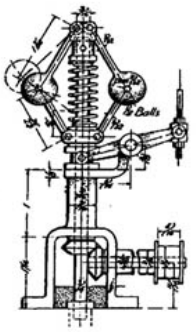

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 185 Sept 2011

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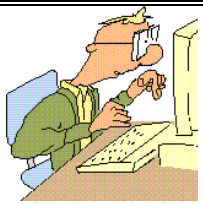

Editor's Desk

Frank Hills

I Love Lucy, In Space!

Did you know that up until recently our government was spending millions of dollars a year trying to find out if we are alone in the universe? Yes, the US government was trying to find E.T. But it wasn't one of those frivolous projects like bridges to nowhere or studying the mating habits of jelly fish. It was a well thought out attempt to determine if there might be intelligent life on other planets. Granted, in this time of economic crisis it seems a bit frivolous, but during the past good economic times when scientific research was considered investing in our future it seemed reasonable to ask if we're alone.

Mind you, it was a contested project. It was perfectly reasonable to ask just how one looks for little green men. The answer was simple, you listen for them. Even before humans were able to fly, we had radio. Years before voice communication even the simplest "spark" transmitters were throwing electromagnetic waves out deep into space. And the interesting point is that those waves are still traveling and will continue to do so for a long time. That means that if there is intelligent life out there and they have even the simplest radio transmitter there's a possibility that we might hear them. With this in mind the SETI project, the "Search for Extra Terrestrial Intelligence", was created.

Continued next page.

Next Meeting

Thursday, Sept. 1st, 2011

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

Membership Info

New members welcome! Annual dues are $25 (mail applications and/or dues checks, made payable to "NEMES", to our Treasurer Richard Koolish, see right) Annual dues are for the calendar year and are due by December 31st of the prior year (or with application).

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

Addresses are in the left column.

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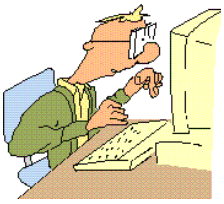


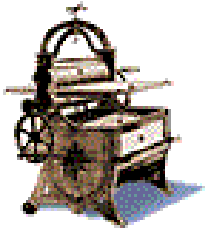
Editor's Desk

-continued from page 1

It sounds like the work of SETI would be pretty simple, but that's far from true. First, energy waves diminish in strength over time and distance traveled, like the ripples in a pond when a stone is thrown in. Second, there are innumerable ways of formatting a transmission; there is short wave, long wave, extreme long wave, all of these terms describing variations in frequency. There is also side band, digital, analog, pulse, AM, FM, and multi band. The list is seemingly endless and we've only been doing this for a hundred years. Then there is the problem of which direction to look! More than likely any signal will be very weak by the time it gets here. SETI may hear nothing unless the antenna is pointing in just the right direction at just the right time. And will we recognize the signal if and when we receive it? A receiver from the late 1950s wouldn't catch a signal from a modern high frequency transmitter. Compared to another planetary race, are we still in the 1950s?

One might ask, with all of the money and time spent, has SETI heard anything? But for one instance, the answer is no, and that one instance is questionable. It's called the WOW signal. It's not that an alien sent a signal that said WOW! It's that a SETI researcher notice what appeared to be a short pattern one day and wrote the word "WOW" next to it on the printout. Patterns are what SETI is looking for, distinct, non-random occurrences. It never happened again and meant nothing that we know of. But all is not lost. We've been sending out radio signals for decades. Maybe someone will hear us! Imagine you're a researcher on a distant planet looking for extra terrestrial life. Suddenly a coordinated signal comes in. You excitedly scream "Gadorksnik" and your cohorts gather around. You play with a few dials, correct to reduce interference, and in comes the "I Love Lucy" show. The late Carl Sagan once said "The greatest proof that extra terrestrial intelligence exists is that they don't come here!" I think I can see his point now.

Next month, "We Know What We Don't Know".



NEMES Gazette Editorial Schedule

Issue	closing date for contributions
October 2011	September 23, 2011
November 2011	October 21, 2011
December 2011	November 18, 2011
January 2012	December 23, 2011

President's Corner

Dick Boucher

The Meeting

Our speaker this month will be discussing his efforts restoring a 9" South Bend Lathe. Join us for this interesting and very practical talk.

Miscellaneous Ramblings

The ramble of note this last month was a great visit with the host of an eastern part of the state, gathering at host Ed Rogers' house. It was a rainy day but Ed's garage just off the shop area was nice and dry and filled with the smell of hot coffee. Along with the coffee was donuts supplied by the host and other pastries brought along by the participants. Nobody went home hungry.

Ed's shop is a very compact arrangement which definitely cuts down on the time required to move from machine to machine. But despite its compactness, Ed, as you all know, turns out remarkable models. The shop has the mechanical models on benches and a showcase with a large collection of antique model airplane engines on display. I have been told that all of the antique engines will run. An extension of Ed's mechanical model engineering life is also being a very accomplished radio-controlled model airplane builder and flier. Tucked up in the floor joists of the room is a large collection of the radio control model airplanes Ed has built and flown over the years. I asked where the Ringmaster "U" control airplane was but the closest he could come to that was the Jim Walker "U-Reely" control handle that wound up the control wires in the handle on display in the display cabinet.

Let's get back to Ed's garage. Ed is also a well-known and respected antique car mechanic and the garage is well equipped to work on these cars. Ed can give you an answer to any question you might have about a Model A engine as well as great tips on building a ¼ scale model of that engine, or of any other for that matter.

Well, the last gasps of summer are upon us. By the time you read this, the Waushakum annual meet will have come and gone and the September engines shows will be going on. The Clark's Trading Post / White Mountain Railroad

Steam weekend will be September 17-18th. The Climax locomotive has just had repairs to the crankshaft with new skew bevel gears and bearings on both the crankshaft and propel shaft completed. As I write this, the locomotive is heading up the main line of the railroad.

Now last but not least, this month the Gazette will start a series on early aircraft engines by our own Jim Johnston. I hope you enjoy the series. Particularly notice the exhaust valve on the Gnome Rotary picture and think about the intake valve setup in the piston that Jim writes about.

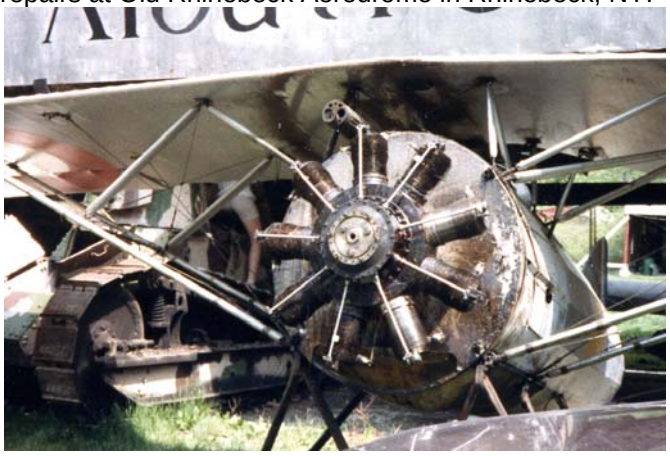
Dick B.

Rotary Engines

By Jim Johnston

World War 1 aircraft were mostly made of wood and canvas. They were generally lightweight, small and evolving in design very rapidly with emphasis on combat agility for short periods of time. Throughout the war, the rotary engine substantially met the needs of designers such as Henry Sopwith for the Camel and 13 more production designs. Evolution and needs were so fast and extensive that the big French Hisso V-8, for the Spad, and the German 6 Cylinder Mercedes in the Fokker series did not displace the rotary, but just added to it. Radial engines, as we know them today, did not exist except for those few produced by Anzani. Initially, these other engines suffered severe reliability problems with life as short as an hour.

The rotary engine, at about 2 pounds per horsepower, was a significant solution to cylinder overheating, exhaust valve failure, and seizure from inadequate lubrication. The Seguin brothers in France invented the Gnome rotary as a means of cooling cylinders. The photo below is a 9-cylinder Gnome mounted on a Moraine-Salnier Parasol type airplane. After restoration, the writer saw this engine throw a cylinder, but the pilot landed safely. It is still flying after repairs at Old Rhinebeck Aerodrome in Rhinebeck, NY.



The French Gnome aspirated an excessively rich fuel-air mixture through the crankcase and thence to the cylinder intake valve, a flap-type valve in the piston head, to avoid explosions within the crankcase. The exhaust valve was kept open during about 1/3 of the intake/suction cycle. Exhaust was swept away and fresh air furnished to the valve. The mixture was properly diluted for firing and at the same time the exhaust valve was cooled by this air--enough to allow cast iron valves of complex shapes.

Upon consolidation of the Gnome and LeRhone companies, rotaries went to two valves but retained all the other features. Exhaust ports, without any stacks, were aimed in the direction of rotation. Cooling and air thus obtained was used in the French Clerget, the German Oberusal, and the American Curtis-Wright as well as the Gnome-LeRhone. The Gnome-LeRhone Company still exists (now nationalized as part of Snecma.)

Oil for lubrication, non-soluble Castor oil, went through the crankshaft with the fuel, as it may today in some 2 stroke engines, because splash lubricating with cooling could not be used. Castor oil has been found essential and is very satisfactory in historical aircraft rotaries, without much plug fouling. No substitutes had been found up to the 1990s. Of course, the pilot would suffer from castor oil in his face and that's probably the reason for the historical scarf worn by WW1 pilots.

Incidentally, there is the cyclical noise of non-firing cylinders that you would hear from nearly all rotaries. Intake passageways through the crankshaft are too long and mixture adjustment too sensitive to permit frequent operational throttle control. So, there is a switch in the cockpit that allows selection of 3, 5, 7, 9 or zero cylinders firing. This is the pilot's control of engine RPM during combat and short flights. It was called blipping. Yes, fuel passes through unburned as well as castor oil, so in transit the pilot did adjust mixture for RPM control, and, yes, there were numerous aircraft losses due to both this and plug fouling.

Rotaries typically realized 50 hours between overhauls. This maintenance cycle was probably an artifice, but it worked. All forces adopted this as standard operating practice. The US Army actually did a full tear down and completed overhaul with test stand operation. There are some wonderful old movies available that exhibit the entire overhaul process.

The Bentley BR-2, developed at the Royal Aircraft factory (RAF) by Lieutenant Bentley, was by far the best rotary of this era, but the war was over. Rotaries were too massive in gyro effect to continue with rotaries. Consider a 2-row 18-cylinder monster, such as the German Oberusal, at around 1000 pounds spinning at 2000 RPM. Haul back on the stick

and you'd jerk violently to the left (?). Inexperienced pilots had a difficult time even taxiing.

By mid-war, alloy steels came into being, pressure lubrication had been invented and engine block/head castings with water portals developed, so aircraft entered a newer war with the French Hisso, the German Mercedes and others. No rotary manufacturer ever succeeded in transforming their business to radial engines based on extension of rotary technology. (Remount a rotary on the crankcase and let the crankshaft turn). The author never found any reports in early magazines about such an experiment. Even the Bentley BR-2 (in the Sopwith Snipe) was very limited in production (about 50 units?). In 1921 for example, Gnome-LeRhone Company purchased British Jupiter radial engine plans with manufacturing process licenses, and made no attempt to incorporate any rotary features.

The tens of thousands of rotary engines were "it" for most of the war but they had their day and were done, finished and actually buried in many instances. We'll take a peek at the Hispano-Suisse (Hisso), Rolls-Royce series, Puma, and German Mercedes next month.

Tool Corner

By Frank Dorion

Last month we talked about the tapered parallel gages Brown & Sharpe maked for checking hole diameters. I saw Jim Paquette later in the month and he mentioned that he has extended the range of his gages by simply slipping a ground tool bit between the two gages to take readings larger than the set's regular 1" capacity. Leave it to Jim to come up with a neat idea like that.

This month, we will reivew another type of tapered tool for checking hole size. As far as I know, Starrett is the only company that made them. And, as usual, there's some interesting variety. Below are the most commonly found types, the Starrett numbers 269A and 269B.

The A gage measures holes from $^{1}/_{10}$ to ½ inch and the B gage goes from ½ inch to 1 inch, with both gages being graduated in increments of 0.001". These gages are small, only 2¾" long. As far as I know, they are still in Starrett's catalog.

So, why are we talking about these gages? You might be surprised at how accurate they are. They were good enough that Moore Special Tool, maker of the famous Moore jig borers and jig grinders, had Starrett make a special version of these gages for Moore's customers.

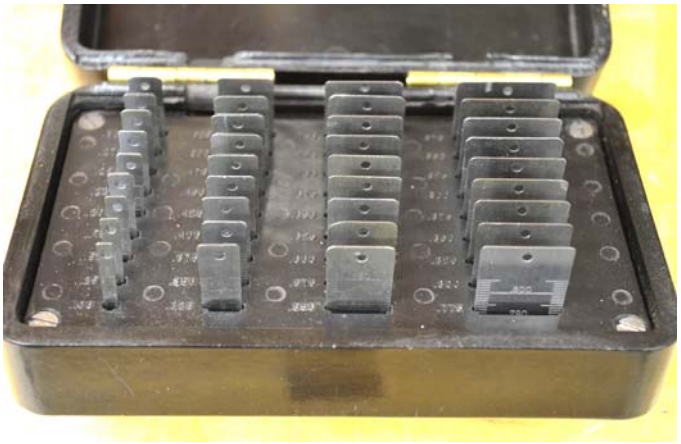
In addition to being accurate, these gages are very easy to read. An accurate reading of 0.001" is no problem to see. If you read the gage carefully, you can do better. For a tolerance of ±0.001" or ±0.002", these gages are all you need.

Why else would you use these gages? First, I don't think there is another tool for the job that's faster and easier to use. There is no need to move your lathe carriage back a foot or drop your mill table way down to make room for this tool. Three inches of clearance will do. Pick the wrong size gage? Flip to the next appropriate size in a second. They are not bulky or delicate like a dial bore gage so it's easy to keep them handy. They are not sensitive to "touch" like other small hole gages and they are self-centering – anybody can use one and get it right. Also, because they take a two-point measurement, they can be used to check a hole for roundness. Finally, if you think you have a bell-mouthed hole, use the gage to compare the entrance and exit diameters. Any difference is easily detected.

The one caution with these gages is that, to get an accurate measurement of hole diameter, the hole should have a clean sharp edge, free of burrs and not chamfered. Since a sharp boring tool almost always produces the clean hole you need, there usually isn't much of a problem

Some may find it difficult to see the value in these gages because they are so small, but the value is certainly there. Starrett also made metric versions of the A and B gages, but I've never seen either of them. In 2002, the A gage set sold for $85 and the B gage, $99.

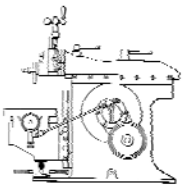
Moore Special Tool took a somewhat different approach for their taper gages. Instead of attached gages, Moore had Starrett make sets of individual gages, with each set having a larger range of sizes than the versions in the Starrett catalog. The Moore gages were also shorter than the Starrett versions. At only 1½" long, they were even easier to slip in between the tool and the work piece. Each gage overlapped the next size by 0.010" for convenience. And Moore stated that the gages were accurate to **± 0.00025"**! The smaller set of Moore gages came in a fitted black plastic case and covered sizes from .095" to 1.005". There are 36 gages in the set.



In addition, Moore offered a larger set of 40 gages that covered a range from 0.995" to 2.005". This larger set came in Moore's typical lovely mahogany case.

There's no question about who made the gages for Moore, see here:

In addition to the above sets, Moore also offered two metric sets in equivalent sizes. The Moore gages come up on eBay and at auctions from time to time. The larger set is less common and tends to bring a fairly high price, but the smaller set can be purchased quite reasonably at times and is probably the more useful of the two. Don't pass up a set if there are a few gages missing – typically the price on a partial set is much lower and as long as only a few are missing, the set will still be very handy. If you get a chance to buy one and the price is right, you will never regret the purchase.



Metal Shapers

By Kay Fisher

R. G. Sparber's Gingery Shaper-Part 17B

Cutting Bar **Photo by R. G. Sparber**

I started with a bar of 0.2" thick by $1^1/_8$" wide CRS. I am sawing it with the stock flat in order to get a decently square cut. Note the bit of paraffin wax flanking the bar. I collect all of the bits of wax in a cup and will melt them down to form new blocks. In fact, I probably will just leave the cup out in the Arizona sun for a few minutes and hope it does not ignite. How's that for being frugal?

Milling to Length **Photo by R. G. Sparber**

Since the pieces are cut fairly square, I only needed to mill off about 0.01". The bar is held in my soft jaws. A home-made stop positions the bar so that both bars are the same length. The accuracy is not critical but this does speed up the machining process.

Drilling Alignment Hole Photo by R. G. Sparber

I drilled a ¼" hole in the center of each bar to make alignment of the boss easier.

Cutting Boss Photo by R. G. Sparber

One end of a length of $1^1/_8$" CRS has a ¼" diameter button machined into it. I then sawed off a length $^5/_8$" long.

Boss Fit to Bar Photo by R. G. Sparber

The button and hole permit me to quickly and easily get alignment of the parts as I set up to weld them together. Now it is time for me to move outside so I can run my welder. I weld just often enough to turn out serviceable beads.

Boss Welding Photo by R. G. Sparber

The bead is probably oversized. This means excessive heating of the bar which can cause warping.

Boss Weld Cleaned Up Photo by R. G. Sparber

The part is shiny from being cleaned up with a wire wheel but there is no hiding the lumpy bead.

Facing Bar **Photo by R. G. Sparber**

The bar was warped and the first boss did not stay down on the bar, but machining solved this. Using the lathe, the bottom of the bar is made perpendicular to the hole. The boss is held in a 3-jaw chuck. First, the bar is faced, then it is drilled.

Drilling Pivot Support **Photo by R. G. Sparber**

1st Half Done **Photo by R. G. Sparber**

This was my first part and you can see that the left end is a different color. I turned the rest of the base true but did not want to give up any more metal just to reach this end. On the second part I first check for warp and used a few taps of a dead-blow hammer to get it within 0.01" of true. I also used a C-clamp to hold down the boss during welding.

Final Assembly **Photo by R. G. Sparber**

Above is a photo of the two pivot supports, the pivot rod, and the crank yoke. I have used two squares to verify that the bottoms of the supports are parallel.

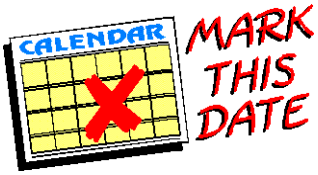
The support on the right is thinner than on the left. As mentioned above, I was able to save a lot of metal by straightening the plate before truing it on the lathe.

Stay Tuned for part 18 from R. G. Sparber next month.

Keep sending me email with questions and interesting shaper stories.

My email address is: **KayPatFisher@gmail.com**

Kay



Upcoming Events

Bill Brackett

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

Bill

Sept 1st Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry
Waltham, MA 781-893-5410
http://www.neme-s.org

Sept 2-4 Vermont Gas & Steam Engine Assoc show
Intersection Rte 100 and Rte 107 Stockbridge VT
Gail Norman 802-485-8224
gailnorman@trans-video.net

Sept 10th NEMES booth at
Saugus Iron Works
http://saugusironworks.com/

Sept 10-11th Dublin Show
RT 101, Dublin, NH

Sept 10-18th Annual Lee's Mills Steamboat meet
Lake Winnipesaukee Lees Mills NH
http://www.steamboating.org/

Sept 16-18th Fall Meet
Pioneer Valley Live Steamers
Southwick MA
http://www.pioneervalleylivesteamers.org

Sept 18th 9AM The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge
http://www.mitflea.com/

Sept 23-25th Connecticut Antique Machinery Museum Fall Festival
http://www.ctamachinery.com/

Sept 24th Vermont Gas & Seam Engine Assoc
Fall Festival - East Burke, VT
Gail Norman 802-485-8224
gailnorman@trans-video.net

Oct 1st 8AM-4PM Original Yankee Steam-Up
The New England Wireless and Steam Museum
1300 Frenchtown Road East Greenwich, RI
http://www.newsm.org/index.html

Oct 2nd Noon-5PM
Roland's Shop visit
90 S. Spencer Rd. Spencer Ma.
508-887-2277

Oct 6th Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry
Waltham, MA 781-893-5410
http://www.neme-s.org

Oct 8 - 9th 8:30 to 4:30 Battle for the Airfield
The Collings Foundation
137 Barton Road in Stow, MA
Cost at gate: $20 Adults
http://www.collingsfoundation.org/cf_OpenHouseEvents11.htm

Oct 8-9th Foreign Auto Festival & Antique Aeroplane Show
Owls Head Transportation Museum Owls ME
http://www.ohtm.org/

Oct 16th 9AM The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge
http://www.mitflea.com/

October 29th 9-5 American Precision Museum
10th Annual Model Engineering Show
Windsor Community Center, Windsor VT
www.americanprecision.org 802-674-5781.