
The NEMES Gazette

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The Newsletter of the New England Model Engineering Society

Ron Ginger, President, 17 Potter Road, Framingham, MA 01701, Ginger@Acunet.net

Rob McDougall, Treasurer, 357 Crescent Street, Waltham, MA 02154, RCMcDougall@MediaOne.net

Kay Fisher, Editor, 80 Fryeville Road, Orange, MA 01364, Kay.Fisher@Compaq.com

Bob Neidorff, Publisher, 39 Stowell Road, Bedford, NH 03110, Neidorff@TI.com

Our next meeting is at 7:00 PM on Thursday
7-Dec-2000 (first Thursday of every month) at
The Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Annual dues of \$20 covers from Jan to Jan.
Please make checks payable to NEMES and send
to our treasurer. (Address in masthead).

Missing a Gazette? Send mail or email to our
publisher. (Address in masthead).

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The Editor's Desk

By Kay R. Fisher

There is no president's corner this month because Ron was busy on the road with his new job. This reiterates Ron's request for someone to step up to the plate and help. Would someone please volunteer to be the coordinator of speakers and programs? This would be a great help to our club and take a responsibility off Ron. I hope it happens soon because I'm afraid if it doesn't Ron may not want to stay on as our President. This would be a great loss to us all. If you think about it, this could be a fun job. Contacting and meeting new friends while seeking out interesting lectures you would like to hear. There are lots of good presentations available from our members. If interested please give Ron a call (Address in masthead).

It looks like our new folding scheme for the Gazette got better results this month but Bob Neidorff (our publisher) is not satisfied. So this month you should be receiving this issue in an envelope. Cost-wise this has two implications. First is the cost of the envelopes and second is the weight of the envelopes, which will require the Gazette size to be reduced to 5 double-sided sheets or two stamps would be required.

We've been working hard on getting a NEMES home page and all the Gazettes on-line.

We're not done yet and the address will probably change in a month or so but it is available for your comment and criticism. See the Web sites section at the end of the Gazette. Email your comments to me (Address in masthead).

Kay

Treasurer's Report



By Rob McDougall

Balance 9/30/00	\$3,086.64
Dues Received*	0.00
Interest Income	1.93
Less	
Reimbursement to Ron Ginger for copying expense	-49.88
Gazette expense	
- Copies	-81.18
- Stamps	-51.81
Guest Speaker Gift	-50.00
Balance 10/31/00:	\$2,855.70

* One member did pay their dues in November, but I did not deposit it until December 11th. Also, your Treasurer was slow in reimbursing himself for the PA system – this will be in next month's statement. **Special Note:** Please look for a note on your Gazette label indicating that my records show you as either paid up until 1/1/2002, or that your dues are payable January 1st. (See me if you

don't agree). I prefer to receive a check for payment of dues, if possible, as this provides a nice piece of evidence of payment. If you give me cash, please make sure I mark that down at the time on the club database.

Rob

Connections



By Max ben-Aaron

While line shafts drove many lathes and milling machines, it is hard to see how a Bridgeport-type machine could be built without an integral independent motor.

Speaking of Bridgeports, I find that the history of the company is of great interest.

Even though the Great Depression began in 1929, two entrepreneurs, Magnus Wahlstrom and Rudolph F. Bannow successfully started a company to manufacture electrically powered hedge-clippers. They quickly developed an even more successful product -- a portable self-contained 1/4 horsepower high-speed milling attachment. Soon, an improved new model featuring a quill was on the market.

Customers loved the milling attachment but they wanted more -- they said they needed a machine on which the multipurpose milling head could be mounted without modifications. One day, while waiting for a truck to unload, Bannow drew up a design on a humble brown paper bag. By 1938, the little company, Bridgeport Machines Inc. shipped its first model, a turret milling machine. The Precision Casting Company of Syracuse N.Y. bought this first machine for \$995.

As a mechanical engineering student (and lover of machine tools) in South Africa up to 1952, I never heard of a Bridgeport till I came here. I suspect that they were a strictly American phenomenon until after World War II. Since

then they have conquered the world and today, Bridgeports and a multitude of knock-offs are ubiquitous, surviving and thriving, even against the challenge of numerically controlled machining centers.

The name of one of the founders, Magnus Wahlstrom, rings a faint bell; I wonder if the Wahl company, which still makes barber's clippers and beard trimmers, can trace its roots back to the first product of the Bridgeport company.

Mb-A

The Meeting



By Stephen C. Lovely

The Meeting, December 7, 2000

Ron Ginger got our meeting started about 7:15 PM on the fifty-ninth anniversary of the Attack on Pearl Harbor.

We have almost a full busload signed up to go to Cabin Fever on the NEMES Bus the end of January. We also have nearly enough people signed up to charter a bus to go to Detroit for the big NAMES show. Ron talked to Gary Schoenly the night before the meeting. NEMES will be organizing the project to make something at Cabin Fever so that the people coming in off the street who haven't seen metal being machined can see something actually being made. Something simpler than the whistle I suggested would be nice, but nobody's come up with it yet. (Get thinking all you creative people – you need to design something with a little bit of lathe work and mill work that doesn't take a lot of time to make so there will be plenty of finished ones to

give the kids.) Prazi and Sakai lathes will be available to make the parts. Jeff DeIPapa will be there in some sort of a display representing the NERDS. Cabin Fever is rapidly becoming a really big deal, and we'll all have a great time there as long as we don't get a blizzard.

There were a whole lot of things for sale at this meeting. Ed Rogers has a 1 HP 3ph motor for sale, and Henry Szostek is looking to sell a pantograph grinder that he has used to make planer and grinder knives. He is looking for the best offer over \$600. Russell Sterns has a shaper for sale. It was made in Worcester, is on a floor stand, and he's asking \$100. You can reach him at 978-443-6770. Jeff DeIPapa is the person to see if you're looking for an eyeglass edger (they have a nice spindle and are used to grind glass lenses to shape to fit into frames.)

Errol Groff passed around the picture of Bob the Shop Rat. Bob is the mascot of Ellis Technical High School in Connecticut where Errol is a teacher. Bob will be available on T Shirts.

We had three new members sign up tonight.

The January meeting will be a poster session. That means no formal speaker and everyone should try to bring in something to show – but don't stay home just because you haven't got something to bring. If your latest project is too big, bring in some little pieces of it or some pictures.

Ron is looking for someone to take over the Presidency for him, or at least to help with setting up meetings. He's been doing it for a long time now, and since he's doing a lot more traveling in his new job he's not sitting in an office where he can plan and organize meetings nearly as much as he was.

Mike Boucher had two items to show. The first was a Lego robot that he'd picked up for \$5. He was amazed how many gears and joints there were in it for the price. He also had an engineering drawing of the East Boston Terminal Tracks in India ink on linen dated 1906. He bought it on eBay.

Geoff Brown visited the Steve Lindsay engraving site and was impressed by the air pressure powered graver sold there for \$700. It only has one moving part, a piston that has the valve ports controlling its movement machined into it. He built a simplified version of it that he passed around. When running it feels like a bumblebee buzzing in your hand.

Don Strang is still reading through old American Machinist magazines. This time, he read about a 5½ Megawatt Steam Turbine that was used to power the Brooklyn Subway. In 1905 they noticed it was making noise, so they opened it up to see what was wrong and found a somewhat mangled pocketknife that had taken out the first row of buckets on the turbine and then lodged in the case. They removed it and the first row of buckets and ran it that way till the new parts arrived.

Mal Partridge, who told us about the wooden Gnome project in November, had bought the set of plans for the Working Wooden Engine that's been advertised the last couple of months in the magazines. He says that it's a well-engineered project with a good set of plans and instructions. He also says that Live Steam is going to put out a Wooden Engine book.

Kay Fisher asked what people thought of the additional white space and graphics that he had put into the November issue of the Gazette. He's had a lot of people tell him they'd like him to open it up some so that the print is a little easier to read. Ron said that the Graphics and layout were good, and everyone seemed to feel Kay was doing a good job. The big thing that holds Kay back from opening things up more and using larger type is the cost of postage. If an issue runs over 12 pages it takes a second ounce worth of postage. The mailing list is up to 150-160 names now, so having to add the second stamp makes a big difference in the monthly cost.

Ron Langlois set up the speaker for the night, Dave Carpenter. Dave is the president of the Jet Pioneers of America and retired recently from GE at 55 after spending 36 years there. He likes to think of himself as the only guy at GE

who has his hobby funded by the company. He runs the museum at the Riverworks in Lynn and has published several books on Jet Engines.

The talk he gave at the meeting is very similar to one he gave recently in Germany.

He brought a very nice quarter scale cutaway model of the GE J-47 engine. It plugs in, lights up, and spins to show how the full size engine works. At one time the J-47 was the most produced jet engine in the world. It was in production from 1946 to 1956 and powered the F-86 fighter and the B-47 bomber. 35,000 of them were made. Dave wanted one for his museum, and got a call from someone that a scrap dealer in Miami had one in a can that had come from Germany, where at one time it had powered an F-86. They wanted \$6000 for it, which was too much for his budget. It sat there for quite a while until finally Dave decided to call and try again to see if he could get it for less as he'd heard they were going to break it up for metal. When he called the can was open and they had pulled a couple of hoses off it in the process of turning it into scrap metal. He couldn't get the guy to budge from \$6000, but finally got him to take \$1 a pound. That's why he now knows that a J-47 weighs in at 2300 pounds.

In 1892 the Thompson Houston Company and the Edison General Electric Company combined and became General Electric. Edison was not happy about the New York financiers dropping his name and is reported to have not set foot in GE for 31 years. Thompson Houston had fewer buildings and people than Edison GE did prior to the merge, but made more money.

Electric motors were made in Lynn, and electric arc welding was developed there. From 1903 until 1986 there was an apprentice shop in Lynn. The end of the apprentice program in 1986 marked the end of the GE company as it used to be.

The Phantom I jet fighter was originally proposed with 6 engines mounted in the wing, 3 on each side. Westinghouse was developing a 9½-inch diameter turbojet to develop 400 pounds of thrust. When they were done it only put out

250 pounds, so the 6-engine version was never built. In the end the Phantom I used a Westinghouse J-30 engine that put out 1600 pounds of thrust. Pratt & Whitney copied the J-30 as their initial entry into manufacturing jet engines.

One of the books Dave has published is about the JB-1 Flying Wing Bomb. It was a hush-hush WWII project here in the United States designed around the 400 lb thrust 9½-inch diameter engine. Nobody knew anything about the JB-1, but Dave saw something in a WWII GE works newsletter. It was a picture that looked like it was a GE turbo supercharger converted into a jet engine.

In WWI, GE Company manufactured the first turbo supercharger, which was tested at the top of Pikes Peak on a Liberty Engine. In 1941 GE built a plant in Everett, Mass. and another one in Indiana to build turbo superchargers. During WWII they made 300,000 of them.

Each unit had to be tested. The test rig consisted of a 500 HP compressor, feeding into a pipe where oil was burned to heat it before the hot air was piped to the turbine section of the supercharger. In 1943 a man named Stokley who was working on the testing of the superchargers decided that there had to be an easier way to test them. He hooked a combustor up between the compressor output and the turbine input to eliminate the need for the 500 HP compressor. In doing so he walked right into a super secret project that was being worked on – the jet engine. He had virtually duplicated the work of Whittle when in 1937 he first produced a demo jet engine. Stokley reported on the test rig he'd developed to his boss – who was in on the jet engine secret. The boss told him he was out of line, there was a war on and he should get rid of the unauthorized test rig right away and concentrate on properly testing production. The boss also reported the security breach to the army man in charge.

The Army at this point was concerned about the problems with the 9½-inch Westinghouse engine. They needed it for the JB-1, which was the answer to the German V-1

Buzz Bomb. The JB-1 had been tested as a manned glider (the glider version still exists in the Hawthorne Museum in California) but at 200 lbs thrust the 9½-inch engine was inadequate for the flying bomb. So, looking for a backup for the Westinghouse engine that didn't look like it was ever going to be up to the needed thrust, the Army asked GE if the turbo charger engine could put out 400 lbs of thrust. The JB-1A was designed to use the GE turbocharger engine. One was built and launched, powered by two of the turbochargers. The plan was to use a 400-foot track and 5000 lbs of thrust from booster rockets. Fifty-six years ago on December 4, 1944 the JB-1A made its first flight. Air bottles were used to start the two engines. The bomb was set up at a high angle of attack to get low-speed lift. One engine failed before launch, but it was launched anyway. With inadequate thrust from only one engine after the booster rocket cut out it took off at a high rate of climb, lost speed and crashed after only flying 400 or 500 feet.

The JB-1 gave way to the proven design of the JB-2 – a copy of the German V-1. Ford made the pulse jet engines for it, and Willys Overland was tooling up to make 1000 of the airframes a month when the war ended and the program was cancelled.

At the end of WWI, GE was making turbo superchargers. If Sanford Morse at GE had taken the existing turbo chargers and hooked them up with a combustor unit the way that Stokley did in 1943 he would have had a jet engine. It could have happened any time in the 1920s or 1930s. Perhaps the primary reason it didn't happen is that instead of just trying it to see what would happen they did a bunch of analysis to prove they couldn't do it. Whittle didn't know he wasn't supposed to be able to do it, so he did it. In 1907 a French journal had an article on a water-cooled combustor with steam from the cooling used on the turbine to add to the energy extracted by the unit. So, all the parts needed to put the jet engine together had existed for years before anyone put the parts together into an actual engine. What would things have been like if the jet engine had been developed in 1925 or 1930?

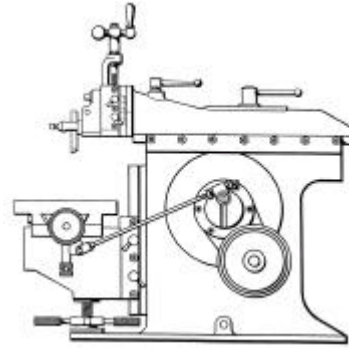
General Electric jet engines powered a lot of first designs. The first cruise missile (the Matador) was powered by the J-47.

The GAM-82 was designed as a decoy for the B-52, which could carry 6 or 8 of them to fly interference for it. The engine for this, the J-85, was designed in the 1950's. It graduated from the GAM-82 to become the power for the T-38 and F-5 series of planes. GE recently was awarded a contract to rebuild a bunch of J-85 engines and it is projected that it will still be in service in 2046. That will make it the longest active engine in military service at 90+ years of use.

Dave only writes books about firsts. Now he's writing a book about the atomic-powered jet. The engine would start on jet fuel and slowly switch over to the reactor to provide the heat. At 40,000 feet it would be running on all atomic power. The idea was that the bomber with the atomic engines could stay up for long periods of time, ready to head out and destroy the enemy at a moments notice. The engine was run on the ground, with an "all up" weight of 600,000 lbs. The engine consisted of two J-47s connected up with the reactor in the middle and supplementary combustors around the central reactor to provide the energy at lower altitudes before going to atomic power.

The Nuclear Powered Jet Engine was known as the "Billion Dollar Rat Hole" and President Eisenhower wanted to kill it. He couldn't though because an article had been planted in Aviation Week about the Russian Version of the Nuclear Powered Airplane. The totally phony story provided the incentive to keep the project going until by the early 60's when in-flight refueling and the advent of the ICBM made the need for a nuclear plane capable of staying up for days at a time less vital. Eisenhower knew the story was a plant and that the Russians didn't have any nuclear powered planes, but the politics of the situation kept him from being able to expose the fraud so the program continued. No wonder he warned about the Military Industrial Complex when he left office.

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Metal Shapers

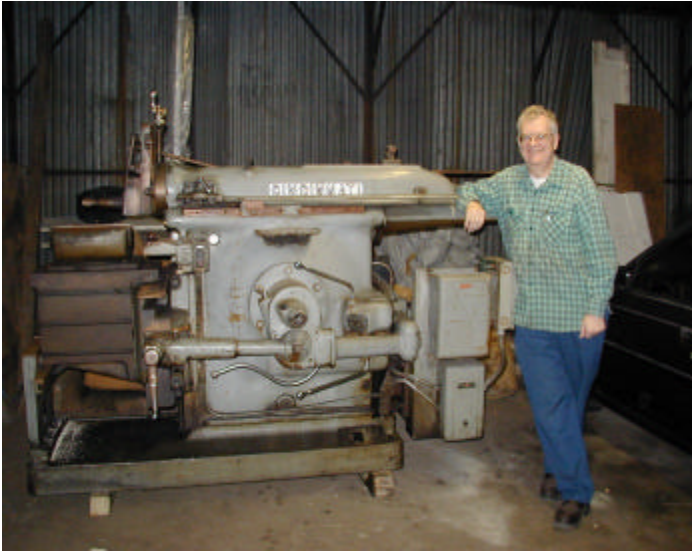
By Kay R. Fisher

It is time for my favorite question. Should I anchor my Shaper to the shop floor? Yes, you should. However this is a case of do as I say not as I do. In general you don't have to anchor small (9-inch or less) shapers but this assumes you never run them unattended and seldom at high speeds. Some would argue there are no high speeds on a shaper, but everything is relative. They will all tend to walk around a bit. I run a 9-inch and two 7-inch shapers without anchors but I watch them and they do move – especially if run at the highest speed. This brings up my favorite shaper story from Jay Stryker.

“A shaper has a faster ram motion retracting than cutting, which means that it will "rock" on its base. It needs to be bolted down. There have been accidents with the larger shapers when set to the maximum speed with no or minimal bolting, the whole thing will "walk" forward across the floor! I heard of a shaper being "tested" in a machine shop just after delivery: they set it on the floor and plugged it in. It had been left at the highest speed, so it "walked" into and “through” a cinderblock wall within a few seconds, and ripped out the power cord, which stopped it. The whole shop staff was just standing there dumbfounded. I guess they had some very interesting explaining (and masonry work) as their very next job!”

Notice his reference to “minimal bolting”. In real machine shops they don't just drill a hole in their cement floor and put in a lag bolt. The floor has a reinforcement mesh laid down with it and special receptacles for the shaper anchor bolts. A big shaper will easily rip your lag bolts out of a normal basement (wimpy) cement floor.

Who would have such a large shaper?
Seems like it is time to share the picture that
Stephen Lovely brought into out last meeting.



24" Cincinnati Shaper **photom by Leslie Russell**

The above picture shows Steve standing next to Howard Gorin's 24" Cincinnati shaper. As my daughter used to say in high school – "Wicked totally awesome and far out"!

Kay



Calendar of Events

By Bill Brackett

Jan 4, 2000 Thur 7PM NEMES Club Meeting
Waltham, MA
Charles River Museum of Industry 781-893-5410

Jan 27-28 Cabin Fever Expo
Model Engineering Exhibition, Leesport, PA
Gary Schoenly 800-789-5068

Feb. 11 Ct. River Ant. Collectors
Ice Harvest Day -Ely, VT
Doug Driscoll 802-333-3243

Feb. 17 NEMES Show, Waltham, MA
Charles River Museum of Industry 781-893-5410

Call: Ron Ginger 508-877-8217

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at wbracket@ultranet.com or (508) 393-6290.

Bill

The Ultimate Lathe – Monarch 10EE?

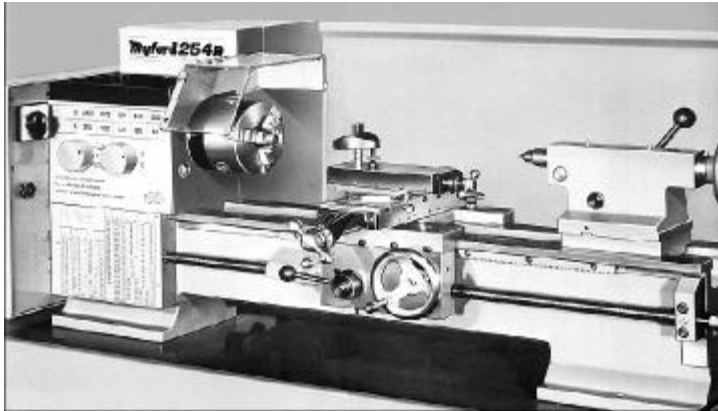
By Rob McDougall

I thought I would pose this controversial title to stir some reaction. Obviously there is no such thing as the ultimate lathe since the "right" lathe depends on the "right" job for a lathe – and the eyes of the beholder. So let's get more real. For "our" purpose – Model Engineering – what would be the "ultimate lathe"? We don't need a really big machine. After all, we make models. But some of us like to make pretty big models. It seems in the USA, there are around 3 groups of modelers. Those in the "micro" category that make beautiful things on the Sherline and Taig style of lathe with around about a 6 inch swing. Then there is the big group in the middle who build small to medium sized models, including up to 1 ½ inch scale locomotives – they typically start with a 9 inch swing and tend to stop at the 13 inch sized machines (South Bends and Grizzly type imports). Then there is the other minority group who goes for the really big stuff and has larger than 13-inch swing lathes. They qualify as "model engineers" because they have their lathe in the home shop and don't do commercial work.

If I can confine this discussion then to the larger middle group, what would be the "ultimate" lathe (no restriction on cost) that this group would use? I think it would be interesting for our club to "spec" out a machine, using the best of modern design concepts and materials, to see what we would come up with. (Hardened ways with Moglice coated saddle and tailstock...)

Looking at what is actually available in the real world; the following three machines seem to stand out - the Myford 254, the Hardinge HLV, and the Monarch 10EE.

I include the Myford 254, even though it is not sold in this country and I don't know anyone who has one. But I have seen them in England and they were specifically designed for use by Model Engineers. They are a 10 inch swing lathe and by all reports, extremely accurate. (Photo below and see Lathe Archive web page for more Details, <http://www.lathes.co.uk>). I believe they can be purchased for around \$10,000, fully equipped.



Myford 254 Lathe

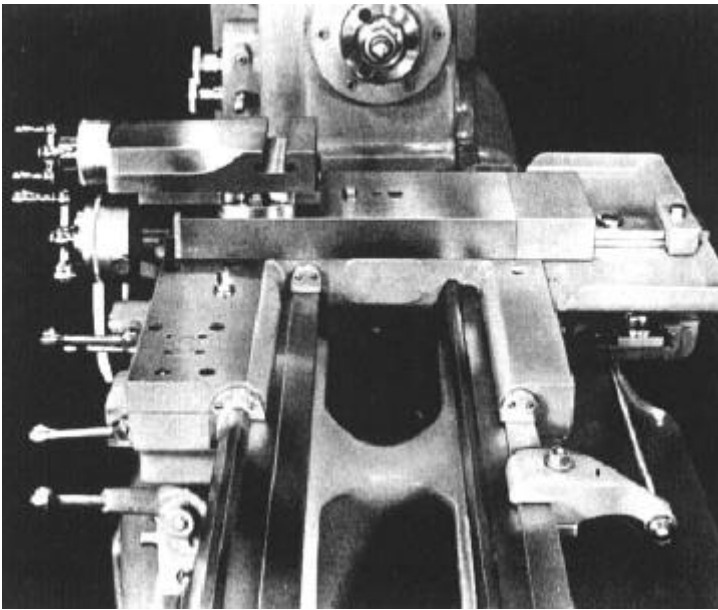
We all know and salivate over the Hardinge HLV lathe. I know at least two club members have them (and by the way, they both have Monarch 10EE lathes as well). They are still available today from the factory and I believe they can be had for as cheap as \$40-60,000 give or take a few accessories.



Hardinge HLV Lathe

Then we have the Monarch 10EE. Now, I just got one so I'll admit to extreme bias. But let me put the case for it being the "ultimate" model engineer's lathe and others please chime in. The first big positive going for it is that Tool & Die Makers I have talked with who have worked in tool rooms where there are both Hardinge HLV and Monarch 10EE lathes available, tend to prefer to use the 10EE. Apparently the "feel" of the controls and the solidness of the machine (it weighs typically 2,500 to 3,500 pounds) inspires confidence. I am not going to say anything negative about a Hardinge HLV (I would dearly love to have one), but the above "customer feedback" tips the Monarch 10EE above the Hardinge HLV in the "ultimate" contest (see the bias?).

The 10EE has a beautiful spindle arrangement. Two preloaded ball bearing races up front and a double row carrier at the rear, fixed at the front. My great friend, ball bearing expert from Fafnir, and club member, Cal Guiry, tells me this is the "ultimate" design for a lathe headstock. I believe this is the same design as in the Myford 254 (does anyone know what the Hardinge spindle design is?). The spindle is driven directly by a rubber-mounted motor that is under the cabinet. All speed control is through the rubber mounted drive motor system (more on that in another article). This isolates the spindle from unwanted motor vibration. The leveling of the lathe is a 3-point system, which can be achieved because the entire machine (bed and cabinet stand) is a one-piece construction out of cast iron. The bed is bolted to the base at 8 points. Last of all in the "ultimate" design department, is the length and width of the saddle relative to the swing. The saddle is 20.5 inches long and the bed travel is 20 inches between centers.



Monarch 10EE Lathe

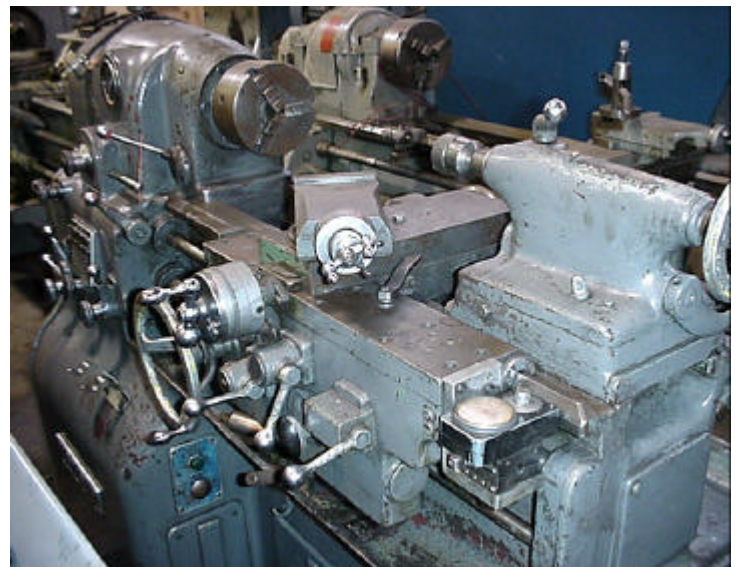
Other “special features” include ball bearings everywhere. All the controls and moving parts, wherever possible, are fitted with sealed ball bearings. This makes for a very smooth and solid feel. For a relatively small capacity lathe (10 inch swing by 20 inches between centers), this is one big lathe.

Now that I have established beyond a shadow of doubt that the Monarch 10EE is the Ultimate Lathe for Model Engineers, where do you get ‘em? You can order one “brand new” from the old Monarch Lathe company spin-off who “remanufacture” them today. They claim to have over \$15 million worth of parts in inventory and buy up old 10EE lathes for their castings. Then they “renew” them for sale with modern drive systems. I believe they sell them for around \$80,000. TWA just bought one in August of this year. I have been able to order all the parts I have needed to replace on mine.

Just in case you can’t afford to run out and buy a new one of these Big Boys, what could you do? They can be found at machinery dealers and on eBay from time to time and vary in price from below \$1,000 for real clunkers to tens of thousands of dollars. Brothers Machinery in North Andover look out for them and get them in now and then. (They have a nice blue one right now that they are going to have done up).

I am the proud owner of a 9 inch Hercus Lathe (South Bend Clone) and have had it new since I was 17 (29 years). It runs better than new because I have added VFD and DRO features, among other things. However, it is still a hobby lathe or “starter lathe” or “training wheels” lathe. Perfectly fine, mind you, but the one thing I have always been somewhat frustrated with has been the headstock/spindle design. In my case a plain journal steel spindle in cast iron headstock. The design calls for a .001 clearance for the lubrication oil. You can actually see the spindle sink into the oil bath when you go from running to stop, with a clock touching the spindle.

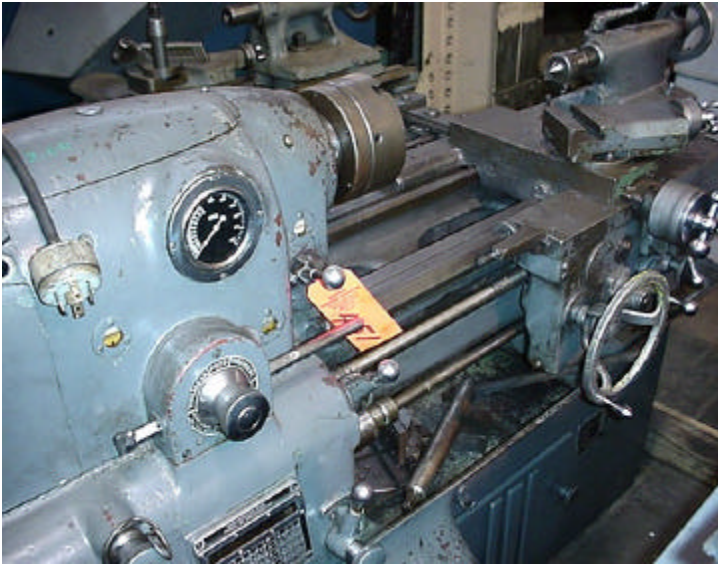
So, I recently bought a 10EE from Machinery Values in New Jersey. I negotiated a price of \$2,000 along with tooling. Having enjoyed the rebuilding of the 7 inch South Bend Shaper in the summer, I felt it was time to tackle a really big job of rebuilding a lathe that would become my “ultimate” machine.



Rob’s Monarch 10EE

photo by Rob McDougall

In the next article I’ll describe to you the process of discovery as to the wear and tear on the machine, what needed replacement, how I am planning on scraping the sliding surfaces and what I had to do about the drive system.



Rob's Monarch 10EE photo by Rob McDougall

Until next time, here are a couple of photos of my own little "ultimate" lathe.

Rob



For Sale

Shaper

South Bend 7" Shaper on factory cabinet with 3 drawers and factory vice. Single phase motor. Paid \$695 asking \$450.

James Chetwynd (781) 665-1978 Melrose MA

Web Sites of Interest

NEMES home page

www.andonet.com/users/fisher/nemes/nemes.html

NEMES Gazette Back Issues

www.andonet.com/users/fisher/Gazette/Gazette.html

Shaper FAQ (Frequently Asked Questions)

www.andonet.com/users/fisher/Shaper/Faq/Faq.html

Shaper Columns

www.andonet.com/users/fisher/Shaper/Columns/Shaper_Columns.html

Lathe Archive web page

www.lathes.co.uk