

# The NEMES Gazette

Vol 1 No 6  
October, 1996

*The Newsletter of the New England Model Engineering Society,  
Stephen C. Lovely, Editor, POBox 277 Milford, Ma 01757-0277, 508-473-8621  
Ron Ginger, Founder, 17 Potter Road, Framingham, Ma 01701, ginger@ma.ultranet.com  
Joe Masciovecchio, Treasurer, 77 Wainwright Ave, Weymouth, Ma 02190*

## From the Editor's Desk:

It's been another month already - time flies. At the last meeting Joe Masciovecchio and I discussed the fact that the time is rapidly approaching when we are going to have to stop mailing the newsletter to the people who haven't paid dues. We ran it past Ron Ginger, and he agreed. This issue is going to go to the entire mailing list, and so is the next one that will come out to remind you of the November meeting. We need to do this because even though I'd like to mail them to everyone, it's not fair to the people who paid to continue sending them to those who didn't once the initial startup period is over. We also need to be sure that we have enough money to operate until next July, which is when it'll be time to have our dues in again for the next year. A quick look at cash flow also indicates that November is the time to cut back. So, if you haven't sent your dues (\$20 per year, running from July 96 to the end of June 97) to Joe yet, send him a check (his address is on the masthead above) or get him the money at a meeting. The expenses for the Gazette are running about \$60 an issue. An 8 page issue costs .25 to print and .32 to mail. This issue I'll be mailing about 95 out to the list, plus another 10 to the Machine Technology class at Waltham High. I usually get 25 or 30 extras printed up when I take an issue to Staples to get copied so that I have some available after the mailing has gone out.

I asked Joe if he'd prepare a report on what has happened so far with the financial end of NEMES, and I've printed it later on in this issue, along with the list he sent me of the people who've paid their dues. In the next issue I'll plan on printing the names of the people who pay between now and then so that you'll know for sure that you are down to receive issues in December and beyond.

Check your mailing label and be sure it's right. I got one back last issue marked "no such street" because the street was misspelled on the label. Ron is maintaining the mailing list, so let him know if your's isn't right.

I've got a little bit more material that could go in this month, but I've been busy and want to get this issue out in time to remind you all to come on the 3rd, so it'll have to wait for another time. Don't let that stop you from sending stuff in though, because what I would like to do is get a backlog of material that isn't time critical so when I have a little extra room in an issue I'll have something ready that I can put in it.

## The Founders Corner

The September meeting was another good session. Lots of interesting talk, and a couple very interesting exhibits. I continue to be amazed at the work being done by our members. I go home from each meeting so excited and full of new ideas I have a hard time sleeping.

We do need to tighten up a bit on the meeting. As much as I hate to cut anyone off, we do need to try to keep to a bit of

schedule. When we have asked someone to speak, its only fair we get to the speaker with enough time left to present his talk. I will try to cut off the show and tell at 8:15, have our break, and resume with the main speaker at 8:30. That will give the seaker an hour, and we will still have a few minutes to chat before we have to clear out of the museum.

There has been a suggestion that we set a theme for each meeting, to bring some focus to our talks. Since drill sharpening was suggested, lets make that a theme for the October meeting. If any of you have gadgets for drill sharpening, bring them along. We will devote the second half of the meeting to drills and drill sharpening.

We will still have a general Show and tell time, so please bring along something to show. I'd like to keep the emphasis on the Show part of that, so lets have more projects like Kay's submarine, or that great steam engine new member Art Corman brought along.

Keep in mind that just 2 days after our next meeting will be the Museums annual STEAM EXPO. I'm hoping to have a big exhibit of our members work. The museum hopes to have steam available, and maybe compressed air. You will have to bring your own tables, and maybe a folding chair. We will setup in the small park right at the end of the foot bridge. Lets make this a big show!

Speaking of shows, the Museum board is happy to have us run a show in February, so start tinkering now about the FIRST annual show, February 15, 1997. This show will not be just steam, but any type of working device- engines, clocks, tools, etc.

I have a speaker lined up for the November meeting. Ray Hasbrouch will be coming from New York, with a few models. Ray is a very prolific model maker, and has designed many engines for building without castings. It was one of Rays designs that was the first model engine I ever made. I'm sure you will all enjoy hearing Ray and seeing his models.

We do have a volunteer librarian, so start bringing in those favorite articles or plans to contribute to the club library.

See you Thursday, Oct 3 -- Ron Ginger

## Calendar of Events

Thursday October 3, 1996 -- NEMES MEETING at the Charles River Museum of Industry

October 5&6. Steam Expo at the Charles River Museum of Industry

George King III, chief engineer of the Sabino is inviting the Members of NEMES to a Steam Open House at his place on Rt 32 in Franklin Connecticut on October 27, 1996. He has a boiler in his shed, along with some stationary engines.

Thursday November 7, 1996 -- NEMES MEETING at the Charles River Museum of Industry

### The Meeting, September 5, 1996

Ron called the meeting to order and started off with a business meeting. The Museum is starting up a Newsletter, and we had a visitor with a camera who will be writing us up in the Museum's new Newsletter.

Karen Leblanc, the Museum Director, told us some more about the upcoming Steam Expo at the museum on October 5 and 6, the weekend after our next meeting on October 3. There should be over 20 steamboats on the river, some Stanley Cars, a Grout Car, an 1890's steam pumper from Johnstown RI that will be taking on the newest Pumper from the Waltham Fire Department, stationary steam, steamed hot dog's, lot's of Steam lectures, and a 12 ton Buffalo Springfield Roller.

The Steam Expo is a Steam Show. We also discussed the possibilities of having a model show at the Museum sponsored by NEMES. November and February were mentioned, but despite the risk of snow the general consensus was to go for February. February is about as early as we can get into the magazines to get publicity. Ron is going to check with the museum about available dates. (He did, see The Founder's Corner.) The show will be open to all, and we will Promote it as a New England Model Engineering Show.

Karen told us that the city of Waltham has a vocational high school. To graduate you have to build a working steam engine. She asked if we would mind if she told the students there about NEMES and if they might visit us if they wanted to. There was a very positive reaction to the idea NEMES is a group open to anyone who is interested in Model Engineering and wants to participate. I will be getting the address of the school from Karen and will send them an invitation to come to our meetings along with a copy or two of the Gazette. So, all you students out there, come on over to the Museum of Industry on the first Thursday of the month, have a good time, and see some incredible things that people have brought in to show.

Don Strang suggested that we should have a theme to our meetings, with an overall topic for each month, ie threading and drill grinding. Ron says that it's been suggested several times, the hard part is coming up with suitable topics. Tool grinding and Fly cutting have been suggested as possible themes. The possibility of demos in the shop downstairs was brought up. It was deemed possible, but the space available would put some limits on what could be done and how many of us could see something at once.

The club now has a librarian. John Wishneusky has come forward to take over the task. The plan is that he will maintain masters of the plans and such in the library. When you need something you can borrow the master, get copies made, and return the master. People who have tried one of the ideas from the library can then tell us if it works or doesn't work, which will give the library an extra benefit beyond being a source of plans and ideas.

Bring something to swap for next time. Paul Gauffin had some of the interesting stuff he's picked up in Russia during his travels there, and Howard Evers brought in some wrist

pins and some cast iron valve seats that quite a few people took home.

Ron and Roly didn't get there Steamboat fired up for the event at Mystic Seaport, but is has been under steam and Ron says Roly has the scars to prove it. They are planning on smoothing out operations so they don't take such a toll on Roly in the future.

Errol Groff reported on his visit to the Hamilton Museum of Steam and Technology in Hamilton Ontario (by Niagara Falls.) There are two enormous steam pumps -- 15 RPM, 24 foot flywheels, 8 foot stroke, 240 gallons/stroke, double acting. There are 240 oil cups that needed to be filled every two hours. In several spots there is only 2 inches clearance between the beam and the cup. So, not only did you have to keep at it to keep all those oil cups full, you had to time it just right or you'd have serious problems. Burns were part of the everyday experience for an oiler there.

Paul and Howard had such a good time running the swap meet at Paul's back in May that they'd like to do it again, but feel they need more room. Paul had a line on a hall from a sportsman's club, but they were afraid we'd be too rowdy a crew so they are still looking. So, if you have a hall available let Paul or Howard know.

Jay Stryker, wearing a very nice name tag that Ron quickly pointed out to the rest of us as what we should all be wearing so we can tell who's who, said that there is a new electronic newsletter on CAD/CAM etc being set up. If you're interested, contact Gary via email, gary@snet.net He also had a couple of photocopies of useful things that are now in the library, along with a copy of the article Roland based the infinite pitches threading attachment that he showed us a couple meetings back.

Don Strang passed a copy of Moore Tools book, "Foundations of Accuracy" around. It has a good discussion of why dual inverted V's are the optimum lathe bed. Moore tool used square bars scraped to be just right, set into V's in the bed that were also scraped just right, giving perfect raised V's for the best possible bed. It also has a good discussion of why cast iron is so useful in machine tool construction.

He also updated some of the info in the Resources section last issue. Holten is now Brothers, and Surplus Tools in Waltham has been gone for several years. As they say in those annoying ads for the telephone company, call ahead before you visit. They may not just be closed this afternoon, they may have been out of business for years. Harvard Machine is now on Rt 110 in Harvard, in the Appleworks.

The filler used on the old tools was Beeswax, Rosin, and Iron Filings applied with a hot tool. Don recommends "Cuz" from the auto parts store as the best of the modern fillers that he has found.

He talked about the American and the English system of drawings. He managed to confuse me somewhat, but the English system is First Angle projection. There's your eye, then the object, then the plane of the drawing. The American system is Third Angle projection. There's your eye, then the plane of the drawing, then the object. Another way to look at it is in the American way the object stays still and you move around it to get new views, while in the English way you stay

still and rotate the object. I think this explains why the drawings in Model Engineer sometimes seem so cryptic to me.

Kay Fisher brought in the largest of his three model submarines. It's a model of the Pardo, a Sturgeon Class sub and is medium sized for the Groton Sub meet. The full sized ship has a 32 foot diameter pressure hull that is 8 inches thick. If you hang a key on a taught string on the diameter in the torpedo room, which is the only place inside where you have open space the entire width of the hull, at depth the key will touch the floor because of the compression of the hull. Kay's model is like a real sub, it has an outer skin and an inner pressure hull. The water tight cylinder fits neatly into the outer shell and contains the radio and other equipment to run the sub. The cylinder has a ballast tank in the middle, and pressure from a storage tank is used to displace the water from the tank when it's time to come back up to the surface.

The pressure tank holds enough gas to make 10-15 dives, but it's hard to tell if you've got it full, so Kay doesn't do more than two or three without refilling it. Another important thing to remember about a model submarine is that you never put it into water that you don't want to swim to the bottom of. It's radio controlled, but the switch is inside the watertight compartment so you have to open it up to get it running. Every sub has a sonar system, and Kay's is no exception. He turned on the pinger and it reminded me of a WWII submarine movie. He spent a winter making it. A lot of the time was waiting for parts to come, and in terms of the actual time spent on the model he spent the most time painting it.

He passed around a magazine that is the source for info on the model submarine field. It is "The Sub Committee Report." To join the Sub Committee and get their magazine, contact Col. Lester E. Hopper, Aus (Ret), Sub Committee Membership Chairman, 3530 Mimosa Court, New Orleans, La 70131-8305. Membership is \$26 a year.

After the break Art Corman showed us the engine he had built. It's to a Ray Hasbroc design and is made all from bar without the use of any castings. He likes machines, spent some time in RC, then decided to make the engine. It has run on air, but he hasn't run it on steam yet. It was suggested that now he needs to build a boat around it to give it something to do.

Errol Groff came prepared with an overhead projector and apologized for going so fast last time on the triple start threads, especially the part about measuring the pitch diameter with three wires. The pitch diameter is measured at the point in the threads where the width of the metal and the width of the gap between the metal is the same. He had some nice handouts for us that he had done with Design-Cad 2-D. The example thread that he is using is 7/16-14. Most threads engage about 75%. Threads come in classes. 1A is the loosest, 2A is a close fit, and 3A is the closest. 3a is like the spindle on a micrometer. To measure the pitch diameter you use thread measuring wires. He had a set, it had 14 sizes, with 3 of each size. What size wire should be used? The ideal wire sits tangent to the thread at the pitch line, and there is a max and a min wire size that can be used for the thread. Outside the range you are going to get messed up. If the wire is too small you don't measure the wires, you measure the tops of the threads. If the wires are too large they don't sit on the sides of the threads they sit on the peaks, and

you don't get a good reading. The ideal and the minimum wire are close. Since you have to use a wire that you have, and since the ideal and the minimum are close, it is safer to go up a wire size from your set when you don't have the right size.

Since one of the times that you are especially apt to be using the 3 wire method to measure threads is when you are cutting them on the lathe, remember to clean up the swarf and lay a rag on the ways before you measure. That way, when you drop one of the wires you've got a chance of finding it again. A dab of grease is good to help hold the wires in place while you are measuring. Don Strang said that he had read that flouro clay was good for holding the wires also. Max ben-Aaron suggested turning a pilot diameter at the root diameter of the thread as a guide to when you are getting close and need to check with the wires.

Some of the Handouts that Errol gave us are included later in this issue. (see page 7)

For internal threads, use a plug gauge. The three wire method will let you make an accurate gauge. Errol recommends Cool Tool 2 and a really rigid setup.

There is a flat at the root so you don't have a sharp V at the bottom of the thread, which also means that you don't have the threads coming out to a sharp point either. It is  $.125/\text{number of threads}$  or  $.125 \text{ times the pitch}$ . Don't put any rake on the top of the tool you use to cut threads, it'll mess up the form of the threads. Errol has a jig that he uses to help grind the proper angles into his cutter to make threads that he will try to remember to bring to the next meeting. I wish I'd had him for shop when I was in high school.

The scheduled Main Speaker for the night was Dick Wells. Dick had always wanted a steam car, so in 1988 when he retired he took the plunge. He has both a Stanley and a White and puts on about 1400 to 1500 miles a year. In principle a steam car is quite simple. In practice it's not. His advice is that if you want to get a steam car, don't do it till you retire. Of his vehicles the Stanley is the simpler of the two. It's controls consist mainly of 16 valves.

The Stanley brothers started making cars in 1899 when they got an order for 200 cars. They were successful with the 200 and were bought out. The resulting car was the Locomobile. A year after they were bought out they were back in business with an improved machine, and they continued to produce steam cars right up into the middle of the 1920's. They made a total of about ten to twelve thousand cars over the twenty plus years they were in business. White made steam cars from 1900 to 1910, when they stopped producing steam powered vehicles. During this ten year period they made about nine thousand. So, in the steamcar heyday the White was produced in bigger numbers than the Stanley. A White is a more sophisticated machine than a Stanley, and sold for twice as much as a Stanley when new. The Stanley Dick has sold for about \$1000 when it was new, his White for about \$2000. Today in the United States there are about 200 running Stanleys and only about 20 running Whites. A lot of Whites were scrapped in WWI for their Aluminum.

Dick's Stanley is a 20 HP model. What does the 20 HP mean? It's a 4 inch by 5 inch double acting steam engine with 2 cylinders, running on 400 to 500 psi steam. At 800 RPM the engine is putting out 80 HP and 650 ft lbs of torque. The layout of the vehicle puts the engine in the rear, with a spur gear on the crank directly driving the differential. It turns 36 inch rear wheels with a 1.2 to 1 ratio of engine speed to wheel speed. The front of the engine is attached similarly to a leaf spring so it stays still with respect to the body of the car while the rear of the engine goes up and down with the rear axle, so there is a lot of unsprung weight. This makes going downhill on a bumpy road quite an experience for the driver.

The boiler is in front. It's 14 inches high and has 650 vertical fire tubes. The tube sheet and the shell are one piece. Today when people make replacement boilers the tube sheet is welded in because of the greatly improved welding technologies in the last 70+ years. There are three layers of 60 mil piano wire wound around the shell to add strength. With copper tubes, a steel shell, and all the wire around the outside to hold it together you'd expect the boilers to not last long at all, but they hold up surprisingly well. Dick has a replacement boiler in his car but says there are still some running with the originals. The condensing Stanleys have steel tubes in the boilers, welded in place.

Oil goes into the main steam line, one quart per 100 miles. It's special steam oil and is equivalent to about a 600 ASA weight oil. Dick says never drive close behind a non-condensing Stanley in the rain, a couple of swipes by your windshield wipers and you won't be able to see a thing through the oil film on the window.

The suspension is by full elliptic springs and perch poles, strictly horse and buggy style, right down to the wooden frame. Most of the Stanley is wood, although the hood over the boiler is metal. It weighs in at about 3000 lbs.

Fuel is carried in an unpressurized tank in the back. It gets 8 miles per gallon of kerosene and 1 mile per gallon of water. Dick says that you meet all sorts of interesting folk while you're looking for water to keep your Stanley going for another 20 or 25 miles. The main burner pressure is controlled by a diaphragm and ball valve. It burns 8 gallons per hour of kerosene in the tiny space under the hood in front of the car, while the typical oil burner heating a house may be rated for something in the range of 3 to 4 gallons per hour.

The White is very different car, and despite the fact that it is mostly metal is actually somewhat lighter than the Stanley at about 2600 lbs. The White engine is a two cylinder compound engine with a three inch stroke and 2 1/2 and 4 inch cylinders. It runs 600 psi steam superheated to 750 degrees F. Dick runs his superheat between 750 and 850 degrees. The engine is under the hood, connected to the rear wheels through a two speed transmission with a neutral. The transmission is needed because of the control system for the steam generating system.

Steam is generated in a 300 foot long monotube boiler coiled up under the drivers seat. The total capacity of the monotube is about 1 gallon, compared to the 10 gallons normally in the Stanley boiler (15 full to the top.) It has the same 8 gallon per hour fire under the 1 gallon boiler that the Stanley has under the 10 gallons normally in it's boiler. So, it needs a sophisti-

cated control system to keep things under control. The control system is a closed loop feed back system, all mechanical. No data is available today on how any of it is supposed to work, what spring tensions should be, etc. The result is that it's pretty tough to get the system set up to work reliably, if at all. Dick is convinced that the difficulty in setting up the sophisticated control system with absolutely none of the original data on exactly how it's supposed to work is the big reason that there are about 10 Stanleys running today for every White. When the White is running it gets 10 miles per gallon of gasoline burned and is much easier to drive than the Stanley because it doesn't have nearly as much unsprung weight.

How do you get a Stanley going in the morning? There is a pilot light, and a vaporizing burner. Think of a BIG Coleman Stove. On the Stanley, heat the vaporizer with a propane torch till the pilot is hot enough to go, then leave things to warm up while you check things out. Run pilot fuel to the main burner for a couple of minutes to get things hot, then turn on the Kerosene. (the pilot runs on gasolene. Dick uses Coleman fuel to keep all the little holes in things from getting plugged up.) He wondered how hot the burner nozzles got, so he put a thermocouple on one and measured 750-800 degrees at the nozzle. After 15 minutes on the burner open the throttle to let steam go through the superheater. You'll have 200 PSI on the gauge, which is enough to get going.

When you first start a Stanley the cylinders are cold and you get condensate in them. It's a slide valve engine so the condensate lifts the slide as the piston comes down the bore and nothing breaks. Open the drip valves and get going. You start going fully linked up, once you are going you push a pedal with your left foot to hook up the valves. Unhook when you stop or you may start up backwards. Push the pedal all the way down and hold it there to back up. The engine has Stephenson Valve Gear.

Running down the road you need to keep the water level even in the boiler. There are two pumps to feed the boiler. If you uncover the tube sheet because you let the water level get too low the tubes will leak. At a Stanley rally you can tell who let the water get too low, they're the ones under the car at 2 AM with the expanding tool doing all 650 tubes so that they'll be able to get under way the next day. Every 25 miles you need water. The Stanley is equipped with a hose and a steam injector so that you can suck water out of any handy source.

When you blow the boiler down you are opening a valve and letting 550 degree water at 600 PSI out of a small hole at the bottom of the boiler. It is LOUD, but 18 inches out from the valve it is cool. After a long day operating the Stanley the blowdown is the perfect way to wash your hands

Operating the White is very different.

To get the vaporizer on the white hot there is a cup for gasolene, just like on a blowtorch. Put gas in the cup, throw in a match, and wait for it to get hot enough to light off the burner. Dick has done it this way once. As things heat up the gas in the cup starts to boil, then it boils over so there's burning gas on the ground under the car. Dick says this is altogether way too exciting, so after that first time he's used the propane torch to get things heated up to start.

Run the pilot for 5 minutes, then start the main burner. You'll have 400 psi almost right away. Jump in and push down the simpling lever so that the steam will be going to both cylinders right from the generator. Rock the engine carefully to get it dried out. The White has piston valves, so if the piston comes down on a bunch of water in the cylinder it's got a good chance to break something, unlike the Stanley that will lift the slide valve off it's seat and push the water into the exhaust. The white had four drip valves to take care of this when getting going from a cold start, but they are conical bronze stop cocks and Dick hasn't been able to figure out how to get them to seal effectively against 600 psi steam if he uses them. Once the engine is running you have to jump out and set the famous white burner controls. Then let it heat up and drive off.

The White has Joy valve gear.

The White driving experience is completely different than the Stanley one. Watch the steam temperature gauge. The burner controls are a closed loop system and run real well. But they don't like transients. So as you cruise down the road at 35 mph all is fine. When you suddenly stop for a stop light or to ask directions, the pressure gauge heads towards the 1000 psi setting of the safety valve, which is under the front right side of the car. Right where the person telling you how to get to point B is standing. When it goes off, the person giving you directions notices.

The White has a condenser on it, so the water goes around and around and you don't need to stop nearly as often for water as you do with a non-condensing Stanley. It only uses 1/2 the oil that the Stanley does, but that's still a quart every 200 miles, and it all ends up in the water tank. He uses a thing like a diaper that soaks up oil but not water in the water tank. It works real well, but it's no fun sticking your arm into the tank to pull it out.

Both cars have only 2 wheel brakes, and they are mechanical. The White has the better brakes of the two. You can't really do engine breaking either. With the Stanley you can throw it into reverse if you have too.

Someone asked about getting them inspected. As far as Dick knows, the law exempting automotive boilers from inspection is still on the books. The Stanley boiler usually fails with a tube collapse, and the White steam generator isn't really a pressure vessel anyway. So, boilers don't present any special problems from a regulatory point of view.

## **Tools and Techniques**

**by Ed Kingsley**

### **The Tool Shed**

Andy Kotlikoff, proprietor of the "Tool Shed", 471 Main St., Waltham, MA, has been gracious enough to stay open an extra hour and fifteen minutes beyond his normal closing time, on the evenings of our meetings, to give us an opportunity to browse his wares and perhaps take home the odd tap, drill, end mill, clamp or otherwise essential metal thingey.

He has done this for three months with the expectation that we would support him as he was supporting us. It's a two way street. He puts off dinner and his plans for the evening and we eat a bit faster and try to get to Waltham before he closes. He will stay open for us on October 3rd, until 6:15, but if there

is not a stronger turnout than there was last month, the experiment will probably be over with both of us the 'poorer' for it.

I couldn't make it last month and, being summer, I expect that many of you also had plans that didn't include shopping for used tools in Waltham. Maybe some of you have stores similar to "The Tool Shed" nearby to where you live. If you do, I'd appreciate your mentioning them in the "Resources" section of the newsletter. I don't, and I think that by supporting Andy (you don't have to buy something every month, but showing up and being interested works for all of us) you nourish a resource which has truly become an endangered species in our avocation. End of sermon, hope to see you there. If you need directions, call Andy, Wed - Sat, 1 to 5PM at (617) 647-7970.

### **Chaos Begats Order - or, Let The Chips Lie Where They Fall**

Over the past three years, I have seen my longtime hobby slowly become first, a part time vocation, and then my primary source of income. With this shift in commitment came the realization that, in order to function both effectively and happily, I needed to bring some order to my (chaos) life.

Three years ago, we bought a new furnace (the kind that just heats up the air in the house, unfortunately) and, in order to make room for the contractor to bring in the new and take out the old, I had to 'dismantle' my shop. To be honest, my 'shop' was an ill conceived and poorly organized bunch of 'stuff', accumulated over 30 years, and more or less used where it fell. Pushing everything to the walls in order to install the new furnace simply moved everything further away from everything else and misplaced scores of things which I've been looking for ever since.

The bad placement, crowding and lack of organization, which could have at one time simply been dismissed as 'character' and which didn't much matter for the odd weekend project, quickly became intolerable as my usage of the shop increased and my patience rapidly disappeared. A number of things soon became apparent. The first was that I was more inept and even lazier than I had thought. Being lazy can be overlooked when things are going well, success is uplifting and its own reward. But, when you make the same mistake more than once, or ruin a perfectly good piece of (hard to find) metal after sweating over it for hours, or days, motivation can become elusive, procrastination financially fatal.

I discovered that being 'happy' restored my motivation and spirit and engendered new energy where none had existed. 'Being happy' consisted mostly of doing as little as possible while accomplishing a lot. The first thing I did was to get rubber mats to stand on, one for each machine. (They made such a difference that I now have them in the kitchen.) Fatigue takes the joy out of work (or fun, but mostly work). Then I sat down. I got a couple of stools and put one at the lathe and shared the other one between the milling machine and the drill press. It's amazing how much less tedious - tedious work is - when you're sitting down. It may be THE secret of civilization, but I digress.

Since I was sitting down, I didn't want to get up, if I could avoid it, and everything I needed to get at was quickly gath-

ered within arm's reach. I found some neat pen/pencil holders at 'Brookstone' and put one on each machine, with a mechanical pencil in it (the kind with the 'twist out (very long) eraser'). Next, I got out the half dozen tape measures I've collected over the years, put a big circle of velcro on each one, and stuck one onto every machine in my shop.

I cut blocks of hard wood, drilled them full of holes and made display stands for all of the counterbores, countersinks, centerdrills and collets that were never anywhere I could find them. As I mentioned in last month's newsletter, I removed all of my 'drill' chucks and replaced them with keyless chucks. If you could do nothing else to make your life easier, do that! Then I took off the bandsaw blade (with the missing teeth) and bought a nice Starrett, bi-metal, variable tooth, 3/4" blade, and ... ahhh, just like butter ...

I bought a dozen end mills, not the cheap no-brands I had been getting, but expensive, brand names; Niagara, Putnam and Weldon, enough to keep a separate set for plastics. Same with taps; Butterfield, Greenfield and Guhring, both plug and bottoming for each size, plus spiral fluted ones, just for aluminum. I bought new, Weldon countersinks and a set of piloted counterbores for machine screws, and put the old, dull ones that I'd bought used (and already dull ...) years before, in the scrap pile. (to be resharpened, someday)

I did, already, have a complete set of good quality drills, but now I also bought some 'slow' and some 'fast' spiral drills, in selected sizes, just for brass/plastics and aluminum, respectively. I picked up another dial guage, with magnetic base, and two 4" dial calipers and another 6" caliper (that I installed center finders on), so that I'd have 'a set' near every tool or bench where I needed one. And, lastly, but not leastly, I installed a roll of toilet paper and a roll of paper towels within reach of each machine. Godliness, et al ...

Some of these 'changes', I'm sure seem obvious, some must seem compulsive and some even obsessive or just plain ridiculous. Nevertheless, the things I've outlined above have made the difference between enjoying or merely tolerating what I'm doing five or six days of every week. Sitting whenever possible, and standing on rubber mats when I can't, has at least doubled my stamina. Organizing the things I need, placing them within reach and using keyless chucks has doubled my efficiency. Having the right measuring tools, everywhere I need them, has increased my accuracy, and using GOOD quality, \*really\* sharp, cutting tools has saved my sanity. Lest I forget, I also have FIVE pair of safety glasses hanging on tools around the shop, which may yet save my eyesight. Okay, the paper towels and toilet paper might even save my marriage, but she doubts it. I went for decades without 'getting it all together'. Now, I can't imagine working any other way. The easier it is, the happier I am. The happier I am, the fewer the mistakes I make. And, when I do screw up, I can (almost) be philosophical about it. I recently recalled my high school, physics teacher's motto, "The easy way is the BEST WAY, if it achieves the desired result". It took some of us longer than others to finally understand what that really means. If YOU haven't - get with it, and you'll thank the both of us.

----- Ed Kingsley

Coming at the next meeting.

Howard Evers called the other day. He was at Sears and happened to run into a sale on ratchet rebuilding kits. He's planning on bringing a bunch of them to the meeting. He's got them for 1/4, 3/8, 1/2 and 3/4 ratchets, so run out right now and write down the numbers on your Sears/Craftsman ratchets so you'll know if one of the ones he's got to hand out will fit yours. Howard says do it NOW or you'll forget!

## Treasurers Report

N E M E S FINANCIAL REPORT - SEPTEMBER 20, 1996

<b>Operating Income</b>	<b>Paid Members</b>	
Membership Dues	54	\$1 080 00
<b>Operating Expenses</b>		
Initial Startup Costs		191 25
Newsletter Expenses		207 58
Checking account (monthly fee)		5 00
<b>Total Expenses</b>		403 83
<b>Net Operating Income</b>		\$676 17

↑ \$676.17

**Expense Explanations:**

Initial club startup costs were cover by Ron Ginger which cover expenses for copies and postage in the effort of introducing the club idea through Home Machinist magazine.

Newsletter copies/postage expenses covering issues April 96 to Sept. 96

N E M E S. checking account is established at FLEET bank. This is non-interest bearing account with a \$2.50 monthly fee.

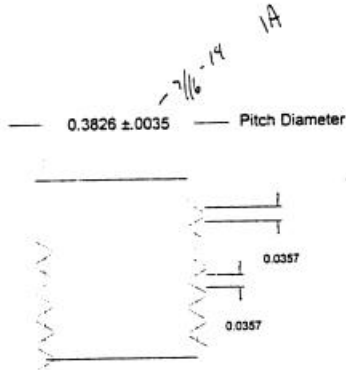
N E M E S Paid Membership Roster

Barker Robert	Gauffin Paul	Wasser John
Barrett Robert	Groff Errol	Wells Dick
ben-Aaron Max	Jaggi Fredenck	White Doug
Bottoms John	Jeanou John	Wishneusky John
Boucher Dick	Jones Leon	
Brackett Bill	Jones Norm	
Brock Neil	Kios Vincent	
Budlong Paul	Kozakerich Victor	
Calazzi Dario J.	Lagasse George	
Caliendo David	Lovely Stephen	
Chapman Everett	Madigan Paul	
Chetwynd James	Madio Fred	
Chetwynd James Jr.	Martha Gene	
Cote Francis	Masciovecchio Joe	
Cotterly Herb	Milligan Don	
Craib Jack	Rogers Edgar	
Daiby Clive	Singer Wayne	
de Beaumont P.	Stauffer Frank	
Donahue Joseph	Stearns Rus	
Eshbaugh Vernon	Stickler David	
Evers Howard	Strang Donald	
Fisher Kay	Stryker Jay	
Ginger Ron	Szostek Henry	
Guacher Arthur	Tomer Richard	
Guacher Roland	Twaits Larry	

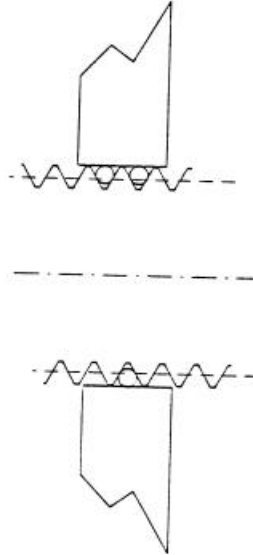
Here is some of the material that Errol passed out at the meeting on measuring threads:

Pitch Diameter

An imaginary cylinder, the diameter of which passes through the thread at such a point as to make equal the thickness of the thread and the thickness of the groove.



Measuring Over the Wires



Three Wire Thread Measuring Machinery's Handbook Formulas

Maximum wire size	Ideal wire size	Minimum wire size	Measurement formula
$\frac{900}{N}$	$\frac{57735}{N}$	$\frac{560}{N}$	$M = E - 86603P + 3W$
$900 \times \text{Pitch}$	$.57735 \times \text{Pitch}$	$.560 \times \text{Pitch}$	

Example: To calculate wire sizes and measurement for a 7/16 - 14 thread.

Maximum wire size	Ideal wire size	Minimum wire size
$\frac{900}{14} = .064$	$\frac{57735}{14} = .041$	$\frac{560}{14} = .040$

Measurement formula
$M = E - 86603P + 3W$
$M = .3862 - .86603(.0714) + 3(.045)$
$M = .3862 - .0618 + .135$
$M = .4594$

M = Measurement over the wires  
 E = Pitch diameter found in Machinery's Handbook  
 P = Pitch of thread ( 1 / threads per inch)  
 W = Selected wire size

A set of wires for this method consists of the following wire sizes.

- .018, .024, .029, .032, .040, .045, .055, .063, .072, .081, .092, .108, .120, .127, .143, .185

Be aware that even though your formulas might give you another number you can only use a wire size FOR WHICH YOU HAVE A WIRE!!

Three Wire Thread Measuring Textbook Formula

Maximum wire size	Ideal wire size	Minimum wire size	Measurement formula
$\frac{900}{N}$	$\frac{57735}{N}$	$\frac{560}{N}$	$D + 3W - \frac{1.5155}{N}$

Example: To calculate wire sizes and measurement for a 7/16 - 14 thread.

Maximum wire size	Ideal wire size	Minimum wire size
$\frac{900}{14} = .064$	$\frac{57735}{14} = .041$	$\frac{560}{14} = .040$

Measurement formula
$M = D + 3W - \frac{1.5155}{N}$
$M = .4375 + 3(.045) - \frac{1.5155}{14}$
$M = .4375 + .135 - .1085$
$M = .464$

M = Measurement over the wires  
 D = Major (outside) diameter of thread  
 W = Selected wire size  
 N = Number of threads per inch

A set of wires for this method consists of the following wire sizes.

- .018, .024, .029, .032, .040, .045, .055, .063, .072, .081, .092, .108, .120, .127, .143, .185

Be aware that even though your formulas might give you another number you can only use a wire size FOR WHICH YOU HAVE A WIRE!!

### Formulas to Find Measurement Over Wires

### Classifieds

Uses 7/16 – 14 as an example

#### Machinery's Handbook Formula

$M = E - .86603p + 3W$	$M = E - .86603p + 3W$
	$M = .3862 - .86603(.0714) + 3(.045)$
	$M = .3862 - .0618 + .135$
	$M = .4594$

#### Textbook Formula

$M = D + 3W - 1.5115/N$	$M = .4375 + 3(.045) - 1.5115/14$
	$M = .4375 + .135 - .1085$
	$M = .464$

- M = MEASUREMENT OVER WIRES
- E = PITCH DIAMETER
- D = MAJOR DIAMETER OF THREAD
- W = THREAD WIRE SIZE
- N = NUMBER OF THREADS PER INCH
- P = THREAD PITCH (1/N)

#### FOR SALE

ERTEN Model 1. Unique combination machine. Lathe (10x14), also performs horizontal milling and boring, vertical milling, and drilling, as well as surface grinding. Made in Russia, this is the only ERTEN machine in the USA. Cuts metric and inch threads. Spindle runout is .0000". Selling only because I'm buying a newer model of the same machine. Complete with lots of tooling: rotary table, milling attachments, cutters, swivel vise, boring arbor and more. Spare parts available. \$3400 for package. Contact Paul Gauffin, (508) 534-5700.

# The NEMES Gazette

c/o Stephen C. Lovely

Post Office Box 277

Milford, Ma. 01757-0277

newsletter of The New England Model Engineering Society