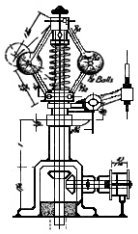

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 215 March 2014 © 2014 NEMES

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Presidents Corner

Victor Kozakevich

The speaker for our March meeting will be NEMES member Fred Jaggi, who will talk about his 18th century Orrey and 19th century planetarium.

For those not on the mail list, I recently posted that meetings in the Jackson room will be subject to a $250 cleaning fee. I was informed of this by the CRMI events manager, but believe this comes from the management of the adjacent building which controls that room. We may meet in the lower museum gallery or in the upper clock and watch gallery at no cost. At this moment, there is no decision as to the specific location for the March meeting, but expect the rear door of the museum to be open as usual, and to find direction from there.

Next topic, the Cabin Fever bus trip. I have reserved a Brush Hill Tours motor coach to take us to York in mid April, and also reserved a block of rooms at the Motel 6 nearby. The total cost of the bus is about $4500, and with 30 seats filled, the cost per seat would be $150. With every additional seat filled, the cost per seat goes down, and the difference will be refunded. So, please, invite friends, neighbors, co-workers or anyone else who would like to see the widest collection of mechanical models likely to be found on the East Coast. And they will get to enjoy the splendid company of your fellow members.

We will be leaving from the Grove St. green line T station off Rt. 128 at 9 AM sharp Friday April 11, and arriving in York that evening. As in the past, the bus will take us to dinner Friday evening at the Old Country Buffet in York then back to the motel. Return home will be directly from the show at about noon on Sunday April 13. After a stop for dinner, we will be back at Grove St. Sunday night.

Next Meeting

Thursday, March 6nd, 2014

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 David Baker) Annual dues are for the calendar year and are due by December 31st of the prior year (or with application).

Missing a Gazette? Send a US mail or email to our publisher. Contact addresses are in the left column.

Issue	Contributions Due
APR	MAR 20, 2014
MAY	APR 17, 2014
JUN	MAY 22, 2014

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Please contact NEMES treasurer David Baker to make your reservation and a deposit check of $150 will be required by March 7, 2014.

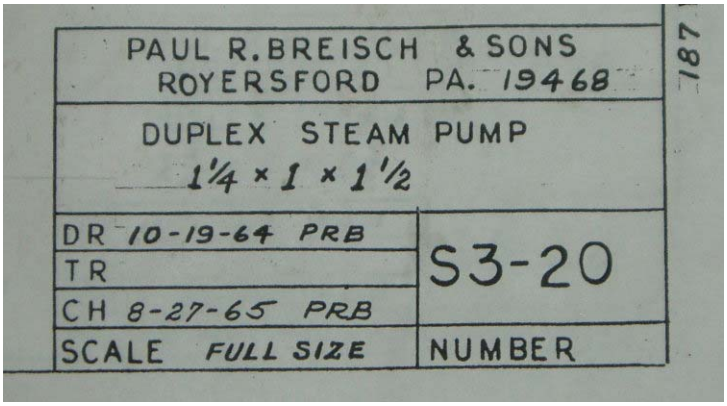
The reservation at Motel 6 (323 Arsenal Rd., York, PA) is under New England Model Engineers, group #M14880063. The room rate is $ 53.99/night for one person to a room, and $59.99/night when shared by two (tax is extra). There is a choice of one king bed or two doubles. Occupancy of up to four is possible at a slightly higher rate if you want to bring the family. Guests must call in to Motel 6 and make their individual reservations by March 12, 2014. A credit card or check is needed to hold the room. The reservation phone is 1-800-466-8356.

Shop Talk

Rolly Evans

New project
Getting back to model making.
A duplex steam pump.

Part two.



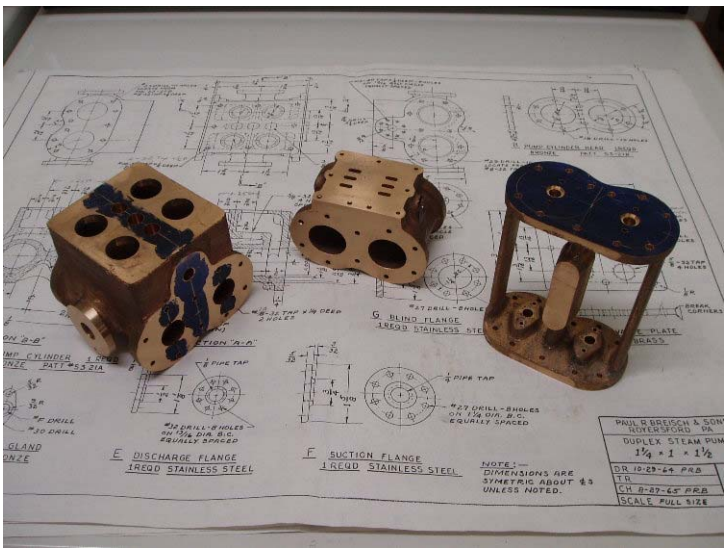
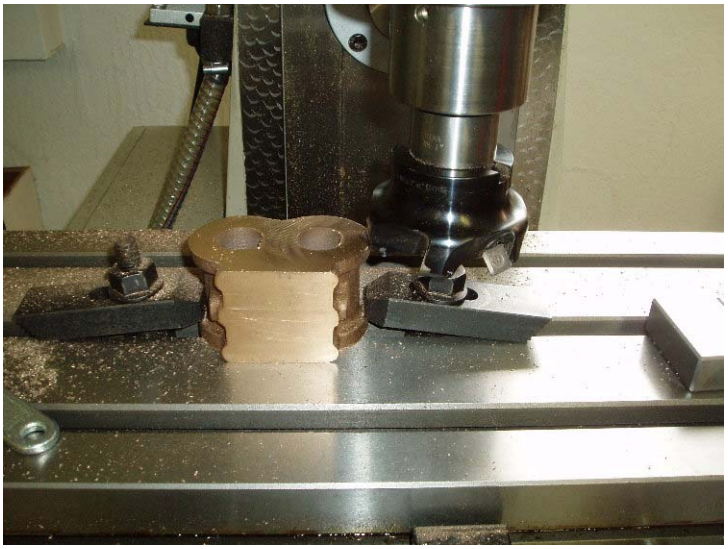


Photo 1

I finished machining the castings, a straightforward project with the exception of the yoke casting that ties the steam cylinder casting to the pump casting. To machine the packing glands pockets for the piston rods inside the casting you need to machine up an end mill that slides over a ¼ inch rod and is temporarily pined to the 1/4 inch rod to mill the pocket. I made this end mill a four flute from a piece of air hardening stock. This got me through the first three pockets in fine shape but on the forth and last hole it shattered like glass and I had to make another one. I think there was a hard spot in the casting. The second one also shattered but the hole was deep enough by then and I settled on the depth. I probably should have made a two flute. I tried drawing down the second one but I guess my sense of color is not what it uses to be.

The photo # 1 does not show the complete machining.



The next step was to make all the 63 parts and pieces photo 4 that need to be fabricated from rod and bar stock. Some of these parts are made up of more than one piece.

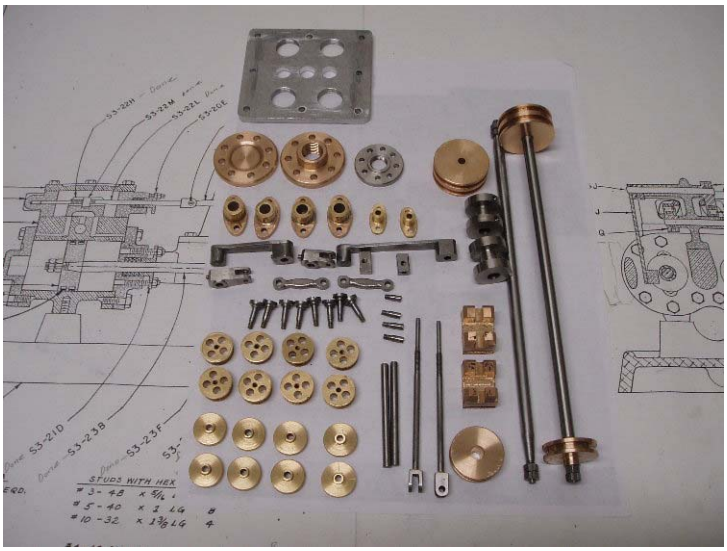
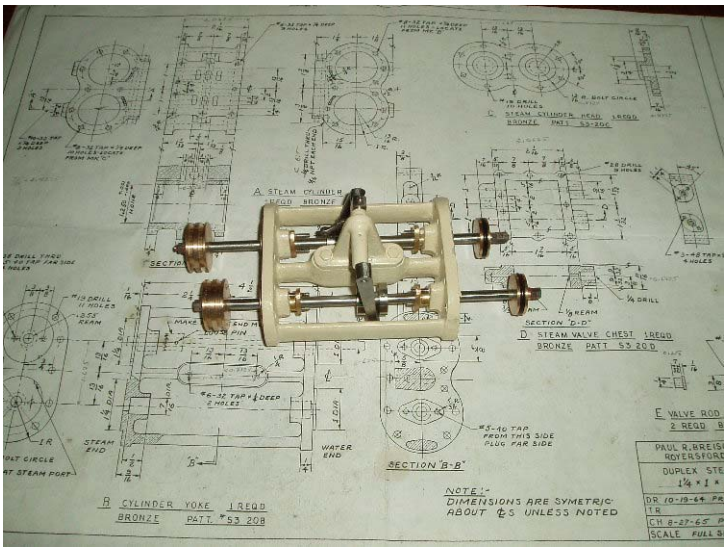
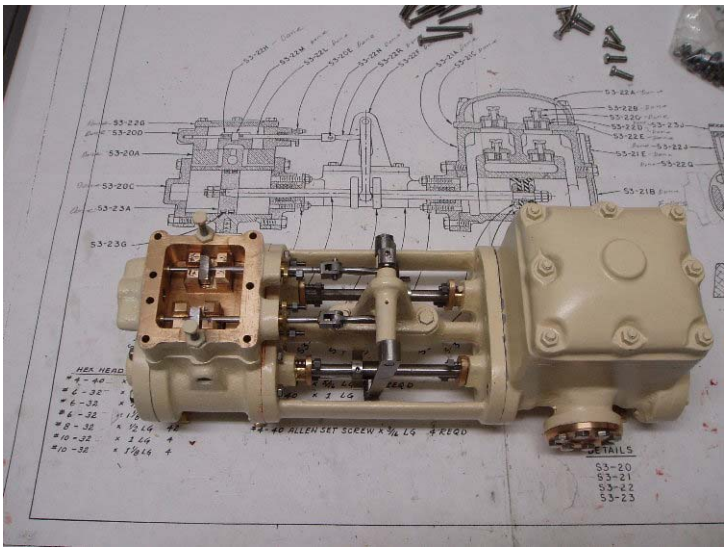


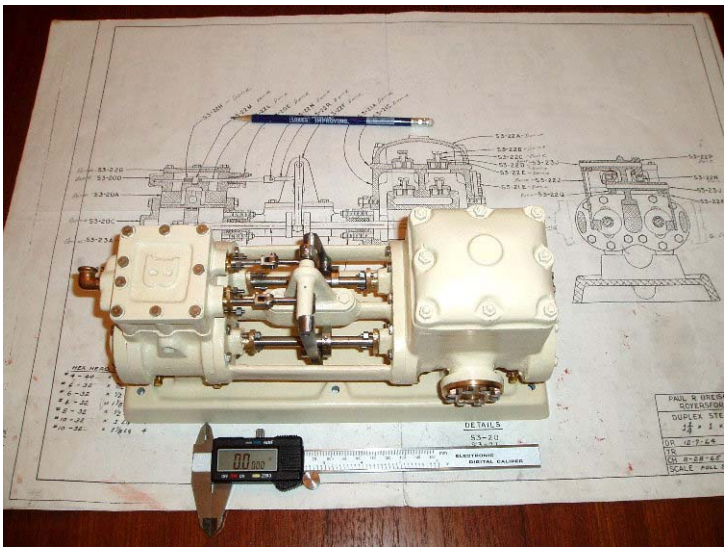
Photo 4

This took me the better part of a month. I should have started this project ten years ago when I got the casting and my eye sight was in better shape. The model will require painting as some of the casting have pockmarks that have been filled with solder or lead. I didn't notices this when I got them. On the whole the casting were well made. There were no cores in the cylinder casting other than the piston holes but the pump casting was well done with all the water passages cored in place. I just had to machine some of the outlet ports, the valve pockets and threading.

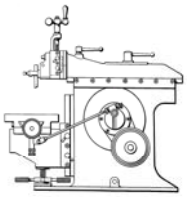


I finished assembly of all the parts and pieces and adjusted the location of the valves. All that remains is installing packing and test running.





Rolly

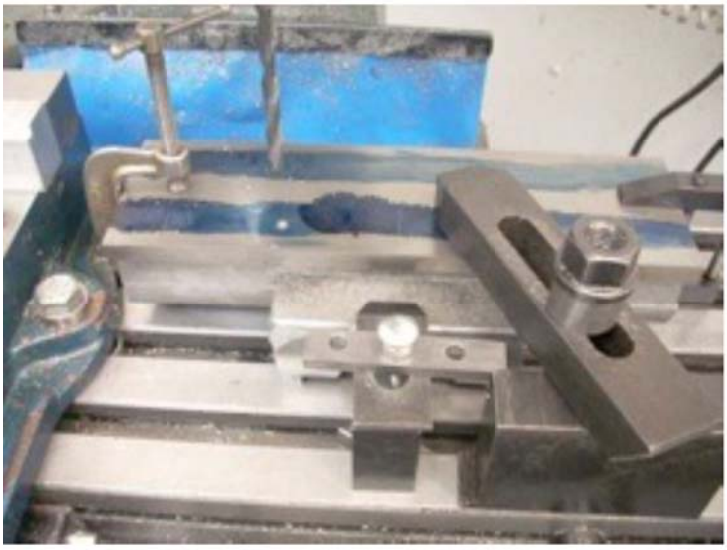


Metal Shapers

Kay Fisher

R. G. Sparber's Gingery Shaper - Part 46

Drilling the Cross Slide Way Holes



Drilling 1st Hole Photo by R. G. Sparber

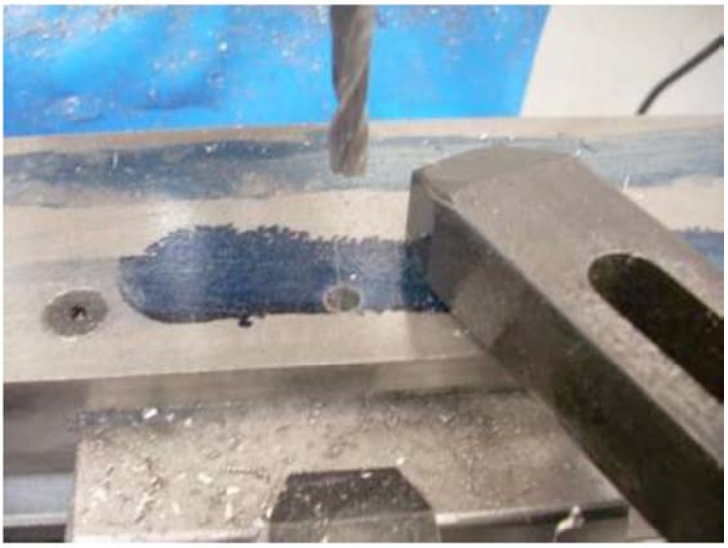
It took a few tries to get the clamps in the right position, but the casting and plate are now secured to the table. The casting has been secured with the reference pads on the back and the small clamp on the front. The plate and casting are secured with the large clamp seen on the right. Part way through the drilling sequence I will have to reposition the large clamp but nothing will move because the small clamp is not disturbed.

I dialed in my first centerline value and then marked the X axis location of all holes. Having a DRO make this work go but the layout lines are a good sanity check.

The left clamp interfered with the drill chuck so I started with the second hole from the left.

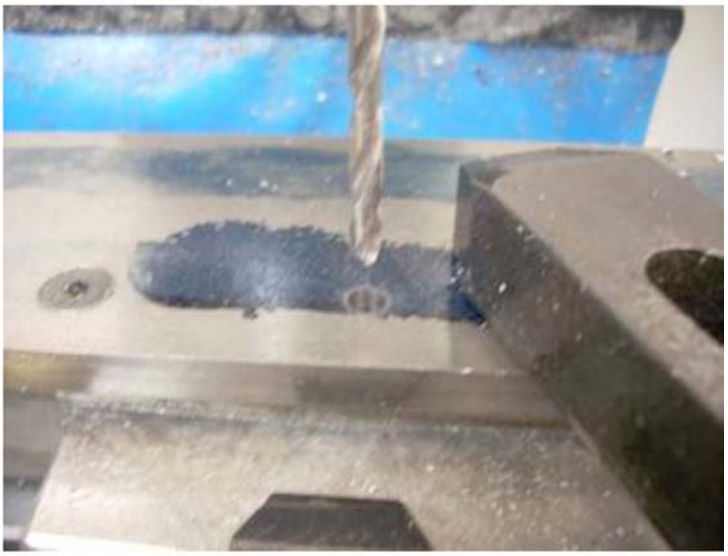
Center Drill 2nd Hold Photo by R. G. Sparber

The first step is to begin with a ¼" center drill.



Clearance Drill Photo by R. G. Sparber

I then went through the $^{3}/_{8}$" steel plate with a clearance drill.

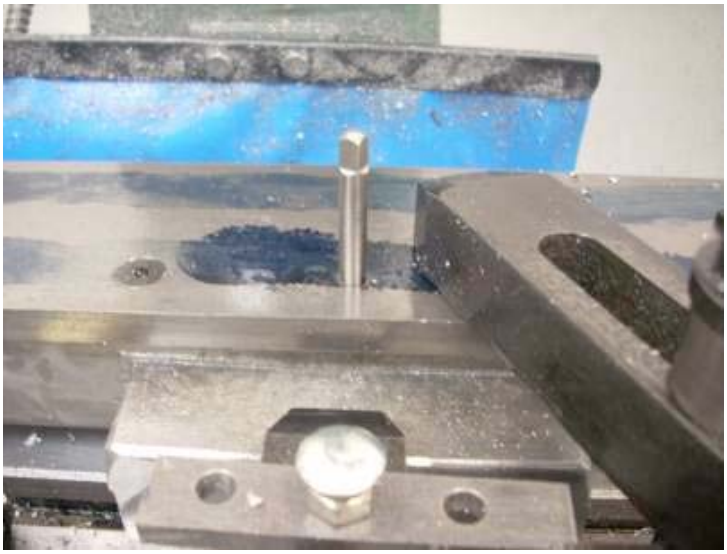


Tap Drill Photo by R. G. Sparber

Using my tap drill, I went down 1.3" to give plenty of room for the shavings that will shoot out in front of the spiral point tap.

Ready to Tap Photo by R. G. Sparber

Next a spiral point tap is placed in the drill chuck. Cutting fluid is generously applied to the hole and to the tap. The mill is brought up to full speed and then power is cut. I then plunge the tap into the hole. It was a bit unsettling the first time I tried this but have since done it dozens of times without any problem. It is essential that you use plenty of cutting fluid and a sharp tap. It is also essential that you don't bottom out the tap since that could cause the tap to break or the threads to strip out.



Tap In Photo by R. G. Sparber

I was able to consistently get the tap to go all the way in without having to advance it by hand. A closed end wrench was then used to back out the tap.

Countersinking Hole Photo by R. G. Sparber

The next operation was to countersink the hole. I used to do this with the same technique as employed with the tap but now just do it under power with lots of cutting fluid. It is a little rough on the countersink but all holes came out fine.

Remove Swarf Photo by R. G. Sparber

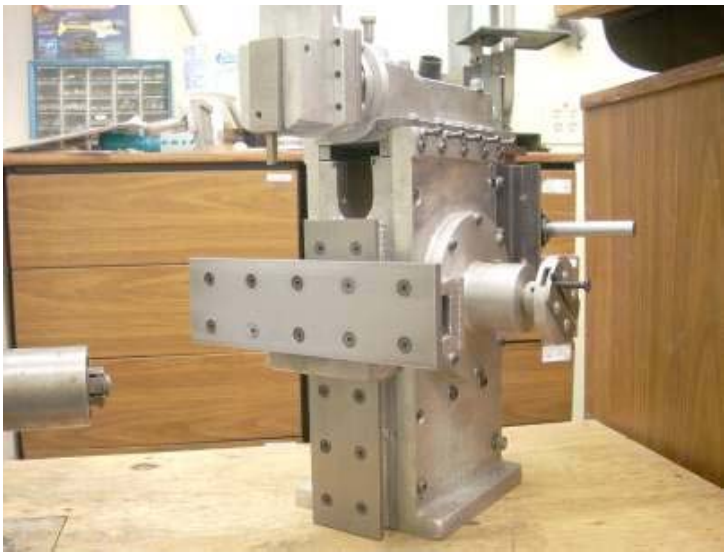
A fat pipe cleaner removes swarf from the threads. Some swarf has been jammed into the bottom of the hole but it is harmless.

Screw Installed Photo by R. G. Sparber

The screw is installed and I'm ready to start the next hole.

Drill & Tap Organization Photo by R. G. Sparber

With all of these drills, tap, and countersink, plus the two depths, it is easy to get confused. I organize all of these tools in a tray which is built into my X axis power feed. As you can see, I have one pocket for a clearance drill and another for a pilot drill. The rest go in the middle. Mixing up those two drills can sure ruin your day.



Cross Slide Way Mounted Photo by R. G. Sparber

The cross slide now joins the other finished parts on the shaper.

The next part to be machined is the cross slide. I have the casting in hand but that is for another day.

Camera Case Photo by R. G. Sparber

By the way, ever wonder about my photographic equipment? I use a Nikon Coolpix® digital camera that I picked up at Target for $85. It is protected from the grease and swarf in my shop with a simple protective case. The case is a snack-size Ziploc® plastic bag with a hole for the camera lens. I've used this reliable camera case for over a year.

Stay Tuned for part 47 from R. G. Sparber next month.

Keep sending me email with questions and interesting shaper stories.My email address is:

KayPatFisher@gmail.com

Kay

Editor's Desk

Max ben-Aaron

Our wonderful Ladies Auxiliary, led, as usual by the incomparable Gail Martha, came up trumps again at our Show. The full roster was:

Gail Martha
Bea Boucher
Sue Brackett
Lucy Young
Leisa Baker
Lesley Jones

We love them dearly and we cannot thank them enough. Bravo, Ladies!

Thales of Miletus, an ancient Greek philosopher, writing at around 600 B.C.E., described a form of static electricity. He noted that rubbing fur on various substances, such as amber (giving us the stem for 'electricity' and 'electron'), would cause a particular attraction between the two. He discovered that the amber buttons could attract light objects such as hair and that if they rubbed the amber for long enough they could even get a spark to jump.

Later Greek philosophers, Leucippus and Democritus, around 450 B.C.E., continued experimenting with electricity and developed an atomic theory that was remarkably similar to our modern atomic theory. They also held everything to be composed of atoms.

The first known experiment in electrophysiology was inadvertently performed by the Dutch naturalist, Jan Swammerdam (1637 - 1680), in the latter part of the seventeenth century. During a demonstration for the Grand Duke of Tuscany he noticed that a frog's leg— wrapped with silver wire— twitched when the wire was brought into contact with a copper support. The effect was absolutely inexplicable at the time; there was no similar phenomenon that could be used as an analogy.

By the early 1730s the only electricity known was still static electricity. The distinction between insulators and conductors – and the idea of semi-conductors that today dominate our world – was still unknown. The distinction was crucial to the discovery of current electricity so it is one of the greatest scientific discoveries, yet the man who discovered it, Stephen Gray, is virtually unknown. This is disgraceful. How did this happen?

Stephen Gray was born in Canterbury, Kent and after some basic schooling, he was apprenticed to his father (and later his elder brother) in the cloth-dyeing trade. His interests lay with natural science, but science was very much a rich-man's hobby at this time, particularly with astronomy. Gray managed to educate himself in these developing disciplines, helped by wealthy friends who gave him access to their libraries and scientific instruments. He ground his own lenses and constructed his own telescope, and with this instrument he made a number of minor discoveries (mainly in the area of sunspots), gaining a reputation for accuracy in his observations. Some of his reports were published by the Royal Society through the agency of a friend Henry Hunt who was a member of the Society's secretarial staff.

His work came to the notice of John Flamsteed (who was related to some Kent friends of Gray) the first English Astronomer Royal, who was in charge of the new observatory being built at Greenwich. Flamsteed was interested in constructing detailed and accurate star-charts, in the hope that this would eventually solve the problem of longitude determination for ocean navigators. Gray helped him with many of the observations and calculations (possibly without being paid).

Gray and Flamsteed became constant correspondents and friends, and this seems to have created problems for Gray in being accepted formally into the world of science. Flamsteed became embroiled in a 'heated battle' with Sir Isaac Newton over access to preliminary star-chart data. This boiled over and became a factional war in the Royal Society, which Newton dominated (virtually excluding Flamsteed and his associates, including Gray) for decades.

Poverty intervened for Gray. In 1720, through the efforts of John Flamsteed and Sir Hans Sloane (later President of the Royal Society) he managed to obtain a pensioned position at the Charterhouse in London, (a home for destitute gentlemen who had served their country). During this time he began experimenting again with static electricity, using a glass tube as a friction generator. Gray was admitted to the Charterhouse as a pensioner in 1720.

Gray was using a glass tube for generating electrostatic charges in his Charterhouse rooms. He used a cork in the end of the tube to keep moisture and dust out at night. He noticed that the cork exerted an attractive force on small pieces of paper and chaff when the tube was rubbed. The charge at the end of the stick persisted when extending the cork with a small fir stick plugged into the middle. So he tried longer sticks, and finally he added a length of pack thread connected to an ivory ball. In the process he had discovered that the "electric virtue" would carry over distance, and that the ivory ball would act to attract light objects as if it were the electrified glass tube.

Over the next few days he extended the reach of his thread-wire (he only had a short piece of wire, and did not understand the significance of metal as a conductor), and on visits to wealthy friends in Kent (Flamsteed's relatives, and the Reverend Granville Wheler) he extended his experiments through thread laced up and down through the large rooms of their manor houses, then down from the tower to the courtyard, and eventually out, across the paddocks to a distance of 800 feet.

In the process, Gray and Wheler discovered the importance of insulating their thread 'wire' from earth contact, using silk (which is less of a conductor than the hemp pack-thread they used as their main conductor). They noticed that wire supports to the pack-thread leaked away the electrical charge, and discovered that electricity would carry around bends in the thread and that it appeared unaffected by gravity if the thread was hung from the tower.

From these experiments came an understanding of the role played by conductors and insulators (names applied by John

Desaguliers). C.F. du Fay, a French scientist, who visited Gray and Wheler in 1732, saw the experiment, and returned to France where he formulated the first comprehensive theory of electricity called the "two-fluid" theory. This was taken up by his associate, the Abbé Nollet, and opposed (to a degree) by Benjamin Franklin's group in Philadelphia—where Franklin and English experimenters Beavis and Watson, had devised a single-fluid/two-state theory (later given the terms positive and negative by Watson) which eventually prevailed.

Gray went on to make more electrical experiments, inducing electrical polarity in suspended objects (he invented the famous "Flying Boy" demonstration - a boy suspended on silk cords, who was charged and attracted chaff, paper, etc., to his hands). He certainly realized that his phenomenon of 'electric virtue' was the same as lightning, many years before Franklin formulated his flying-kite theory.

Despite the importance of Gray's discoveries (it can be argued that he was the inventor of electrical communications) he received little credit at the time because of the factional dispute in the Royal Society, and the dominance of Newtonianism (which became the Masonic 'ideology'). By the time his discoveries were publicly recognized, experiments in electricity had moved rapidly on and his past discoveries tended to look trivial. For this reason, some historians tend to overlook his work.

There is no monument to Gray, and little recognition of what he achieved, against all odds, in his scientific discoveries. He is believed to be buried in a common grave in an old London cemetery, in an area reserved for pauper pensioners from the Charterhouse.

Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person call for further information to Bill Brackett at:

thebracketts@verizon.net or 508-393-6290.

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

March 23-23rd Midcoast Model Festival
Owls Head Transportation Museum Owls ME
http://www.ohtm.org/events_2000.html

April 3rd Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry Waltham, MA
http://www.neme-s.org 781-893-5410

April 11-13th
Cabin Fever Expo Bus trip
Dick Boucher 978-352-6724
http://www.cabinfeverexpo.com/

April 26-27th NAMES Expo
Yack Arena Wyandotte,MI
http://www.namesexposition.com/expo.htm

April 13th 9:00am The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge
http://w1mx.mit.edu/flea-at-mit
http://www.mitflea.com

April 27th Belltown Antique Car Club
Gas and Steam Show
East Hampton Ct
http://www.belltownantiquecarclub.org/shows/engine%20show%20main.htm