent Sale) about the possibility of their staying open late, one night a month, for the benefit of our club members. Both were open to the idea, and I said I'd float the proposal at the next meeting to see what kind of interest there might be. Both stores are in Woburn, just off of Route 128 and less than a mile from each other. Metal Source normally closes at 4PM and J&L closes at 5PM.

Metal Source continues to increase its inventories of brass, aluminum and stainless steel, and their display/layout of the stock is just short of amazing. Excellent selections in every department.

I remind that J&L will accept phone orders that can be picked up at the Woburn branch, without paying shipping charges. I tried it, last week, and it worked just fine.

GETTING MORE OUT OF THOSE CATALOGS

1) My 1998 MSC Catalog arrived recently, and I didn't throw the old one away. They come in very handy when you need something heavy and flat to moosh things with. I've heard the EPA was worried about the accumulation of old National Geographic magazines in geologically unstable areas? Hmmmm... I wonder what those guys in black want?

On the page opposite the fold-out "Thumb Tab", for Section_12, is an excellent chart of Tap and Drill Sizes, which includes standard Metric and Pipe Taps, as well as Form Taps (even Metric ones!). It tears out easily and fairly cleanly. The Section Tabs are a nice improvement, too.

2) The J&L Catalog is in full color, and is now almost half the size of MSC. It has numerous "For the Techie" boxes, with very useful information on a wide range of items. Notable is the data provided on carbide tools and inserts.

3) I've heard the ENCO Catalog ink comes off on your butt.

--Ed

A Different Way to Level a Lathe **by Bob Niedorff**

The commonly recommended method of leveling a lathe is to put a precision level on precision risers and make sure that the flat-to-flat at the headstock is level, and that the flat-to-flat at the tailstock is level. This will give you a lathe with zero twist. Following this procedure, you are advised to put a bar in the headstock and the tailstock, and check that the bar is parallel to the ways. If it isn't, they say that your bed is misaligned. Below is a different approach which makes more sense to me, especially when setting up a lathe with some wear.

My lathe has four aligning "ways" on it: two "vees" and two "flats". The carriage rides on one flat and one vee, while the tailstock rides on the other flat and the other vee. My lathe also has a few dozen years of use on it. Some spots on the bed are more worn than others. Specifically, near the headstock, the flat and vee for the carriage are worn, while the rear of the bed has the flat and vee for the tailstock worn. If I used a level on the flat-to-flat near the headstock, the wear on one flat will tilt the level one way. If I then moved the level to the far end of the bed, the wear on the other flat will tilt the level the other way. So for a worn lathe, this leveling method isn't very useful.

A much more straightforward approach to leveling a lathe is to put the level on the lathe carriage itself. Then crank the carriage from one side of the lathe to the other. If the lathe is level, the bubble won't move. If there is any twist in the bed, the bubble will shift as the carriage moves. This technique

checks for twist in the bed in the right place, as seen by a cutting tool!

This test doesn't insure that the headstock is parallel to the ways. However, for a quality lathe, that is correct from the factory and not affected by wear. In the case of my lathe, the headstock rides on one vee and one flat, and these are scraped in at the factory.

So if you set the lathe with a level on the carriage, you should get nearly perfect results with a test bar in the headstock. If you don't, then you may have a burr or nick in the bed under the headstock, rather than a problem of bed twist.

Wear in the tailstock ram and under the tailstock are another set of problems.

(Drawings on Page 6.)

NEMES Exhibits at Topsfield Fair Grounds

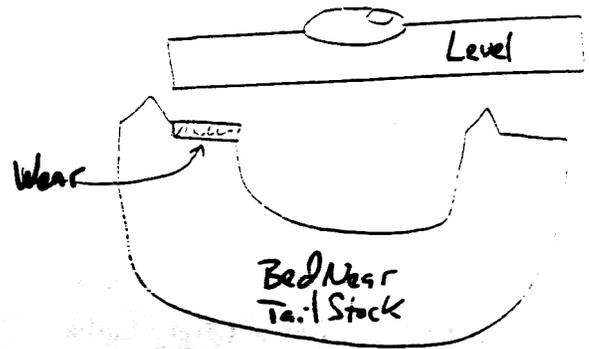
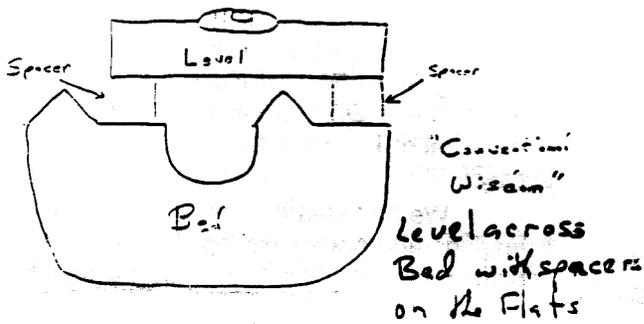
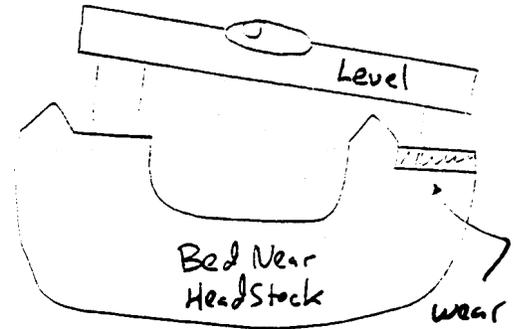
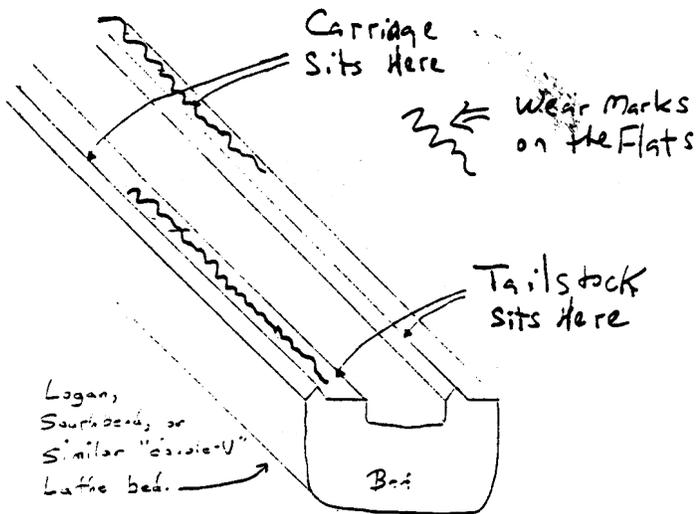
Sunday September 13th was a beautiful sunny day at the Topsfield Fairgrounds. About twenty NEMES members were on hand for the Model Engineering Show that Ed Rogers set up as part of the North Shore Old Car Clubs annual show. We had a nice tent to keep the sun off us, and 8 tables for display.

We had steam engines running on air, sterling engines and hot air engine running, IC engines, RC boats (one electric and one with a miniature V-8,) 3 cannons, a live steam locomotive running on a test stand, and the BR-2 running on it's test stand every so often during the day.

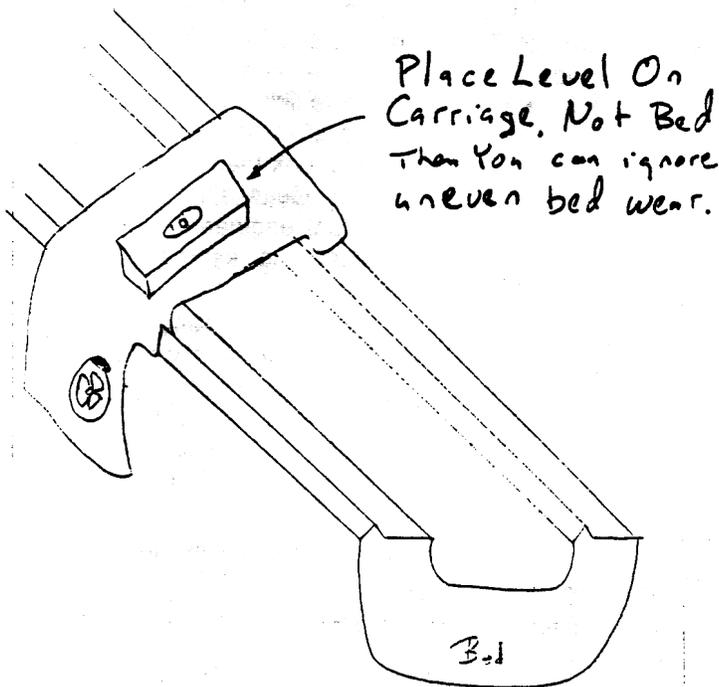
I hadn't thought about it before hand, but it was obvious to me as soon as I arrived. This was a good place for a model engineering show. People who come to car shows like mechanical stuff. I think we had more people stop when they saw our tent and really take a good look than we had at our main show in the Museum. Quite a few of them hadn't even known that model engineering existed before they saw our display and expressed interest in NEMES.

Ed Roger's quarter scale 1940 Ford V-8 was a big hit with the car people, some of whom recognized the block and wanted to know if it was really a Flat-head. Ed's made a lot of progress since the first time he brought it in to a meeting to show us. I'm looking forward to seeing it run after a couple more winter's worth of work.

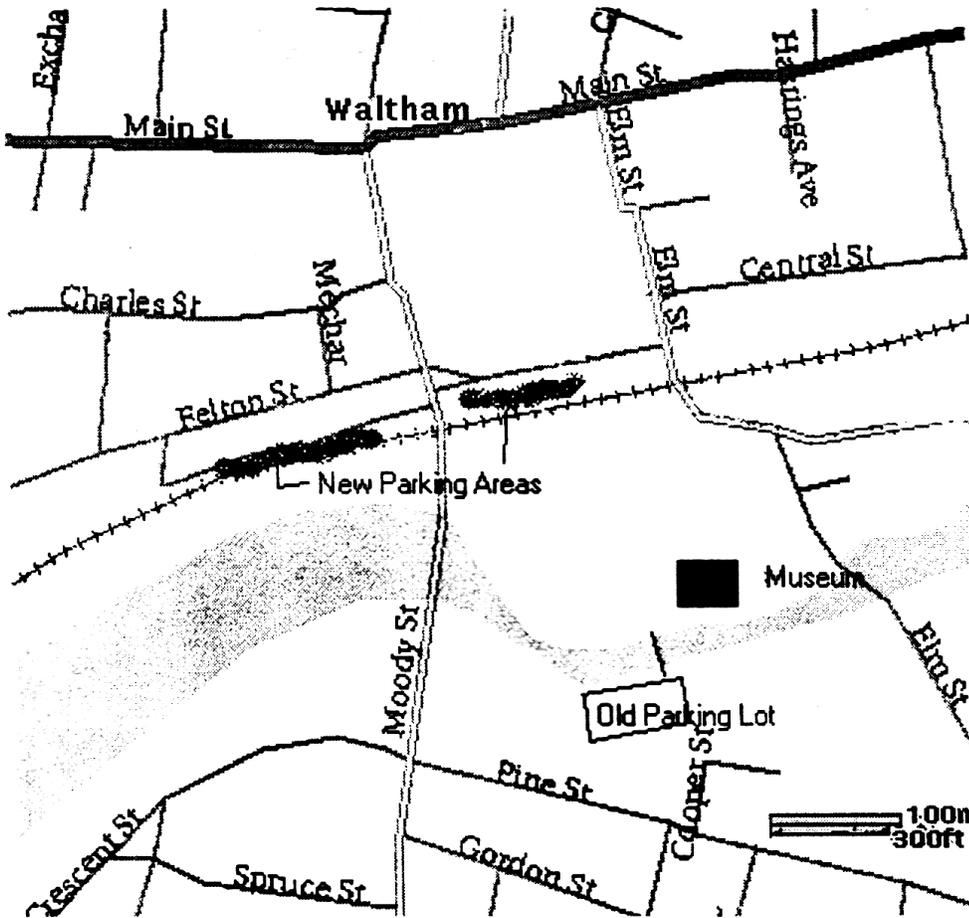
We all had a good time, and the public seemed to really like what we were doing. I think NEMES should consider making our club part of this show an annual event.



Even with a Straight Bed, a level on the flats suggests a Problem.



8/5/98 Bill Neill



Here's
the Map to
go along
with Mike's
parking info
on Page 1

The American Precision Museum

We've mentioned the American Precision Museum in past issues of the Gazette, and now that Robert Barrett has sent me some material on it, along with the report that he visited it and thought it was just the sort of place that NEMES members would enjoy we're mentioning it again.

The building was built in 1846 to house the Robbins and Lawrence Armory and Machine Shop. It was erected to fulfill a contract with the United States Government to supply 10000 rifles for \$10.90 each. They got the building up and completed the contract at a good profit 18 months ahead of schedule.

In 1851 Robbins, Kendall & Lawrence participated in the Crystal Palace Exhibition in London, exhibiting six of the rifles they had made for the US Army Rifles they had made. Visitors were so impressed with the interchangeable parts that manufacturing items assembled from interchangeable parts became known as the American System. They also got a contract to supply the British Government with 150 machine tools for a new armory in Britain.

The building went through a succession of owners prior to 1966 when it was turned over to the American Precision Museum, Inc. The Museum has been rehabilitating

the building and developing it as an industrial museum since then. It is known as the Robbins & Lawrence armory and the US Department of the Interior has designated it as a National Historic Landmark.

The National Machine Tool Collection, tools from Thomas Edison, and a collection of Guns made in the armory and by it's descendants are just part of the things you can see there.

The Museum is located in Windsor Vermont, at 196 Main Street (Route 5) between exits 8 and 9 from Interstate 91. They are open 9-5 Mon-Fri and 10-4 Sat, Sun, and Holidays from Memorial Day til November 1st.

The American Precision Museum is one of the places that's on my list of places to go.

Classifieds

A friend of Bob Barrets's and mine has a Taiwanese bandsaw for sale. Specs: 40" throat, 3 wheels (20"dia.) takes up to 1/2" blades,has welder, varispeed drive + 2spd. trans., 1 HP 3 Phase motor and is almost new. Price - would like \$1900 Contact Don Strang if interested.