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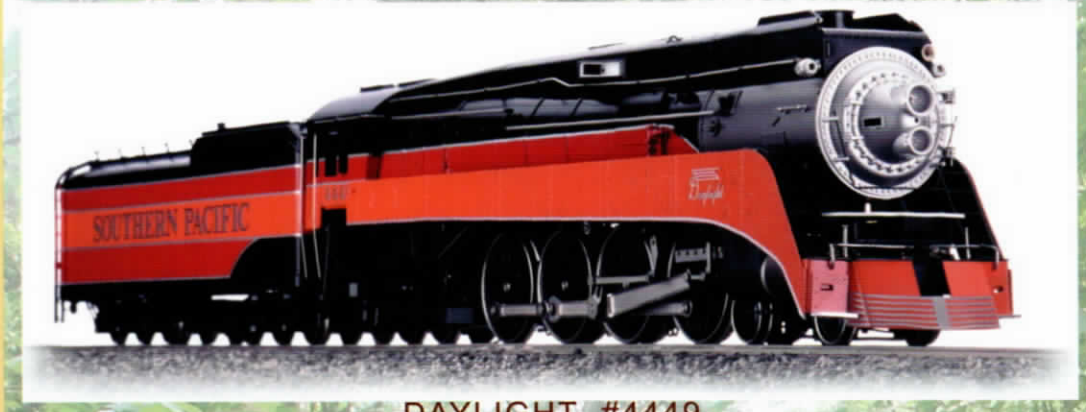

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STEAM IN THE GARDEN

Vol. 16, № 2
Issue № 86

Gather, friends, while we inquire, into trains propelled by fire...

Articles

Departments

FRONT COVER:

Pemberton Models' LMS/BR Princess Coronation Pacific "Duchess" heads up a rake of passenger coaches on Jim McDavid's line in California. Look at that photo...you can almost smell the coal smoke! Read the review of this magnificent loco in this issue...

photo by Jim McDavid

Editor
Ron Brown

Faithful Assistant
Marie Brown

CAD & Other Drawings in This Issue

Tom Bowdler • Dan Rowe

Charles McCullough • Doug Matheson

Regular Contributors

Larry Bangham..... California
Paul Blake..... Australia
Tom Bowdler..... New York
Keith Bucklitch..... England
Jim Crabb..... Texas
Les Knoll..... Illinois
Jerry Reshew..... Mississippi
Dan Rowe..... Texas

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Check out our new web site at steamup.info

CALENDAR OF EVENTS

Southern California Steamers - contact Sonny Wizelman for dates, places and any other pertinent information. 310-558-4872
● **sonnyw04@comcast.net**

26-28 May, 2006, Pennsylvania Live Steamers Memorial Day Steamup at the PLS site in Rahns, PA. Contact Harry Quirk for details. e-mail cequirk@netzero.net or phone 610-346-8073.

27th - 28th May 2006, Garden Railways In The Hunter. Well, it is on again in 2006. After the great success of last years event we, the organisers felt that it would have been irresponsible for us to just let it go away and never held again. It is a lot of work by all involved to put a show like this on, but the effort is definitely worth it, especially when we receive great feedback like we have. Attendance will be as last year at $55 for the weekend and $35 for a single day. Children and spouses will be $25. Dinner will once again be $20. Lunch and Morning and Afternoon teas supplied. As with last year, the public are not invited as it is only for registered attendees. This show is for YOU and the growing family of Garden Railroaders, so we invite you once again to join us in Newcastle. Contact: Geoff Horne, 29 Kenley Crescent, Macquarie Hills, NSW Australia 2285 or email: geofhorn@bigpond.net.au

19th - 22 June, 2006. Steamboat meet at Mid Lakes Marina, Macedon (near Rochester) NY. Dave Conroy - Phone 315-945-7099, e-mail is libertyboat@Juno.com, or winter address is 2592 Cay Cove, Matlacha, FL 33993. Boats burning wood should let us know so we can plan ahead for an adequate supply. Free camping and launching on the marina grounds.

June 23 - 25, 2006 - Finger Lakes Live Steamers First Open House of the year. The event includes larger scale (1 1/2" & 2 1/5") "ride on" equipment - Live steam (coal, gas & kerosene fired) plus the diesel / electrics with gasoline and battery operated locomotives. We also have a 1" scale track which is presently undergoing major expansion, including a 28' thru truss bridge. The newest operation is our Gauge One Line which is over 600' of stainless rail (3 loops, 2 of which are interconnected) all with 10' minimum radius curves and # 6 turnouts, a 20 foot dual track wooden trestle (used primarily for steam up), new 6' thru truss steel bridge plus a growing number of other attractions. Bring your trains, we have something for everyone and regularly run steam, battery and track power all at the same time when compatible. If it goes on Gauge One Track, bring it along - we are still waiting for our first "clockwork". Information is available at http://www.fingerlakeslivesteamers.org/ or contact John Spencer (315) 689 - 3402.

June 25, 2006 - The Pine Ridge Lumber Co. in Jenison, MI, will host a steamup from 9 am until 6 pm. For more information contact Robb at steamlogger@yahoo.com or call (616) 667-1260. We have 450' of elevated 45mm track with 16' radius curves. Portable tracks will also be available for running. Visit mssls.info for photos of past steamups.

July 6 - 9, 2006 - 33rd Annual Tuckahoe Steam and Gas Show, located in Talbot County on Maryland's Eastern Shore, five miles north of Easton between mileposts 57 and 58 on Route 50. Lots to see and do for the whole family. Mike Moore's portable Gauge 1/Gauge 0 track will be set up and operating, so bring your steamers and trains. For information call 410-822-9868 or e-mail: info@tuckahoesteam.org Web site: http://www.tuckahoesteam.org/

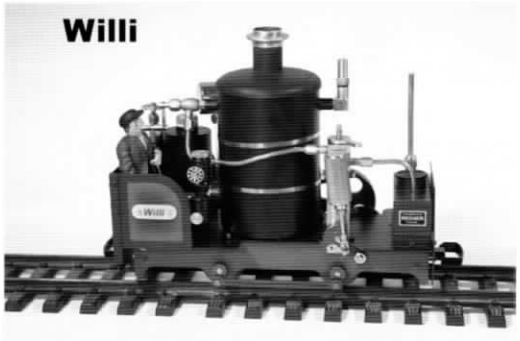
July 14-16, 2006 - The "American Invasion" (see article in this issue) in Ottawa, Canada. Any live steamer who may wish to attend and participate can get in touch with Doug Matheson at dmkkk@hotmail.com or at 613 - 692-4049.

July 19-23, 2006 - the 2006 National Summer Steamup will be held at the Lions Gate Hotel in McClellan, Calif., a suburb of Sacramento. The National Summer Steamup gives owners and operators of small-scale (1:13.7-1:32) live steam locomotives the opportunity to meet and run equipment in a secure, indoor, friendly setting. The 2006 event will feature both 45mm and 32mm tracks, a Saturday night BBQ dinner, clinics and workshops, exhibitor displays and swap tables. Because of the cancellation of the 2006 International Small-Scale Steamup in Diamondhead, Miss., the National Summer Steamup will be the only major small-scale steam event this year. The Lions Gate Hotel, on the grounds of the former McClellan Air Force Base in suburban Sacramento, will provide the steamers with a ballroom setting of more than 6400-square-feet. Event organizers have secured the services of the Pacific Coast Live Steamers' "original track," a 110-foot 45mm-32mm dual-gauge layout as well as the new "San Luis Obispo" track; in addition, they are working to bring in even more trackage. The hotel is providing live steamers with the low room rental rate of $85 per night (double-occupancy). Reservations can be made with the Lions Gate toll-free at 1-866-866-7100. For more information on the 2005 National Summer Steamup, please visit the web site at http://www.summersteamup.com/, e-mail steamup@summersteamup.com or call 650-557-9595.

August 31, September 1-3, 2006 - Pennsylvania Live Steamers Labor Day Steamup in Rahns, PA. This is an extended meet to celebrate the PLS 60th Anniversary! Contact Harry Quirk for details. e-mail cequirk@netzero.net or phone 610-346-8073.

September 22-24, 2006 - Finger Lakes Live Steamers Second Open House of the Year. See listing for June 23-25 for full information.

Because of publication lead time, please send info for Calendar of Events well in advance. Include name of host and location of event, with address and/or phone number to contact for complete information. Some basic info about the site is also useful (i.e., ground level or elevated, minimum curve radius, ruling grade, etc.)



Got your Regner WILLI?

Let your creative juices flow and see what you can do with the little gem!

The Train Dept. and *Steam in the Garden* are sponsoring a Willi Bash. Send us photos and a writeup on what you did and how you did it. At the end of the year (2006) our panel of impartial judges will decide who is the best craftsman.....and who has the most imagination.

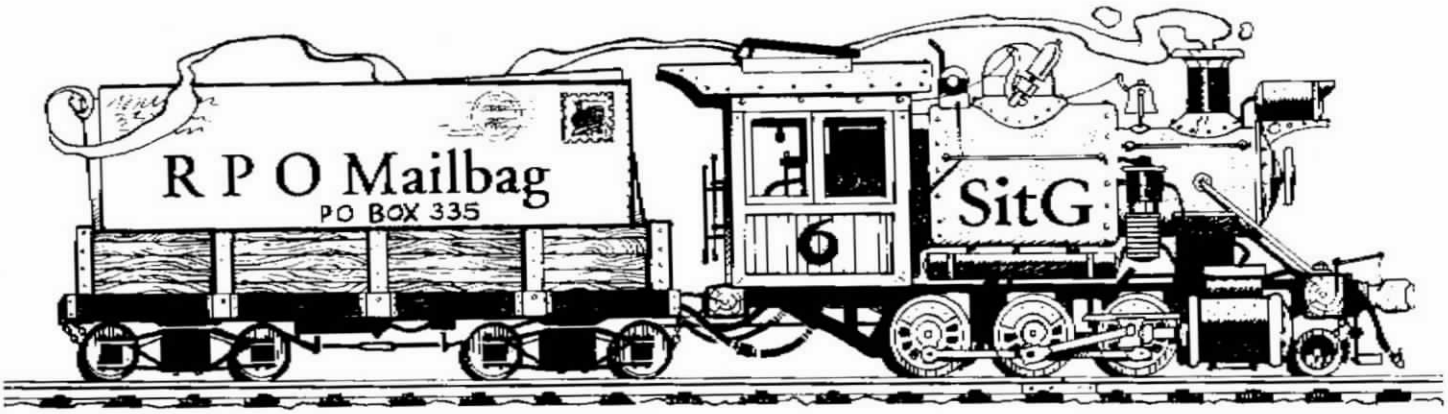
Prizes will be awarded!

1st Prize - $100

2nd Prize - $50

3rd Prize - $25

All winners will also receive a one-year subscription to *Steam in the Garden.*



Letters from readers are welcomed and encouraged. Offer advice, encouragement, suggestions or constructive criticism. Tell us about your current project (and don't forget the photos!) or just share live steam experiences. But please keep your letters to a reasonable length so everyone has a chance to use this forum. Letters may be edited for length or clarity. Send your letters & photos to: SitG, Dept. RPO, P.O. Box 335, Newark Valley, NY 13811, USA...or e-mail to <rbrown54@stny.rr.com>.

* * * * * *

Austria
via e-mail

Hi Ron,

SitG has arrived this morning. Thank you. I noted a couple of readers have done some burner head scratching and come up with some results. We also did some head scratching, particularly as complaints were made about loud Accucraft engines and stories of the double burner engines being difficult keep both burners running.

I used an 8mm burner to replace the 10mm burner, gaining more combustion room around the burner. I made it a little longer and instead of "toast rack" slits I drilled 3 rows of 1.5mm holes on 3mm centers. The result was a 2 cylinder Shay that runs quiet, needs less gas and heats quicker.

On the double burners we found the jets were sometimes at the rear of the air mix holes and sometimes towards the front. We also found some of the copper pipes on the jet assembly were not nicely bent, but some were kinked thus reducing the inside diameter.

The largest single cause was gas starvation due to the gas being turned down too low. One other interesting point was we usually fill our gas tank first, then do the other jobs around the engine. This allows the gas to warm up while we are working. You may be aware of the size of the K-27 and C-21 gas tanks and can imagine how they cool (in our geographic area (Austrian alps) However, while running at Sinsheim 2005 the K-27 tank was filled. These tanks have a safety valve!!. The tank warmed up, the pressure increased and the safety lifted. Now at this time a coal fired engine was running past with an almost white glow under the firebox. I won't try to tell you the size of the flame which went up from the gas tank.

You would probably not believe me, but now there are no safety valves on our gas tanks.

Have a nice one,
Bert

* * * * * *

Peter Sidler (Switzerland) firing up his scratchbuilt "Wobbler", one of a batch of 7 being built by a group of friends. **photo by Bert Horner**

Austria
via e-mail

We spent the weekend steaming in Switzerland at the Congress Center in Biel (Peter Sidler's home club). Various hobbies were exhibiting and something was needed to compete with the aircraft, etc. For us it went down well and I was to able to give a couple of junior members their first lesson in steam engine driving. I am aware that this is a very serious virus when it takes, but I still keep on letting youngsters drive my engines. I have found that if you ask them to take care of your engine while you are away, then it is in very safe hands. Even if the person has only had one lesson. This is a tactic I use. I go away and leave them to it. I am, of course, only a short distance away observing without them seeing me, but this method gives them the feeling that they are trusted. If something looks like it could go wrong I turn up "just in time". So far I've never been disappointed and we have successfully infected a couple of younsters along the way.

Regards,

Bert Horner

* * * * * *

Les lecteurs francophones peuvent contacter Guy Ozanne pour obtenir, gratuittement, une tradauction sur un element de texte paru dans SitG. 41 rue Jeanne d'Arc, 94.500 Champigny, France.

tel (33) 01-48-83-62-86
e-mail <Guy.Ozanne@wanadoo.fr>

Aster NKP Berkshire - kit version
Part I

by Ryan and Charles Bednarik
some photos courtesy Aster Hobby

On a cold day in December number 779 Nickel Plate Road Berkshire made its way down the rails for the first true run beyond the roller test and a brief down and back on the shop tracks. The engine seemed a bit sluggish. In fact, once the throttle was opened the pressure quickly dropped. With that reoccurrence there was a flashback to the various building steps over the course of nearly forty hours in hopes that I could determine the problem. Could it be the misalignment of exhaust nozzle, maybe the burners were offset, or the wicks were wrong?

The pressure was now back up, throttle open and off the engine went! After all the hours, the many building steps and the detail parts, now the engine was moving as a well oiled steam machine. The holiday spirit came rushing back into my soul as the engine made its first complete lap. After running about 40 minutes, it was time for lunch. I made two mental notes, the performance along with that white residue on the stack.

During lunch a discussion about the engine, the building of the kit and the various operating options

Calmly, I decided to check the wick holder for alignment with the thought that maybe during the ride to the club it had moved. Well, that was not the problem. I decided to try again, thinking that the engine just may need to work through the situation (optimistic, wasn't I?).

keep us from thinking about the return to the cold wind and the remainder of the afternoon left with running to do. Along with the Berkshire we had several engines that were being checked out. So, it was a while before a second run was engaged. During that time I was reflecting on the performance and that white residue

on the stack. Given that the building of the kit was as easy as building an Accucraft Ruby kit, I was confident that something minor had affected the performance. Without a doubt this was one well-designed and tested engine prior to release. That's not to say I am an expert; more in the fact that the credit goes to Aster and Hans Huwyler for the well designed manual and quality parts that allowed me to build this engine without missing a beat. The closing will indicate the outcome for our first steam up of #779.

All the bits and pieces, ready to assemble.

Nickel Plate Berkshire #779

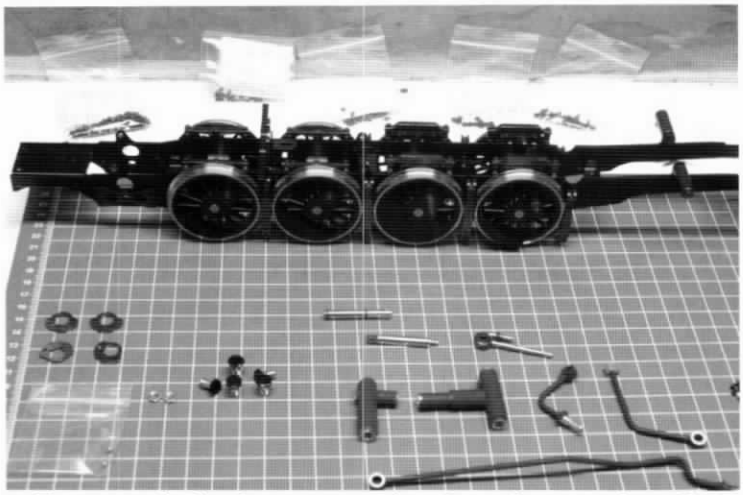
The kit arrived in the traditional Aster green covered box. All the parts were separated into lettered boxes. The main components (e.g. boiler, tender shell) were wrapped front and center in the box. Only one aspect was missing for building the engine: the manual. That was easily dealt with as Hans was kind enough to e-mail the draft manual pages to us, allowing for a quick start and relief of our anxiety about starting this project.

A brief overview of the building project would best describe the kit process as relatively quick (approximately 38.5 hours) with only a few screws to be replaced (for equalizer and "D" valves) to finalize the engine. The layout of the manual with the visual emphasis was very easy to follow compared to having the two traditional Aster reference manuals that required cross checking to ensure that all was correct.

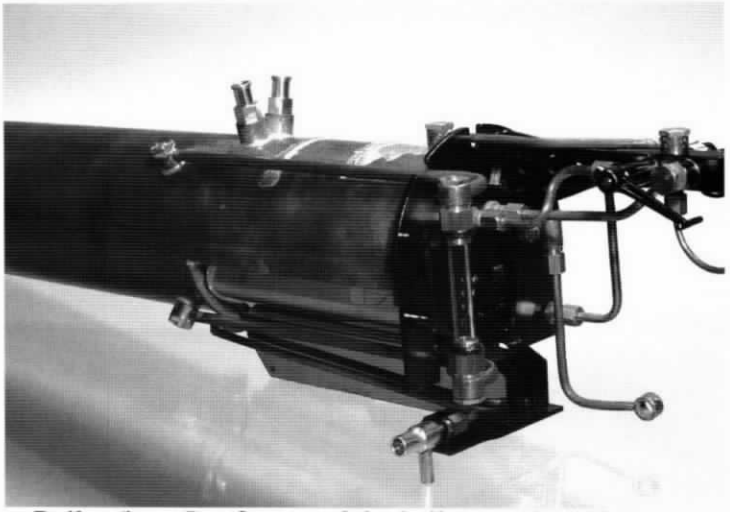
A general concept of building the Aster Berkshire would be expressed in 5 major areas: frame, tender, running gear, boiler, fittings, and all the detail parts. The frame took 3.5 hours to build. This was the one area that needed longer screws than what was supplied. The correct screws were sent to us in a timely fashion, and we simply utilized other longer screws used in later steps to avoid having to wait for parts to arrive.

Combining the time for the pilot and trailing trucks, we had 5.5 hours invested. Next came the building of the tender. I would have guessed that the time for this would be relatively quick; two sets of wheels and one welded body. Incorrect guess; the tender trucks required a great deal of time, along with the details. The total time for building the tender was 9.25 hours.

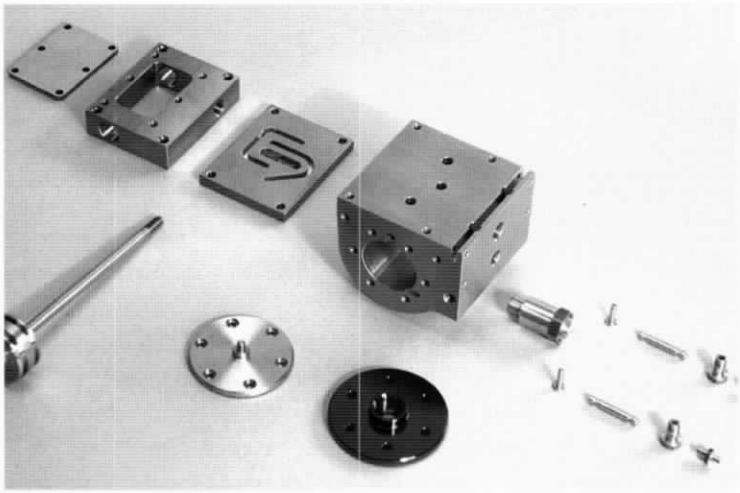
Now we moved on to the running gear and cylinders for the 2-8-4 steam locomotive. This is getting exciting, knowing that we could soon air test the basic running components. In completing the first cylinder set our total construction time was 23.5 hours (8.75 hours for cylinders) then another 2.75 hours to link up the valve gear and complete timing. Then it was onto the air test along with a steam test (could not resist) using a spare Saito boiler. What other motion could be put forth restricting all other aspects of daily life? To see the entire motion under steam was very gratifying.



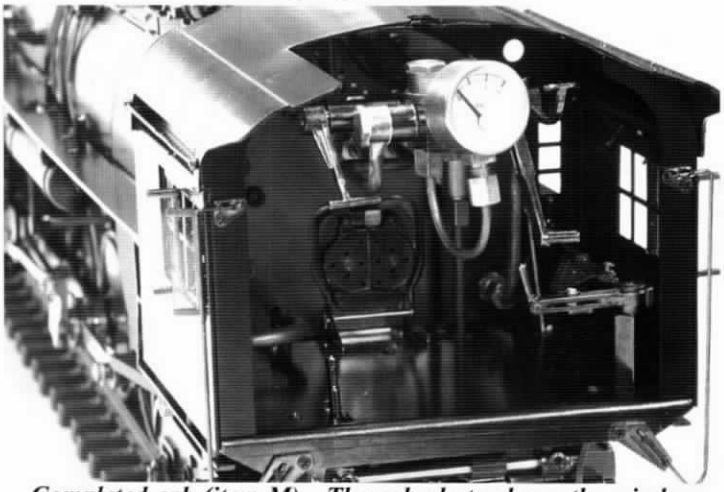
Frame and wheel set - preparing for axle pump installation (item D on the building log).



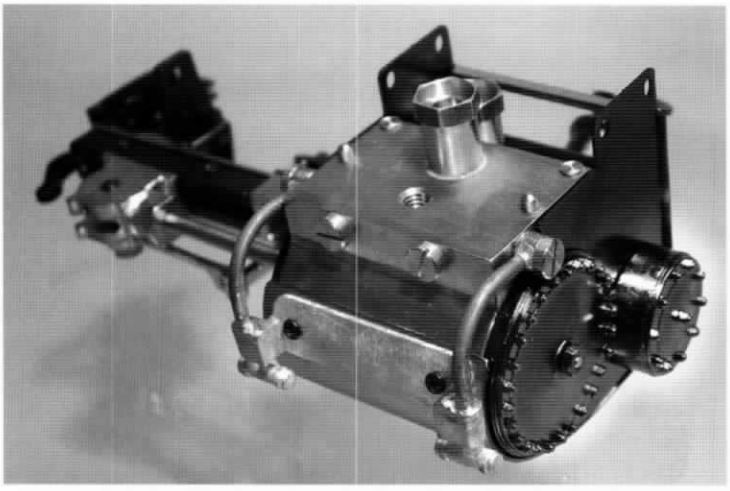
Boiler (item I) - On top of the boiler are the safeties, on the bottom is the blowdown valve and on the body at the backhead is the water gauge and throttle.



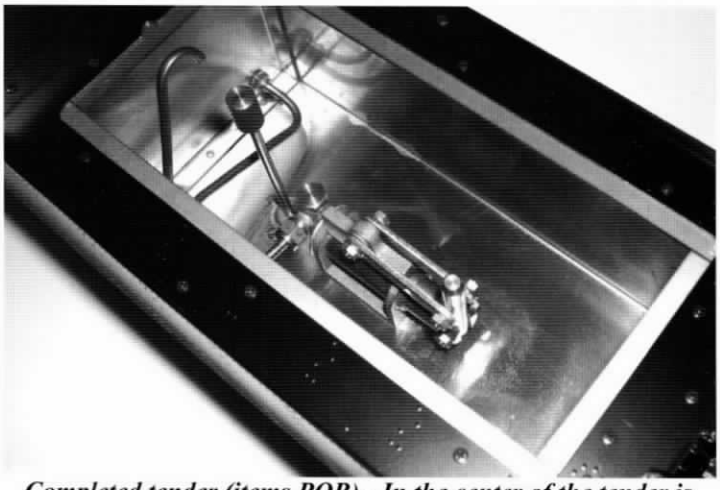
Cylinder parts: main parts (l. to r.) for cylinder (item E in building log) - cover, valve block, cross port, cylinder block, drain cock parts, and below the body of the cylinder block is the piston and cylinder covers.



Completed cab (item M) - The cab photo shows the window deflectors, pressure gauge, throttle (r. side), reverser (r. side), firebox door, and to the left of the gauge (toward the roof) is the blower. Down on the cab floor is the drain cock lever.



Completed cylinder. Attached to the cylinder is the crosshead guide, Baker valve gear (left rear) and the drain cock lines.



Completed tender (items PQR) - In the center of the tender is the water pump, bypass line return and the drain plug (vertical rod with round handle) in front of the water pump.

Yet, one must ask if there were any problems reading the manual and getting a set properly done? Yes, in the next portion while building the bypass. As we discovered later in testing the bypass, our interpretation of the manual resulted in incorrect placement of the banjo bolts in the delivery lines (more on this in the related section). Our total time on the building log at this point was 29.50 hours. The remainder of the building involved the boiler, pipe fitting and details. Without a doubt the details were time consuming similar to the tender requirements.

I remember the discussions with Hans during the summer as he ran the production model. His conversation indicated to us the need for various improvements and his desires to get the correct dimensions and details. Most of all, it was very important to produce a first class engine in kit form that would encourage more of us to seek the opportunity to engage this portion of the hobby. Hans' efforts are our rewards in his taking on this venture as Aster's USA distributor.

The enjoyment of finishing the kit is second only to the knowledge gained of this engine from the frame to the details. Tom Rowe once told me that, to have a true experience in live steam can only be obtained through building a kit. For Tom and all the others steamers who have many years of steaming wisdom, we are glad to have listened and learned this truism.

Finally, another friend in the live steam hobby, Robert Hekemian, as indicated by my Dad, helped us in our decision for purchasing a kit. The most important aspect of all was to be the father and son experience. Thanks to Robert's kindness and many minutes of listening we obtained something from this kit not found in the directions or instructions: a life lesson about relationships (sometimes as basic as getting along during those trying moments).

The remainder of this review will involve two things. Each of the sections as per labeled box will be gone over. The closing for this report will be the running characteristics of the Aster Berkshire on a cold, blustery winter day in December.

End of Part I.....to be continued in the next issue.

Bulleid's Light Pacifics

by Ken Matticks
photos by Peter Trinder

Aster announced recently their next locomotive for the British Gauge One market will be a Southern Railway Bulleid Light Pacific. As a fan of Britain's Southern Railway and its predecessor railways, I volunteered to briefly recount the life and times of this unusual locomotive class to set the stage for the model coming from Aster.

The class contained 110 locomotives in all, being assigned numbers 34001-34110 after nationalized British Railways came into existence in 1948. These locomotives were originally designated the West Country class, being named for that part of Britain in which the locomotives were destined to operate. Later siblings (from 34049 onward) were known as the Battle of Britain class and individual locomotive names were, as might be expected, related to the Battle of Britain, a decisive air battle in Britain's fortunes in WW2. The West Country class and the Battle of Britain class were the same locomotive and were treated as a unitary class by the SR. The first of the class was introduced in May, 1945 and the last example completed in 1951.

They were designed by the last Chief Mechanical Engineer of the SR, Mr. O. V.S. Bullied, who held that post from 1937 through 1947. These locomotives are considered one of the most radical designs of any major class of British locomotives. Although the class was originally designed to be express passenger locomotives, they served successfully in both express passenger and heavy freight service during their working lives.

These locomotives had

several different tenders, the most significant feature being the cutting down of side panels in later days to assist the driver's view when running tender first. The overall length over buffers measured 67 feet 4 inches.

Interestingly, the West Countries were introduced just four years after the introduction of the SR's Merchant Navy class of express passenger locomotives. The Merchant Navy class were big locomotives by British standards at almost 95 tons, having an axle loading weight and width that exceeded the maximum allowed on some lighter branches of the SR. The West Country/Battle of Britain's were designed to have an axle loading three tons less than the Merchant Navy class and to be overall a slightly narrower locomotive. These changes gave the West Country/Battle of Britain's the ability to serve secondary routes and branches of the SR closed to the Merchant Navies.

If you have looked at the photographs with this article, you will already see one of the reasons for the choice of the word "unusual" as an initial description of the West Country/Battle of Britain class. Air-smoothing cladding of the boilers gave them a significantly different appearance to almost any other SR locomotive other than 30 examples in the Merchant Navy class before rebuilding and one experimental Schools class. This cladding was not for aerodynamics, but rather for ease of cleaning and to match the profile of Bulleid's flat-sided coaching stock. Moreover, the West Country/Battle of Britain class boasted of three cylinders which, although perhaps more common on the SR, were not so on other railways making up the BR in 1948. Other distinctive features of the class were its oval smokebox door, Bulleid's steam reverser, distinctive wheels that look similar to American "Boxpok" wheels, and chain-drive valve gear enclosed in an oil bath.

Rebuilding of the West Country/Battle of Britain class began in 1955. In all, 60 of the 110 in the class were rebuilt. As might be expected, the air-smoothing cladding over the boiler was removed to improve ease of maintenance. Also, a screw-type reverser and Walschaert valve gear replaced the original Bulleid designs during rebuilding. Although the third cylin-

Horizon Hobbies Spektrum DX6 System

by Jeff Runge

Oh, happy day...no more glitching!

I have been using radio control in my live steam engines since 2000. My reason: being able to drive the engine, as you would if you were sitting behind the controls was very appealing. This review is NOT intended to persuade anyone who likes free running to change their ways. I have some engines in my collection I do not want to radio control.

As anyone who has gone down this path quickly discovers, there are some problems to deal with beyond the installation. The worst is GLITCHING, the term we use when referring to radio interference causing erratic servo movement. You may have witnessed this as someone's engine stops and starts or reverses direction rapidly for no reason while just cruising around the track. Some engines suffer more than others for different reasons ranging from the radio itself to the installation of the servos and/or receiver.

All our radio systems we have been using were either AM or FM, radios operating on an analog or digital signal on a frequency of 27MHz or 75MHz (or 72MHz if you were using an air-only radio). Most of the glitching we experience is generated by our engines and trains themselves. The more metal to metal contact the more interference we generate. ALL this is at 300MHz and BELOW, and our radio frequencies are right in the middle of all this!

The complete Spektrum DX6 System.

Along comes Spektrum with DSM (Digital Spectrum Modulation) operating on at 2.4GHz . This is said to be the "Worlds most secure radio links, used by NASA, US military, FBI, CIA. All rely on Spread spectrum technology" What does this mean for us? NO MORE GLITCHING! And as you may have guessed, there are even more improvements with this new technology. I first saw this in use on the nitro powered R/C cars and trucks. (The bandwidth is large so they offer real time telemetry: engine temp, speed, etc)

There is no longer a need to worry about someone turning on a transmitter that's on the same channel you're using. When you turn your system on it finds an empty channel. The transmitter and receiver "know" each other through what's called a "binding process". Each receiver has it's own "GUID" code (there are over 4.2 billion different codes available). Once they lock onto a channel they will not "listen" to any other radio. All equipment operating on this frequency is required to use this technology!

The DX6 has a 10 model memory, so you can program in settings for 10 different models, and either buy a new receiver for each one OR move the receiv-

er from model to model. More on the cost of doing this later.

There are more details in the 90+ page-operating manual and on the web site: http://www.spektrumrc.com/DSM/Technology.aspx

Spektrum Receiver - about the size of a book of matches.

So who is "Spektrum"?
A: They are part of a large company called HORIZON HOBBY. They are also the parent company of JR radios. The case of my DX6 radio looks just my old JR XF421EX 5 channel, but with a few more buttons.

Quick note here. This radio system is designed for "park flyer use" and actually utilizes 2 channels at one time.. The transmitter is the conventional 2-stick type that we are all familiar with. My research has not found any FCC rules restricting its use, other than not to use it in larger aircraft where a range of more then 3000-ft is needed. There are 2 R/C car radios available; one is 3 channel and one is 2 channel. These are both the pistol grip style transmitters.

Here is what I got in the box:

1- DX6 Transmitter. 6 channel 2-stick programmable radio, total antenna length 6 1/2"

1-600mah Ni-Cd battery pack for the transmitter

1-AR6000 receiver, 6 channel. This receiver is UN-like any I have used before. It's small (39mm x 39mm x 9 mm). For the pre-metric group that's the size of a matchbook! It has 2 antennas, each less than 4"

4 - S75 Sub-Micro Servos, size 23mm x12mm x24mm (.90"x.45"x.94") 17.2 in/oz of torque.

1-battery charger for Ni-Cad battery pack. This charger has 2 charge leads, one that plugs into the transmitter to charge the supplied Ni-Cd pack, and the other lead will charge Ni-Cd receiver battery packs (NOT supplied). If you want to use NI-Mh packs you will need to purchase a different charger. The good part about not getting a receiver pack is you can pick from many different pack sizes & shapes to best fit you application.

Servos...you get 4 with the Spektrum system, which should be enough for more than one locomotive. (see text for dimensions)

1-Manual. The manual walks you step by step through every thing you need to do. Like how to bind additional receivers to your transmitter and how to set the travel limits for each servo.

The list price for all this is $199.95, I have not heard of anything better than $189.00 on the DX6 system. Additional receivers, should you chose to buy them, are about $69.00.

The only thing you need that does not come in the box is a receiver battery pack, and on this item you need to think about where you want to mount it. It should be a 4-cell 4.8-volt pack. More MHA's = more $, but that allows more run time between charges.

This all sounds great, but how did it perform in the real world? I was able to put 4 servos and the receiver in the cab of my Aster Berkshire, and I can still access the fire door and see the waterglass and pressure gauge.

The radio works perfect. I love the tiny servos, but they lack the muscle needed on some engines to close the throttle tight enough.. And that is my one and ONLY problem. This is easy to fix by upgrading the throttle servo with a beefier one. You don't need to go overboard here. The stock servos will set you back about $15.00 each should one melt down in an accident. I spent about $30.00 on a Hi-torque servo for the throttle.

Glitching is gone!

I have installed a Spektrum receiver in my Mikado as well; all the original installed servos were reused. I just programmed the radio to the desired servo travel end-points.

Let me back up a bit here, as there are a few things to keep in mind. This radio is designed for model airplanes, not trains. So the dual stick has some of the stick levers spring loaded to a center position. Although it can be used this way, it can be improved to make it more user friendly for our applications. It just requires opening the radio case and removing a few springs.

This radio system is a good deal for the money, in that it has almost everything you need. You can control up to 4 functions with a total investment of about $225.00 plus tax etc. That is for the radio system and receiver battery pack. Since the charger is included there is no need to keep replacing batteries. There are 2 more channels available on the radio, however both are on 2 position toggle switches, one is for landing gear, so it would be limited in its application...maybe for cylinder drains if you wanted them all the way open and all the way closed, no in-between? The other is marked Auxillary, Flaps.

My personal feeling is that this radio may make all others obsolete, at least for our hobby. I almost feel bad for all the people who have invested so much trying to fix this with servo smoothers and the like.

Steamup Report

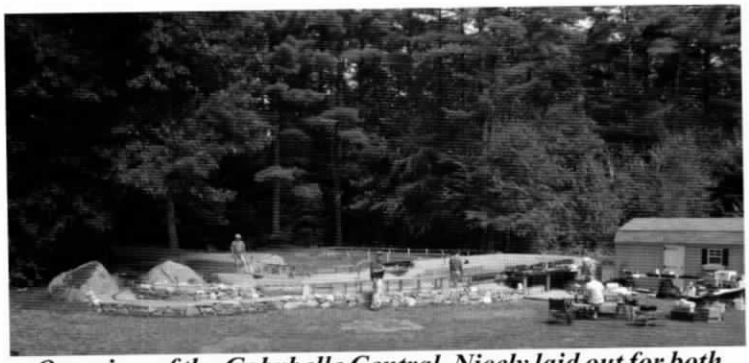
4th Annual Southern NH Invitational Steamup

by Tom Bowdler

In the 60's the Beach Boys sang "I'm getting bugged driving up and down the same old strip" in their tune ***I Get Around.*** That isn't so for me as I have been fortunate that if I ever make it to Jim Curry's steamup I'll be able to say I've been invited by friends and have steamed from Maine to California and Michigan and Mississauga to Mississippi. For now the furthest "Down East" I've run trains is New Hampshire at Larry and Pattie Goodhue's homes. That's right, plural, and therein lies the story of the amazing reincarnation of the Gabeybelle Central Railroad.

I made the acquaintance of Larry and Pattie at Diamondhead some years ago. After several invitations I attended their steamup in Manchester, NH on the Saturday of Labor Day weekend 2004 traveling by private plane. (a great way to combine hobbies) Their large old Victorian home on a small city lot provided the backdrop for a magnificent garden railway with abundant rockwork and a superb water feature along with a level "running track" where I exercised by coal-fired Class A Shay. Meeting with friends old and new, the excellent food and entertainment by Pattie's Sweet Adelines quartet made the steamup a

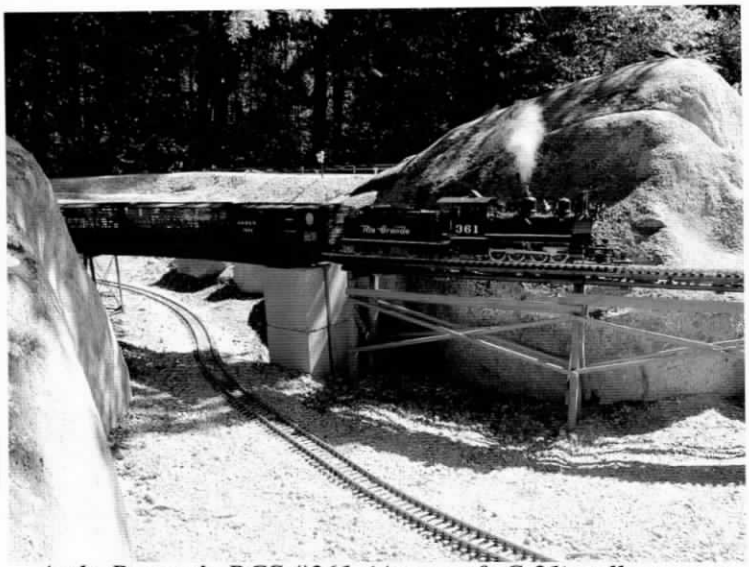
Engineers from New Hampshire, Massachusetts, Maine, New York and Florida joined in on the fun.
photo by Leland Beachy



Overview of the Gabybelle Central. Nicely laid out for both running and watching trains. **photo by Larry Goodhue**

Norm Saley's coal fired scratchbuilt Shay pulls a consist over the bridge in the middle of Chipmunk Gorge.
photo by Larry Goodhue

Andy Brauer's weathered Accucraft C-21 travels through the steaming bay on the upper loop.
photo by Leland Beachy



Andy Brauer's RGS #361 (Accucraft C-21) rolls over a trestle with a consist of stock cars.
photo by Leland Beachy

Steve Hanson adjusts the throttle on his Roundhouse Forney as it rounds the bend on the lower loop, headed for the Gorge. **photo by Larry Goodhue**

Host Larry Goodhue (l.) and Norm Saley spend some time firing up Larry's brand new alcohol fired Accucraft GS-4 on the morning after the steamup. **photo by Pattie Goodhue**

"must attend" for me despite the distance.

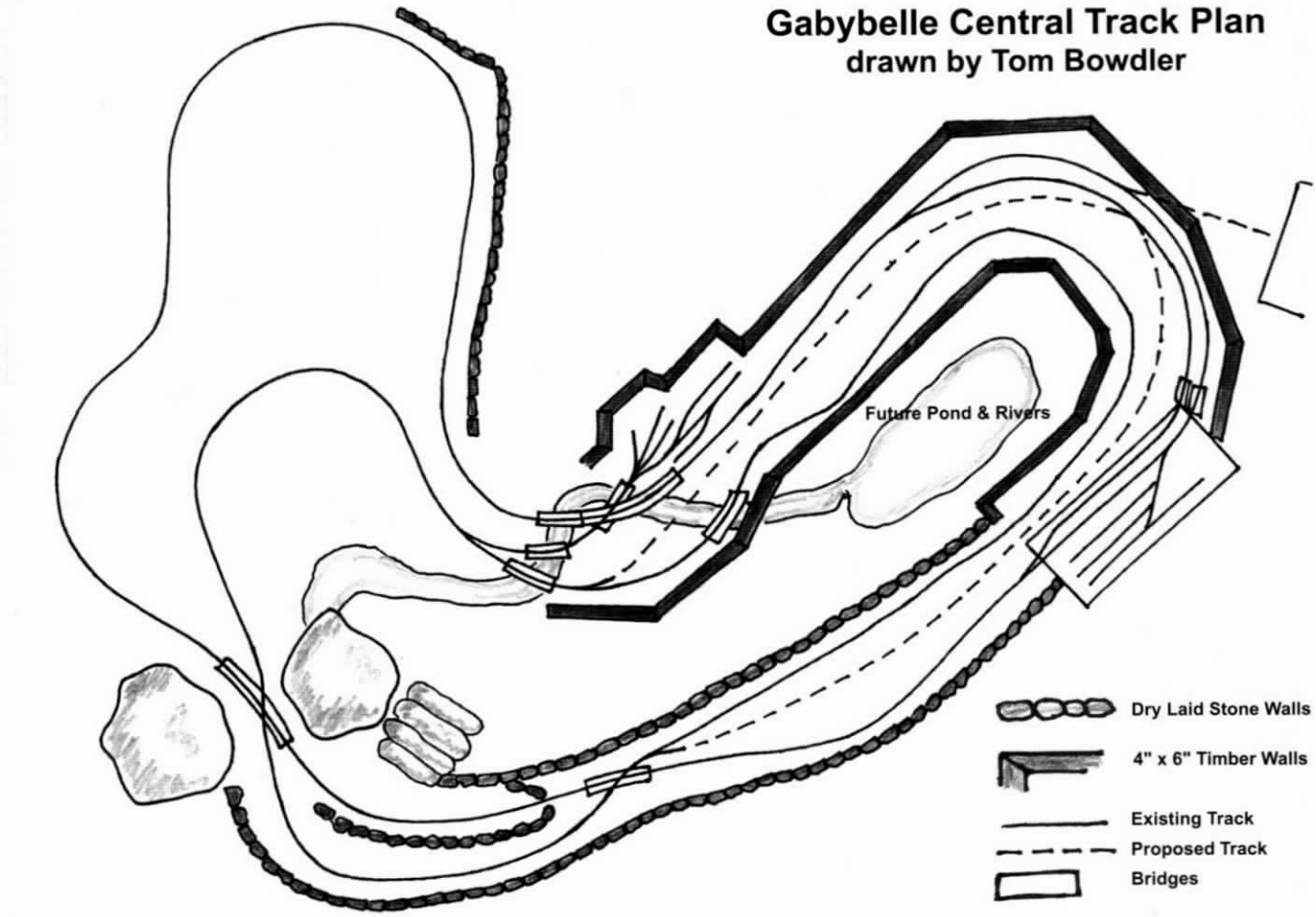
In 2005 with their children grown and gone Larry and Pattie decided to downsize, sold their city home and moved to nearby Bedford, NH. Their new home is smaller but instead of a city lot they now have 6.1 acres of wooded, rocky countryside as the palate for their new live steam garden railway. But the amazing part is that they moved lock, stock, barrel and wall hangings to Bedford in March, began construction of their railroad in mid July and were able to host their Fourth annual Southern NH steamup only six weeks later!

My first view of the new Gabeybelle Central was through their kitchen window. I noted two intertwining L-shaped level loops with a waist-high steamup area becoming nearly ground level as their property slopes upward to their back line. One prominent focal point is two large granite boulders just far enough apart to allow both lines to snake through one above the other.

Larry and Pattie laid the rails on the ground to a design they fashioned utilizing track from the previous incarnation of the Gabeybelle at their home in Manchester. Marking paint was sprayed on the ground to outline the walls, both stone and timber, that would be constructed to retain the granite fill and raise the roadbed to be level throughout its run. Numerous bridges and trestles available from their previous railway and several of new construction became part of the new railway and were incorporated in the design.

The granite "hardpack" fill for the roadbed is retained by impressive dry laid granite walls in some areas and 4"x6" timber retaining walls elsewhere. You'll read of the impressive amounts of materials in the accompanying table. Larry told me he could make a round trip with his tractor bucket full of fill from the row of piles in front of their house to the railroad and back every three minutes!

As wonderful as the railway appeared and functioned this past September, Larry and Pattie have many plans to upgrade it for the future. Phase One will continue with tweaking the present railway to near perfection. Phase two will include turnouts and spurs to connect upper and lower loops. A lift bridge spur will be constructed into an adjacent storage shed so trains may be made up under cover, run over the line and returned to storage. Larry and Pattie have also envisioned the addition of a turntable with multiple steaming bays and an extension of the upper loop that will encompass another 500 feet of mainline and a turning wye. There is no end to what this partnership will accomplish, and viewing the pictures that accompany this article I think you will heartily agree!



Pemberton Models
Michael Gregory Model Engineer
LMS/BR Princess Coronation Pacific Locomotive

by Jim McDavid

Have you ever thought to yourself after looking at a David Leech coach, one of Jim Hadden's creations, Charlie Mynier's locos or one of Harry Wade's boilers that there is something else here besides an immense skill level and good engineering? I have, and I believe they all have a passion to produce the best piece of model engineering possible. This is the way I feel about Mike Gregory's Duchess class engines. His locomotives are produced to the highest level of model engineering. They are truly works of art, right down to the paint and lining. I think he leaves a little of himself in every locomotive he produces. They are made to run but will also look fantastic on your mantel.

The LMS Duchesses, or more correctly the LMS Princess Coronation Pacific's, were produced starting in 1937 to haul heavy passenger trains up the west coast mainline from London to Glasgow on a 6 1/2 hour schedule. They were capable of speeds well in excess of 100 miles an hour and a cylinder horsepower ranging over 3300. In describing the mystique of this, the most powerful steam passenger engine ever to ply the rails of Great Britain, I think the late David Jenkinson, renowned author, historian, model maker and fellow gauge one live steamer said it best in his 1979 book, *The Power of the Duchesses* by Oxford Publishing Co.

"Midsummer dawn and the chorus of birdsong is just beginning to disturb the silence of the short summer night over the Cumbrian fells when, away to the south at Tebay, the sharpening four beat exhaust of a large steam locomotive working hard can just be discerned above the timeless sounds of nature in this desolate yet magnificent spot. Soon a plume of steam and smoke can be seen erupting skywards from the cutting below Scout Green and into view comes a gleaming dark red Pacific locomotive. Behind it, . . . one, two, three, . . . twelve, thirteen, fourteen (or even more) massive sleeping cars of the 'Night Scot' enroute to Glasgow – perhaps 600 tons of train proceeding majestically up one of Britain's most famous railway gradients behind what is arguably the supreme example of express passenger steam power ever to be built in Britain – an LMS 'Duchess' 4-6-2."

Thirty eight Duchesses were eventually built, the last 6257 being constructed in 1948. All but fourteen were originally built with streamline casings. Starting in 1946 the streamlining was removed so they all eventually ran as conventional engines.

The model I asked Mike to build for me is number 6233, ***The Duchess of Sutherland,*** one of the original non-streamlined versions from the second batch built in 1938.

The technical specifications of Mike's Duchesses are as follows;

10 mm scale, coal fired, choice of manual or radio control

Overall length (locomotive and tender) 30" approx.

Weight: 24 lbs approx.

Recommended minimum radius + 10 ft.

Cylinders: 2 outside cylinders of .593" dia x .920" stroke, pistons fitted with bronze piston rings

Valves: double ported piston valves with PTFE valve heads and bronze liners – 80% maximum cutoff

Valve gear: full Walschaerts valve gear, all machined from steel with hardened or bronze bushed joints. The manual loco has a lever reverser. The radio control loco has a servo acting directly onto the reverser shaft.

Lubricator: positive pressure displacement type

Wheels: all high quality lost wax grey iron castings mounted on hollow axels as per prototype

Suspension: compensated bogie, all other wheels individually sprung

Boiler: fire tube locomotive type, with 6 tubes of 3/8" dia and 1 superheater flue of 9/16" dia, wet back head and sides, hydrostatically tested to 200 psi. The grate area is 5 sq inches, fire bars are of stainless steel. One water gauge with blow down valve and pressure gauge. 100 psi maximum working pressure. Two pop type safety valves (plus 2 dummy safety valves). One non radiant super heater. Fiberglass wool insulation. Screw type regulator and screw type blower valve on backhead (radio control loco also has a disc type valve for regulator/blower and drain cock functions)

Drain cocks: steam operated piston type, mounted in between frames, operated by a disc valve on backhead for manual control model

Water feed: 6 mm axle feed pump and 3/8" dia hand pump in tender, bypass valve mounted on the backhead

Whistle: Resonator type, with deep "hooter" sound. Whistle valve on backhead

Working double blast chimney

Paint finish: Self etching primer with acrylic stove enamel top coats (some small areas are of cellulose). Lettering is by dry print decals (transfers). Lining is had applied in synthetic enamel. The loco is finished with an acrylic stove enamel clear coat

Coal: The locomotive is designed to burn a hard steam coal, i.e. Welsh steam coal or anthracite

Radio control equipment is by Futaba

Whistle: Resonator type, with a deep "hooter" sound

Whistle valve on back head

Working double blast chimney

Price and availability: Contact Mike Gregory at Pemberton Models 34 Cox Green Road, Bromley Cross, Bolton, Lancs., BL7 9HF UK

Ph # 011-44-1204-592258

Mike makes all parts in house except for the pressure gauge, handrail knobs, couplings and etched plates. The loco is supplied in a foam lined wooden box with the bottom machined thin on the ends which allows this heavy engine to be rolled directly onto the track and back into the box. Every model is bench and track tested before delivery to the customer. Operating notes and technical specifications are supplied, as is a tool packet with all necessary tools for firing and cleaning of the engine.

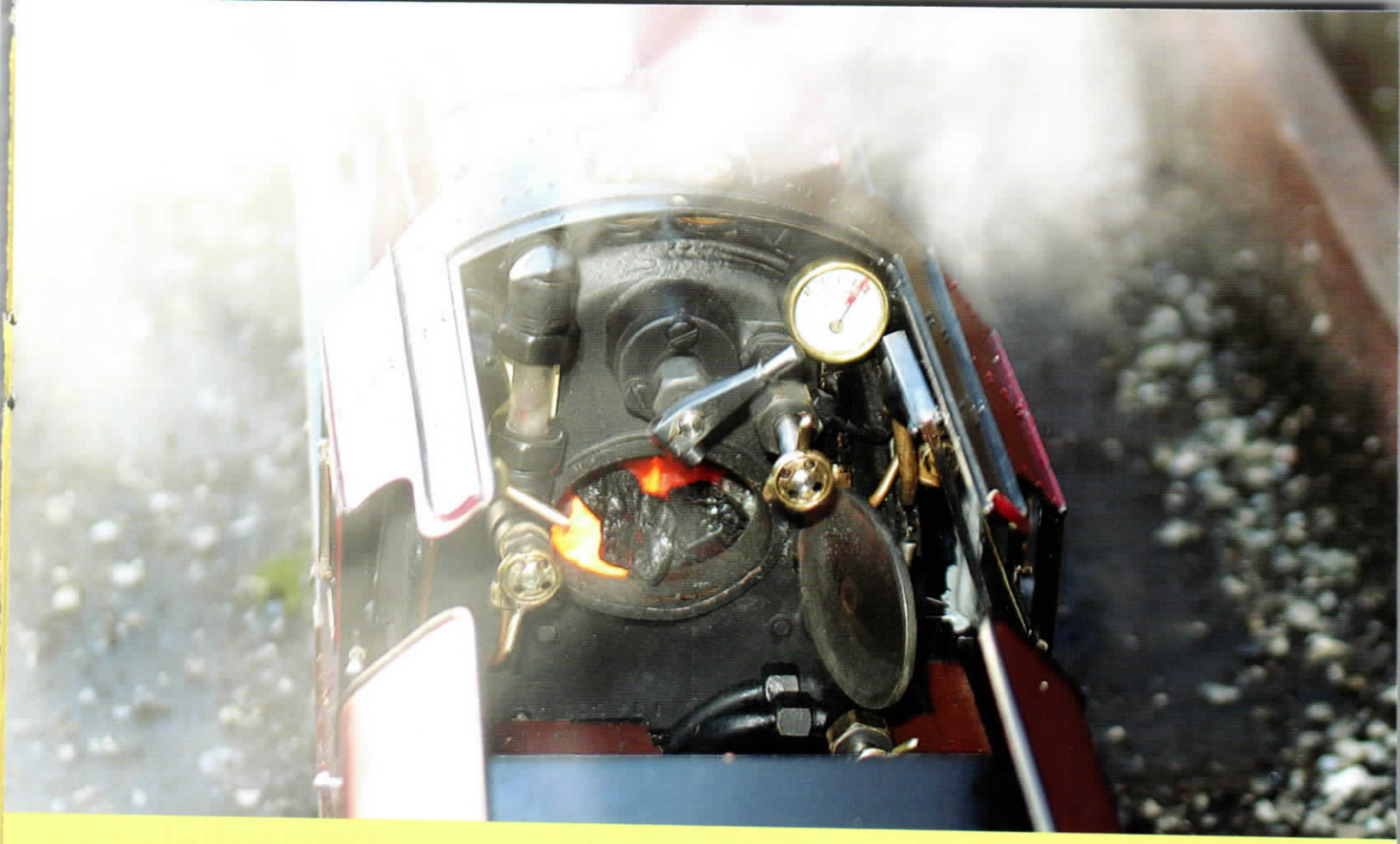
I decided to run the engine light for the first firing so that I could get to know the controls. After oiling around and filling the lubricator I brought the boiler to 3/4 glass with the tender hand pump. I then filled the firebox to the bottom of the fire hole with kerosene soaked charcoal, the last shovel full being alight. I added charcoal with the blower fan going until the pressure was at 40 psi, at which point I switched to the loco's own blower. From here on I started adding Welsh steam coal until I had a good deep bed of glowing coal and the engine was consistently blowing off at 100 psi, all the time keeping the glass at 3/4 full using the tender hand pump. Time to test the whistle. It sounds fantastic, and I'm sure it will make Larry Bangham smile.

It was time to pull the engine away so I made sure that the cylinder drain cock valve was closed which opens the cylinder drain cocks. I put the reverser in full forward, lowered the blower, made sure the bypass valve was closed and cracked open the regulator. The engine moved off with the cylinders cocks spitting steam and water. After a few feet the cylinders were cleared and I opened the cylinder cock valve on the back head, closing the cylinder drain cocks. I kept the blower valve slightly open to allow for light running and kept the site glass level at 3/4 full by adjusting the bypass valve. The locomotive ran flawlessly for an hour, stopping every five minutes or so to add coal, at which time I decided to let the fire die down and have a hand at cleanup.

Cleanup, as anyone with a coal fired engine knows, can be a real pain. Mike has made life a little easier by incorporating a few features designed to help with the disposal of ash and cinders. The entire smoke box front is removable leaving no lip to try and get ash over, making the sweeping out of the smoke box simple and giving access to the fire tubes for brushing out. The trailing truck can be removed with one spring clip and the ash pan and fire grate can be swung down by unscrewing a dump pin, allowing easy cleaning of both.

This is hands on live steaming at its best. The whole process from lighting up to cleaning up is a joy. My Pemberton ***Duchess of Sutherland*** leaves me with no complaints. Mike is rightly proud of the models he produces and has an ongoing program for improvement, my engine being the first with a whistle, stove enamel paint and improved piston valves. I look forward to many years of steaming with it.

These days you can certainly purchase a gauge one loco for much less than the cost of a Pemberton model, but there is something missing and it's the personal touch you can only get with a hand built model. So if you're after the ultimate in a gauge one live steam locomotives, give Mike a ring. Mike's model of the LMS Coronation Pacific is every inch a Duchess and is a true progeny of the original.




6233
DUCHESS OF SUTHERLAND
6233

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ARISTO CRAFT TRAINS

G 45 mm

#1 GAUGE

1:29 SCALE

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- **Goodall Valve available separately.**
- **Roadnames: ART84100 Undecorated**
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  ART84102 Santa Fe
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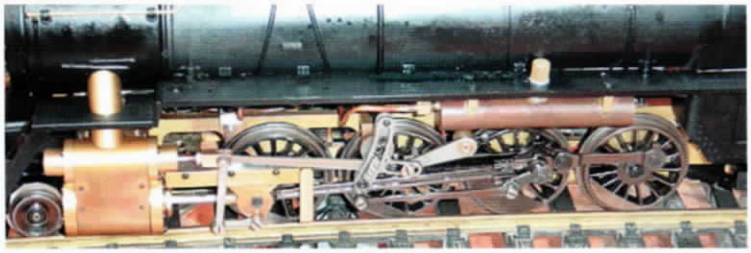
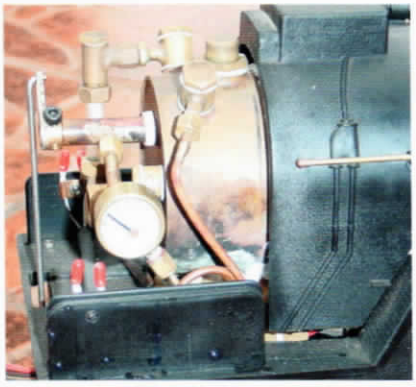
**Transmitter batteries not included





Photos are of Engineering Sample. Appearance of production model may differ. Cylinders, under frame & many other metal components will be blackened.

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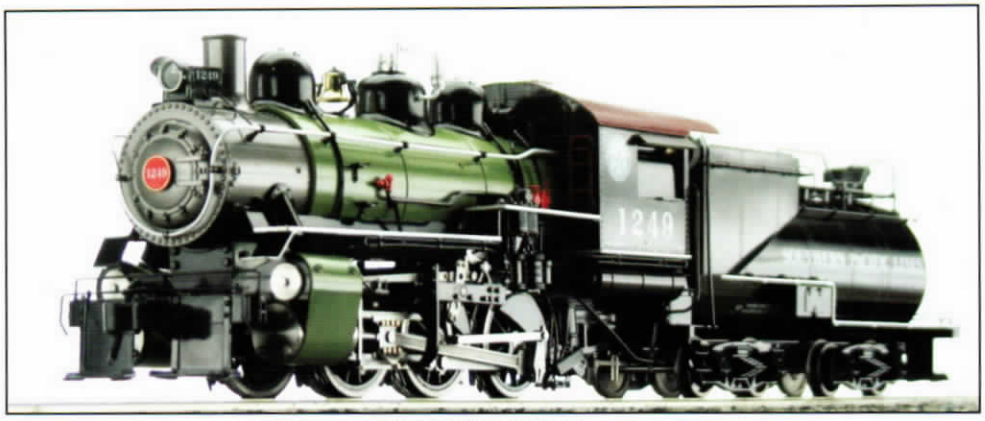

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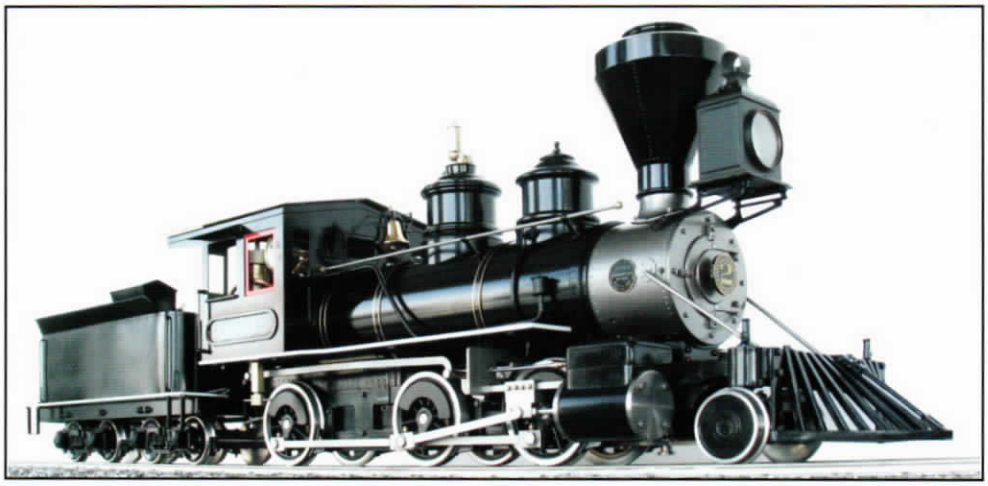

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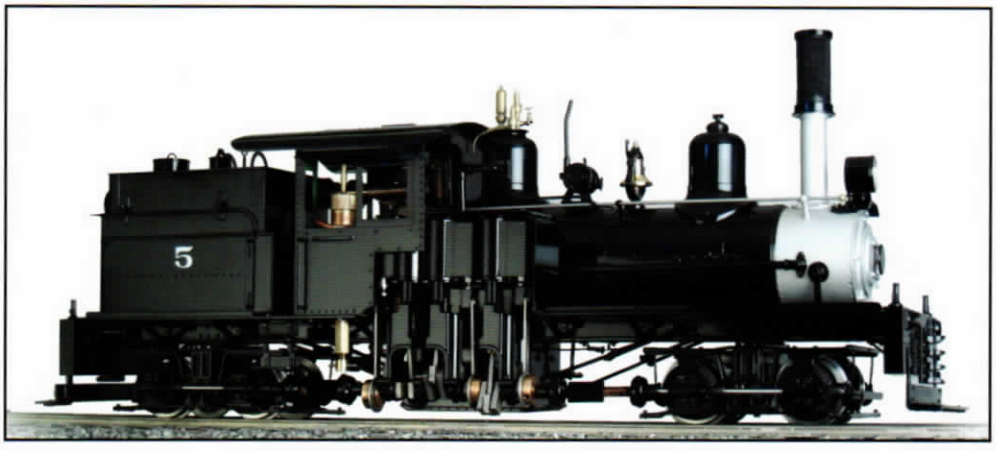

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Above: Pete Comley, Howard Freeth and Geoff Spencely (plus Tony Dixon) open the throttles on the Duchess parade.
photo by Mike Martin

Below: Shay lashup getting ready for the world record. **photo by Jim McDavid**

Sacramento 2005 - Duchesses and Shays

by Pete Comley

Hi-jinks at the National Summer Steamup

The National Summer Steamup was held for the 3rd time at the Lions Gate conference center in Sacramento on July 20-23rd, 2005. This event has been organized by the Pacific Coast Live Steamers group for the last few years, and so the event is now a well oiled, smoothly run machine. There are 5 sets of tracks to run on, including the main double track 12ft radius circuit.

I didn't take notes at the show, so yer scribe has to rely on memory. There were two great events that need to be recorded for posterity, the ***Duchess extravaganza*** and the ***World Record Shay Lashup.***

There were a number of British outline engines there, Panniers, Jim McDavid's and Tony Dixon's coal fired Britannias and the like, but the main show of strength were the 5 LMS Duchesses. Howard Freed, Geoff Spencely and Lynn Gaston brought their new Aster Duchesses, Tony Dixon had his Pemberton coal fired one, and I bought along my streamlined City of Lancaster. Over drinks on the second evening, we concocted a plan to have a grand parade of Duchesses. At the appointed hour we prepared the engines. As we all know, getting two or more engines to come up to pressure at the same time is a bit of a feat, but we did manage to get all five of them up and ready for the off. We had an assortment of 15 David Leech and P & G LMS coaches lined up, and so, with the City of Lancaster leading, everything was coupled together and off we went. It was certainly a grand sight to see 5 LMS mainline engines and 15 coaches at high speed around the track, and we had a great 30 minute run. Lots of fun!

Not to be outdone by this, the US contingent had planned an even more ambitious venture. After the barbeque on Saturday evening, the world record Shay lashup was attempted. Everyone with a Shay was cajoled into participation, I remember John Timonian complaining he had never run his before, but he was still press ganged into the roster. There was even a half built engine that was put on a flat bed car and declared a half-Shay. Eventually there were 22 1⁄2 Shays lined up around the track, lubed, oiled and watered. Sonny Wizelman assumed track marshal responsibilities and, armed with a microphone, got things in order. At his command "Gentlemen, light your engines!", there was a concerto of pops as flame was applied to burners.

If we thought getting 5 Duchesses ready at the same time was an achievement, try 22 engines. The early steamers were soon ready, but by the time the later ones got up pressure, the first ones were out of fuel, or water, or something, and Sonny was racing up and down the line helping out. The air conditioning struggled, the atmosphere grew murkier by the minute, the spectators were cheering and anticipation was rising. It was a full half hour before everybody's hands were raised signaling readiness, then they all had to be coupled up, with Gary White and Clark Lord leading the ensemble. Finally.... they're off! 20 feet later a coupling blew under the stress and the train stopped for repairs. A quick fix with a paper clip and off they went again. It's a funny sight you know, watching 22 grown men slow stepping in unison around the track, hunched over their engines.

Lap one was successfully completed, and to everyone's amazement, a second lap was accomplished. A new world record. What an achievement! Sonny declared that this record would never be broken, thereby inviting a challenge to do just that.

All in all a very enjoyable occasion, with all kinds of engines on the tracks, from a beautiful pink Ruby and matching train, to Larry Bangham's steam cleaning machine that did an excellent job of de-greasing the track, and the Accucraft GS4 Daylight that pulled 170 lbs of cars around for 40 minutes per run (so that means it can pull people too?) and a hundred more. It was a great opportunity to meet and b-s with old friends again, and together with Diamondhead, we are lucky to have these two excellent organized get-togethers to enjoy each year.

The straight boiler was used on all Shay classes 42 tons and less. A large straight boiler with a 59.75" waist was used for the 80-3 class on S/N 1612, S/N 1812, and S/N 1813. This same boiler was used for S/N 1651, a 100-3 class. The last straight boiler was S/N 3024 shipped 12/18/1918.

Wagon top boilers

The most popular style of locomotive boiler being built in 1880[1], when the first Shay was built, was the wagon top or locomotive type of boiler. (Figure 3) The straight boiler was a distant second place contender. The wagon top boiler was soon adopted for Shay service. The first known example was S/N 99 shipped on 12/28/1883. This type got its name because the top of the outer shell above the firebox, or wagon top sheet, is higher than the top of the waist, giving it a vague resemblance to a wagon top.

The extra space above the firebox in this design gives ample steam space for generating dry steam, even on a grade. The other reason that large steam space was desirable in locomotive boiler design was the use of bad water in some locations. Untreated water would cause undesirable foaming on the water surface that led to priming. The wagon type boilers had the steam dome placed above the firebox.

The main defect of the wagon top design is weakness. The extra high wagon top extends the flat section of the back head above the firebox. Long brace rods connect the back head to the waist, which also strengthen the weak angle joints of the upper connection sheet.

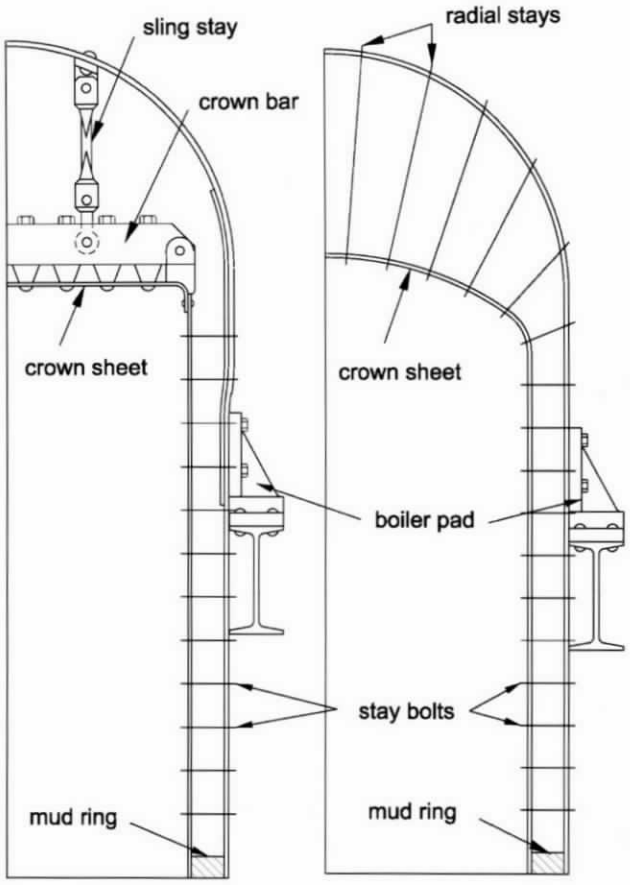


Figure 2 Crown Bar **Radial Stays**

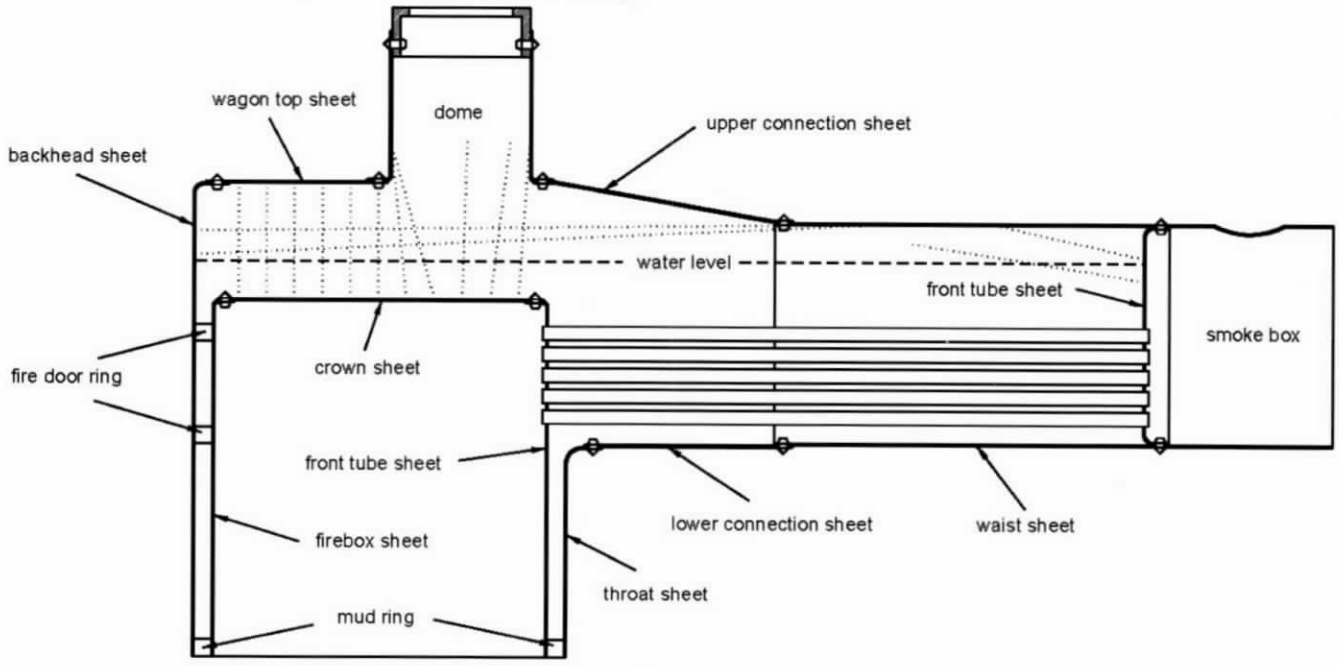


Figure 3 Wagon Top Boiler

Crown bars or girder bars shown in Figure 2 were used for support on flat crown sheet designs. These crown bars bridge the width of the firebox about every 4 ½ inches. The crown sheet is riveted to the crown bars on the same 4 ½ inch square grid to provide support for this critical area. The ends of crown bars rest on the upper edge of the inner firebox side sheet. Vertical sling stays are connected to angle brackets at the top are used to provide support for the crown sheet. The placement of the steam dome above the firebox left a large hole where no sling stays could be attached. The upper brackets for the sling stays in this section are riveted to the inside of the steam dome.

The wagon top boiler was a very popular boiler and was widely used until the 1920s. Wagon top boilers were used on all Shay classes up to and including the 100-3 class. The last Shay with a wagon top boiler was S/N 3073 shipped 4/6/1920.

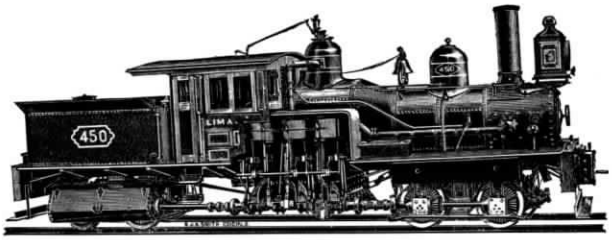
Extended wagon top boilers

The final type of boiler was the extended wagon top. (Figure 4) The first Shay to have an extended wagon top boiler was S/N 673 shipped 03/04/1902. This boiler type was used on all Shay classes from 1902 until the end of production. The extended wagon top boiler combines the best features of the wagon top and straight boilers.

The connection sheet is the same diameter as the wagon top, giving this section of the boiler the appearance and strength of a straight boiler. Figure 4 shows a small version of the extended wagon top boiler that has a single conical course for the waist. Larger versions of this boiler used two courses to form the waist.

The steam dome is placed forward of the firebox allowing the use of a simpler system of radial stays (Figure 2) to support the crown sheet from the wagon top. The complex system of crown bars and vertical sling stays is not needed, saving weight and internal boiler maintenance cost. An extended wagon top boiler has the maximum steam generating space. These improvements made the extended wagon top the most frequently used boiler type. The last Shay with an extended wagon top boiler was S/N 3354 shipped 05/14/1945.

[1]White, John H. "American Locomotives" revised edition pg. 198 (1997)



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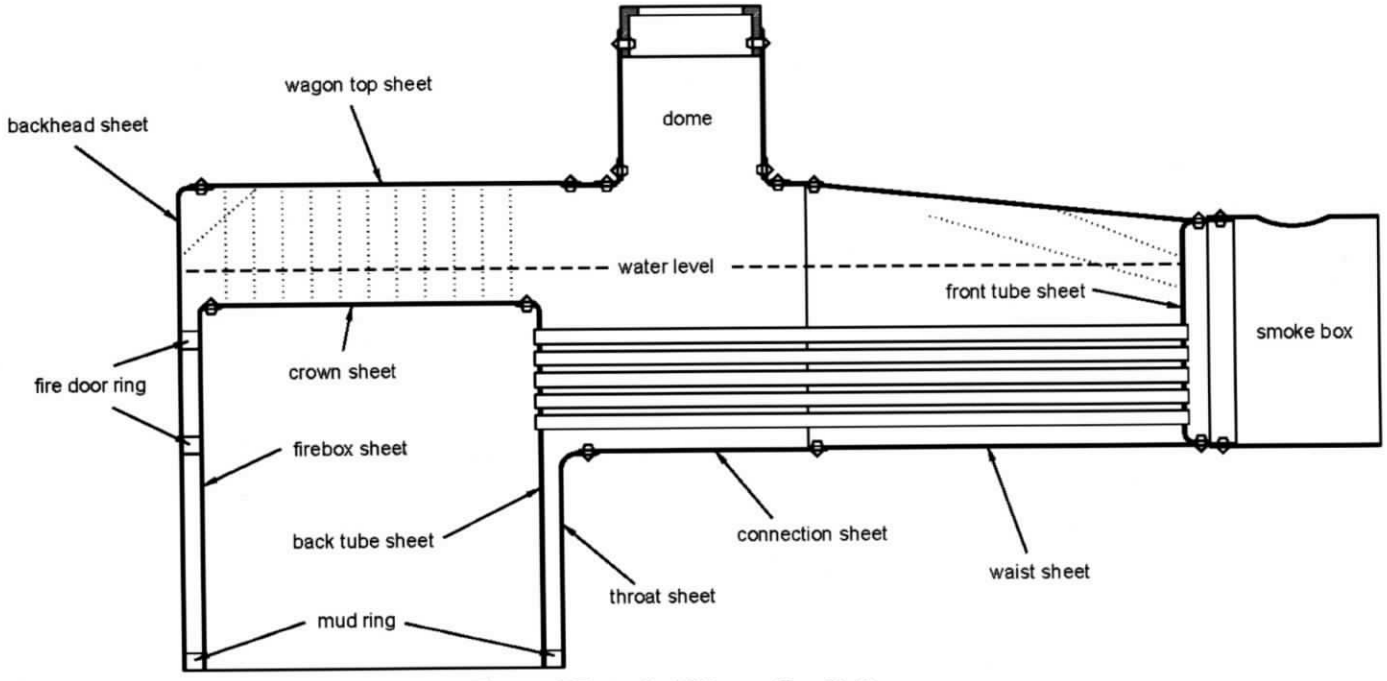


Figure 4 Extended Wagon Top Boiler

The Nuts and Bolts of Shays Boilers, Part 2: Rectangular Fireboxes

By Dan Rowe

The last issue covered the vertical and boot boiler which both have a circular firebox. The three other types, straight, wagon top, and extended wagon top all have rectangular fireboxes. The names describe the upper edge of a side view of these three boiler forms. The grate area of a rectangular firebox is maximized to the width of the frame, and all the grate bars can be made the same length. This is the main advantage of a rectangular firebox; it has more grate surface than a round firebox, for the same width frame, and can be made larger by increasing the length.

Straight boilers

The first straight boiler locomotive built by Lima was S/N 3, a 0-6-0T rod engine that went to James Alley. The first known Shay to get a straight boiler was S/N 50 in 1882. The early straight boilers used on Shays had the steam dome above the firebox. The final form of this boiler had the steam dome placed forward of the firebox. (Figure 1) Brace rods and stays are shown as dotted lines.

The advantage of the straight boiler is it is the simplest form of rectangular-firebox boilers. The cylindrical horizontal section known as the waist has the same diameter as the top sheet. This gives this type of boiler a straight top and its name. The top sheet and the crown sheet follow essentially parallel planes. They are both semicircular on the top and form the inner and outer sides of the firebox.

The disadvantage of a straight boiler, as compared with other types, is a small steam space above the water level for collecting dry steam. This is a big disadvantage on a steep grade because extra water must be carried to keep the crown sheet covered. Carrying high water reduces the already small steam space, causing water to carry over to the engine. This situation, known as priming, causes reduced engine power because wet steam does not expand as much as dry steam and it washes away lubricating oil. In extreme cases, the volume of water is greater than the cylinder clearance space at top or bottom dead center. Water is not compressible so excessive priming can result in severe engine damage, breaking the cylinder heads or pistons.

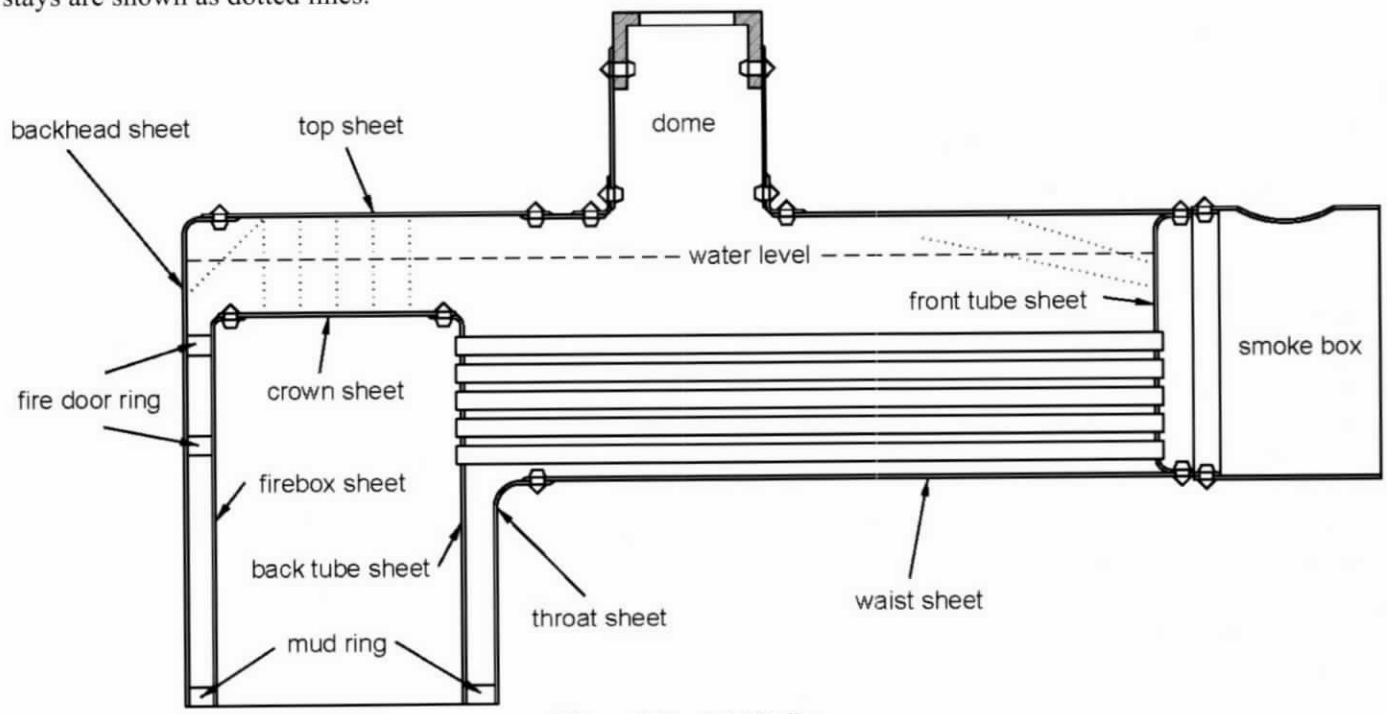


Figure 1 Straight Boiler

The straight boiler was used on all Shay classes 42 tons and less. A large straight boiler with a 59.75" waist was used for the 80-3 class on S/N 1612, S/N 1812, and S/N 1813. This same boiler was used for S/N 1651, a 100-3 class. The last straight boiler was S/N 3024 shipped 12/18/1918.

Wagon top boilers

The most popular style of locomotive boiler being built in 1880[1], when the first Shay was built, was the wagon top or locomotive type of boiler. (Figure 3) The straight boiler was a distant second place contender. The wagon top boiler was soon adopted for Shay service. The first known example was S/N 99 shipped on 12/28/1883. This type got its name because the top of the outer shell above the firebox, or wagon top sheet, is higher than the top of the waist, giving it a vague resemblance to a wagon top.

The extra space above the firebox in this design gives ample steam space for generating dry steam, even on a grade. The other reason that large steam space was desirable in locomotive boiler design was the use of bad water in some locations. Untreated water would cause undesirable foaming on the water surface that led to priming. The wagon type boilers had the steam dome placed above the firebox.

The main defect of the wagon top design is weakness. The extra high wagon top extends the flat section of the back head above the firebox. Long brace rods connect the back head to the waist, which also strengthen the weak angle joints of the upper connection sheet.

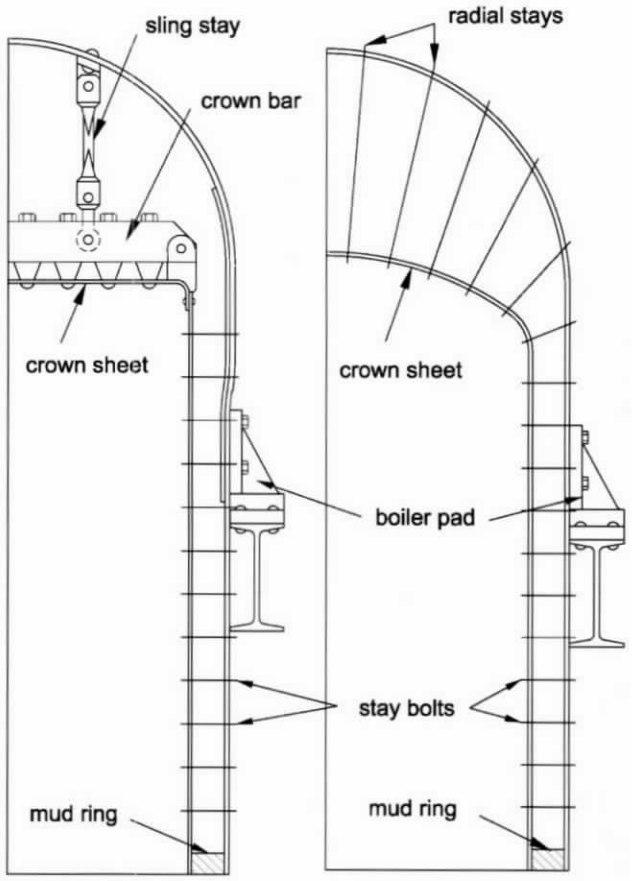


Figure 2 Crown Bar **Radial Stays**

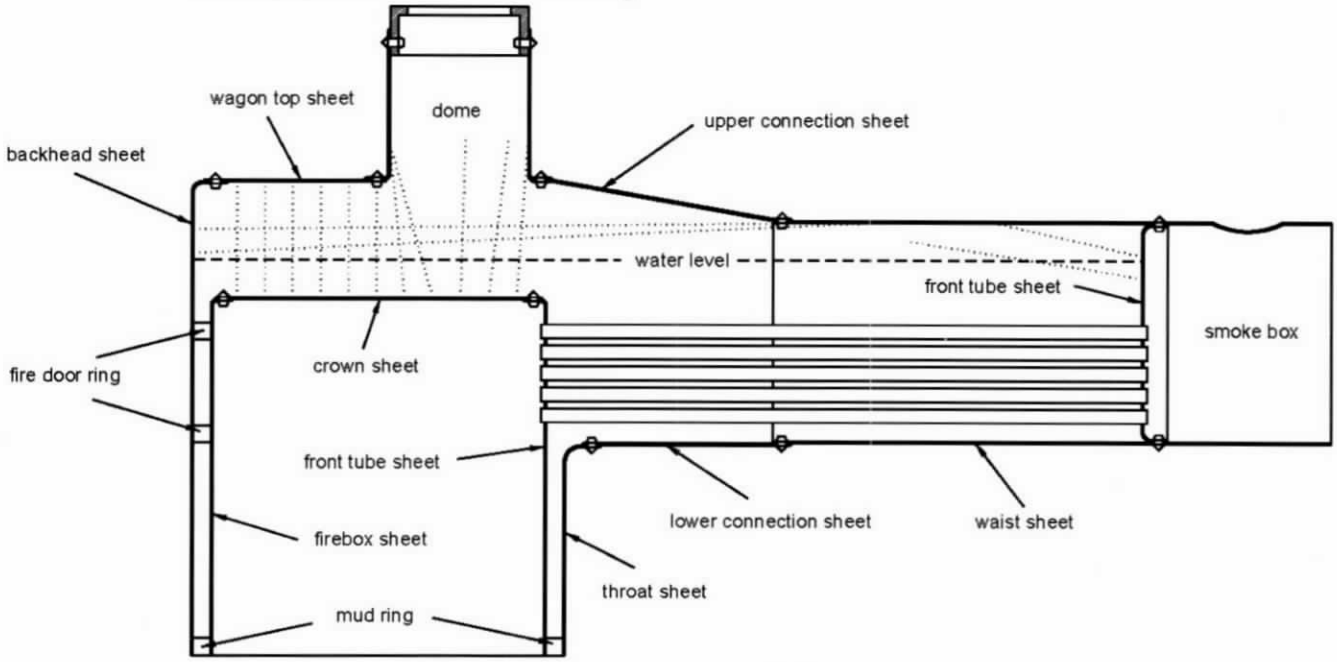


Figure 3 Wagon Top Boiler

Valve Gear - Part I

text and drawings by Charles McCullough

The term "VALVE GEAR" is the name applied to the mechanism that controls the valve that governs the application of steam into a cylinder to push a piston to the other end of the cylinder. To be useful for locomotion, there needs to be some method of getting the piston back to the starting position. This can be done by linking the piston to a flywheel to use the inertia of the flywheel to push the piston back, or by applying steam pressure to the other end of the cylinder (the latter is known as a "double-acting cylinder", whereas the former is known as a "single-acting cylinder"). Of course, there needs to be a method to exhaust the end of the cylinder that the piston is moving toward. The valve gear mechanism is what controls the sequence of applying steam to move the piston one way, then cutting the steam off and allowing the steam pressure to be exhausted as the piston moves the other way.

The valve gear can be as simple as valves operated by a human hand, or something very complicated, including a sprocketed, multi-lobed crankshaft moving many different valves in some particular sequence.

To understand 'Valve Gear' you need to have some knowledge of the valve it is to control, but to understand the valve you need to understand why it needs to do what it does.

I shall endeavour in this series of articles to present enough basics to bring the novice to the point of understanding the steam powered engine such that they can diagnose valve problems and, if necessary, adjust the valves for correct operation. I do not intend to make the reader into a valve gear design engineer, nor do I intend to cover the dozens of variations and enhancements that exist in the world of steam power. There is a whole lot more to the design considerations of valve gear than could possibly be included in a short series of articles in a magazine. I hope that a good grasp of the basics will enable the reader to understand the valve gear they have at hand with their own engine(s).

First, let's use four bathroom-faucet-like valves to control the flow of steam to make a piston cause a wheel to rotate. Assume the power piston is midway between the ends of a cylinder and the wheel it is attached to is positioned such that the drive pin is at the bottom of its rotational positions (See Figure 1).

If we apply steam pressure to one end of the cylinder (and open the other end to allow the contents to exhaust) the piston will move off center and cause the wheel to rotate. In Figure 1, the steam inlet valve on the left (rear of the cylinder) is closed and the exhaust valve is open, the steam inlet valve on the right (front of the cylinder) is open and the exhaust valve is closed... in this condition, the wheel will rotate clockwise one quarter of a revolution from the original position. The wheel may overshoot this, due to inertia, but if the valves are not changed (and the pressure is high enough to overcome any friction) the wheel will reverse direction and return to the 1/4 turn position (and maybe overshoot it again, but will eventually come to rest 1/4 turn from the original position). A 76-inch diameter wheel would roll about 5 feet.

If, at the moment of the first overshoot, you changed the valves such as to exhaust the pressure from the end it was just applied to and apply the steam to the other end, the wheel would continue to turn in the same direction until it had turned three quarters of a revolution (having now rolled about 15 ft.). Again, it would probably overshoot that position and you could re-apply the pressure to the first end, exhaust the other end, and get the wheel to continue past the original position (at about 20 ft.) and proceed to the quarter position again (and will have rolled about 25 ft.). And, if you kept this up for a few revolutions of the wheel, you'd have some really sore wrists from twisting all those faucet handles!

Unless you were uniform in timing the changing of the valves, you could get a very jerky ride. If you were too slow to change the valves, you might catch the wheel on the second overshoot and the wheel would reverse direction! A couple of things can be done to preclude these things. You could make a bigger flywheel, or increase the weight of the locomotive to provide a higher inertia to increase the overshoots.

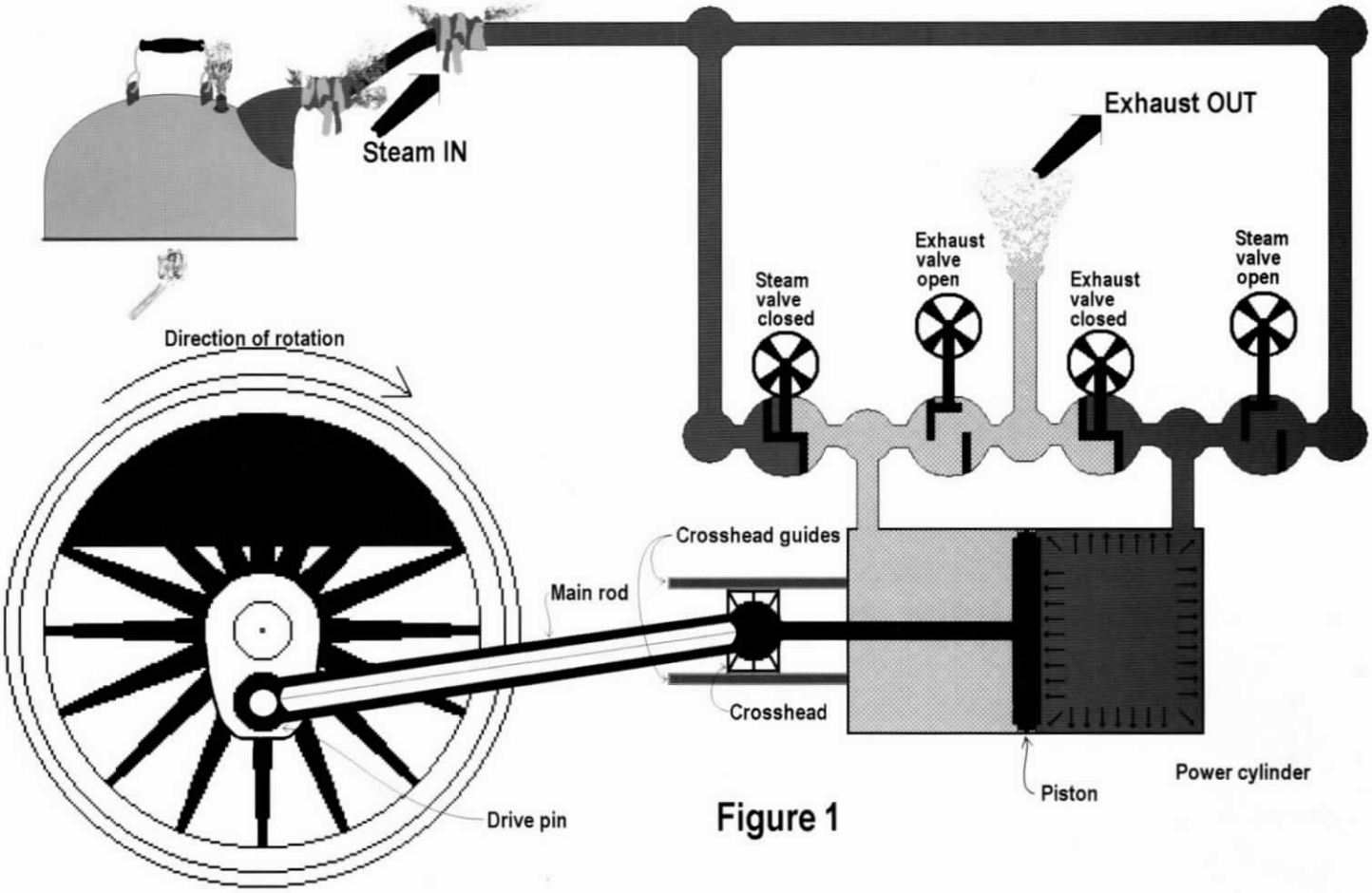


Figure 1

Another is to provide a second power cylinder that is positioned such that it is in the middle of its power stroke when the first cylinder is at the end of its (and the first cylinder will be in the middle of the power stroke when the second one is at the end). See Figure 2. The two cylinders complement each other to keep the wheels moving uniformly in one direction. But, that adds four more valve handles to twist and I doubt if I could remember which handle to turn next.

The best thing you can do, though, is to get the unreliable human hand out of it and connect the valves to the wheel in some manner such as to make the valves automatically change at just the right moments.

Just when are those "right moments"? From my description so far, one would suppose the timing to be; exhaust one end and apply the steam to the other when the piston has just passed being at the end of the stroke. For a single cylinder with little inertia in the system, this is close. With even just a small amount of inertia, or with a second power cylinder providing power, all the events: Admittance of steam, cutoff of the steam, exhausting the used steam and the compression that occurs when the exhaust gets closed, can occur earlier in the cycle. Yes, once the engine is running and has some inertia, even the admittance of steam can occur BEFORE the piston has reached the end of the stroke!

Let's assume a diagram showing one drive wheel with the power cylinder on the right and the piston fully to the left (closest to the wheel) and call that zero degrees (0°) (similar to Figure 1, but 1/4 turn clockwise). Forward motion of the wheel is clockwise rotation. Admission of steam should start into the left (rear) end of the cylinder at around 0°.

Depending on the amount of power required from the engine, steam needs to remain applied to the cylinder for some number of degrees of rotation of the wheel, but obviously less than 180°. The cutoff point is usually specified as the percent of the piston stroke. This is usually around 80%, or about 127° of rotation. From that point, until the exhaust opens, the steam trapped in the cylinder continues to push the piston, and this is known as the "Expansion" phase.

The exhaust needs to open anytime after the steam is cut off, but at least by 180° of rotation, and it needs to remain open for most of the return stroke. The closing of the exhaust begins the "Compression"

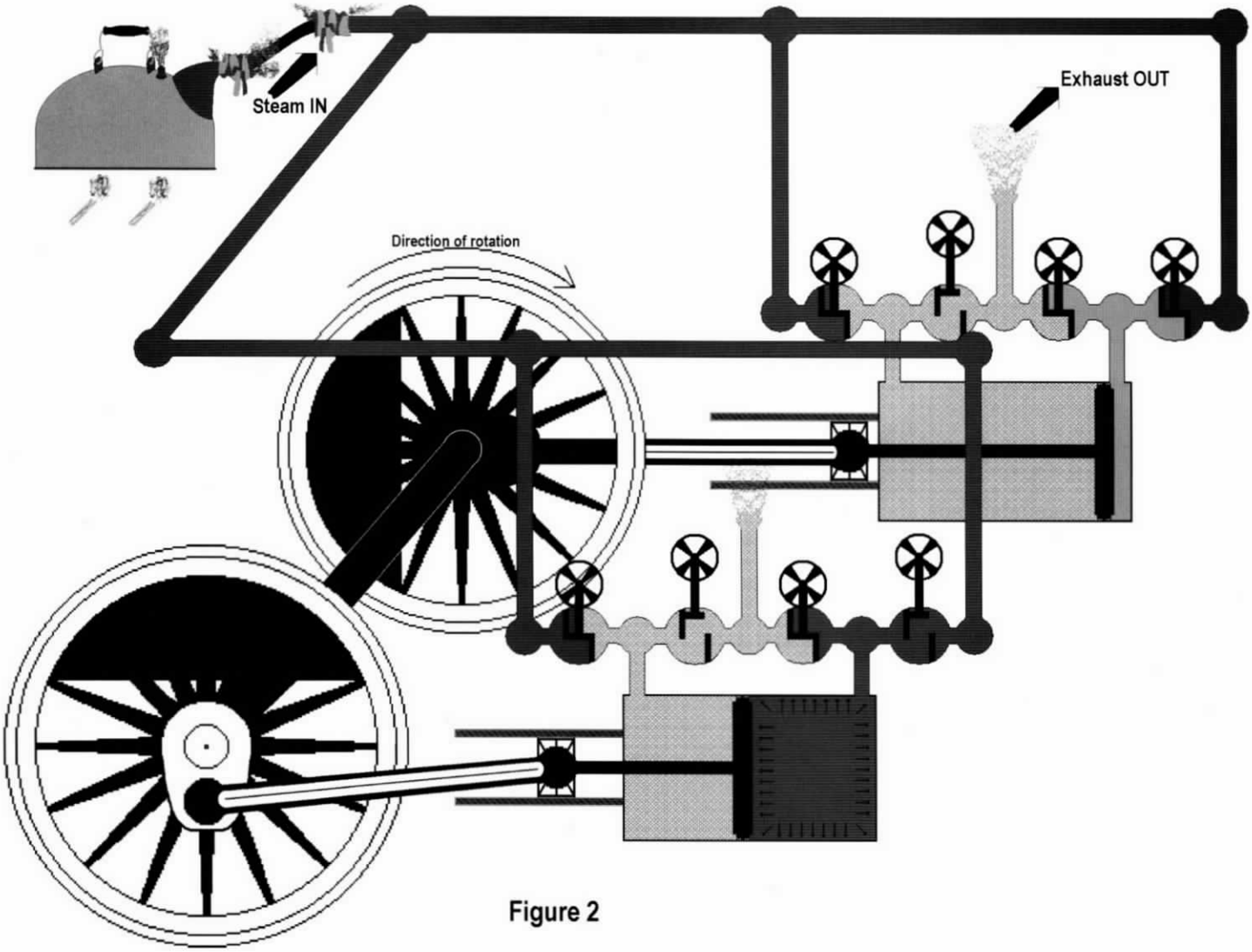


Figure 2

phase. The exhaust must close before admittance of steam occurs again or you will lose steam directly out the exhaust.

In a double acting cylinder, the other end of the cylinder is going through the exact same sequence of events, but offset by 180°. Opening of the exhaust on one end of the cylinder usually comes close to coinciding with closing the exhaust on the other end.

In a two-cylinder engine, the two ends of the other cylinder are going through the same sequence, but offset by 90° & 270°. (If there were three cylinders, one would be offset by 60° & 240° and the other by 120° & 300°.)

See Figure 3 for a diagram of the angular positions of one wheel for the sequences of the four ends of a two-cylinder engine at 80% cutoff. Clockwise from "Admittance" to "Cutoff" the valve is open to connect the steam from the boiler to the cylinder. Then from "Cutoff" to "Exhaust", the valve is closed and the steam expands, still pushing the piston. Then at "Exhaust", the valve opens to allow the trapped steam to leave the cylinder as the piston returns toward the starting position, where the exhaust valve closes and a short "Compression" phase begins in preparation for the next "Admittance" phase. (The black spot in the circles is the drive pin location in Figure 1.) Note in the upper two diagrams that when one end of the cylinder is in the exhaust portion, the opposite end is in the power portion. Also, consider all four diagrams and note that when the piston in one cylinder is at one end of its stroke, the other pistonr is in the middle of a power stroke.

There is one point of ambiguity in Figure 3 that needs attention: If we assume that the upper left circle represents the sequence for the rear portion of the right side cylinder of an engine, then the upper right circle represents the front portion of the same cylinder. The lower two circles represent the other cylinder, but whether the left and right circles represent the rear and front portion of the cylinder, respectively, depends on whether the left side of the locomotive leads the right or lags behind. As drawn, the lower set of circles indicates that the left side of the engine lags behind the right side (right side leads). If you have an engine where the left side leads, then reverse the positions of the lower two circles. Also, another point of confusion;

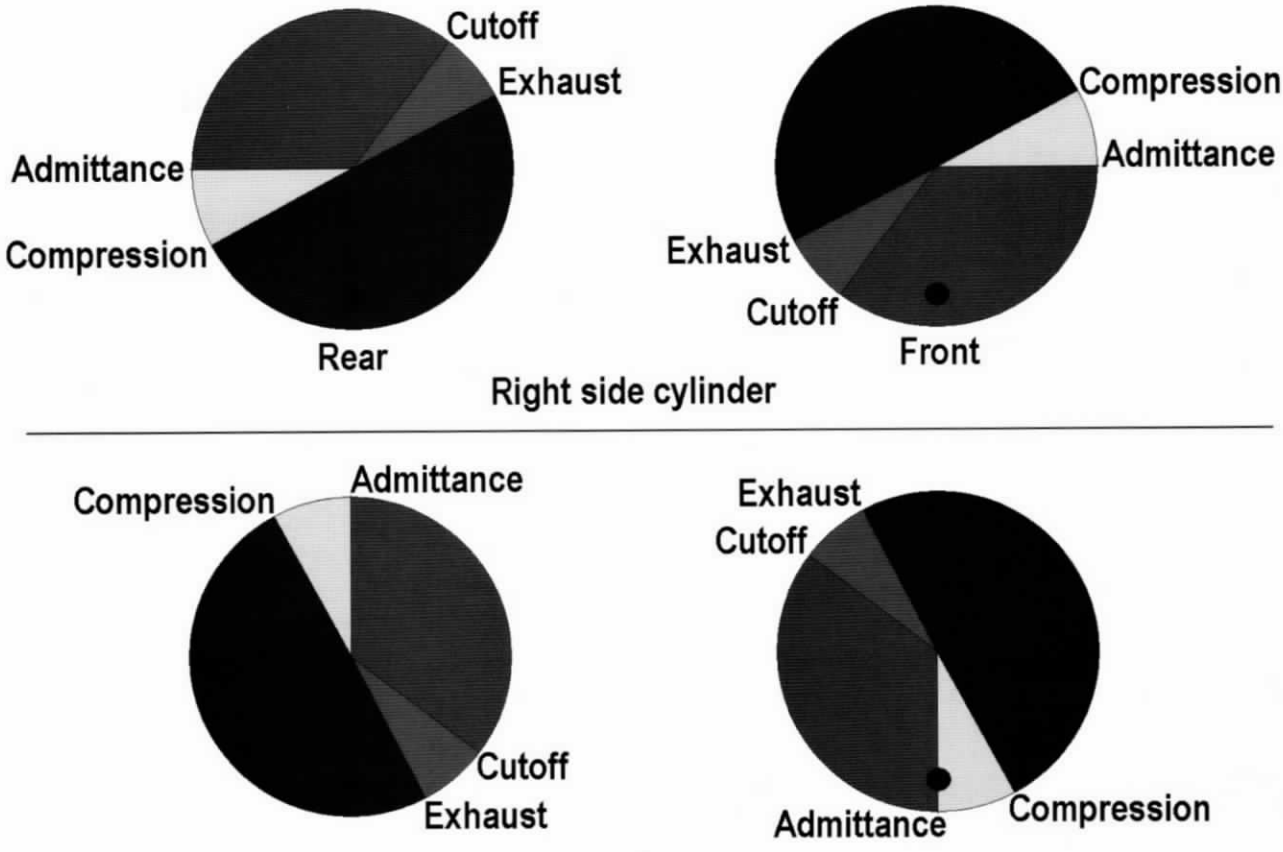


Figure 3

the lower circles represent the sequence of events of the cylinder on the opposite side of the engine but viewing the same wheel as the upper two circles.

I use Figure 3 to help diagnose timing problems. One of my engines sometimes had only three chuffs per revolution of the wheels. By putting the locomotive in full forward gear and using my (gloved!) hand to apply a load such that the wheels could not slip and I could control the forward motion of the engine, then I could tell which cylinder was not producing an exhaust chuff as I let the locomotive roll forward. I then had to disassemble only half of the loco to get to the problem.

Each end of a cylinder provides power to turn the wheel for less than one-half of a revolution. That power portion is divided into two sections; Admission and Expansion. Admission is from Admittance to Cutoff, and Expansion is from Cutoff to Exhaust. All during the Admission period, the pressure of the boiler is applied to the piston. Because of the relative sizes of the boiler and the cylinder, any loss in pressure in the boiler (as the steam fills the cylinder) is replenished by the fire immediately. At the point of cutoff, the steam trapped in the cylinder is at the same pressure as the boiler and continues to press against the piston. As the piston moves, the volume of that end of the cylinder rapidly gets larger and the pressure in the cylinder drops rather dramatically, but is still a force against the piston and performing work to move it. The longer the steam port is open to allow steam into the cylinder, the less time is left for that steam to expand in the cylinder before the pressure is lost out the exhaust. The less time the steam port is open, the less steam is used, which means less water needs to be boiled which means less fuel is used... management and the stockholders of the RR just love that! But I'm getting ahead of myself.

Next issue we will get rid of the bathroom faucet valves in Figure 1 and see what is really used. Also... I'll point out an error in Figure 1... anybody know what it is?

Semper Vaporo

Steaming at the 2005 "American Invasion"

by Doug Matheson
photos by Roger Caiazza

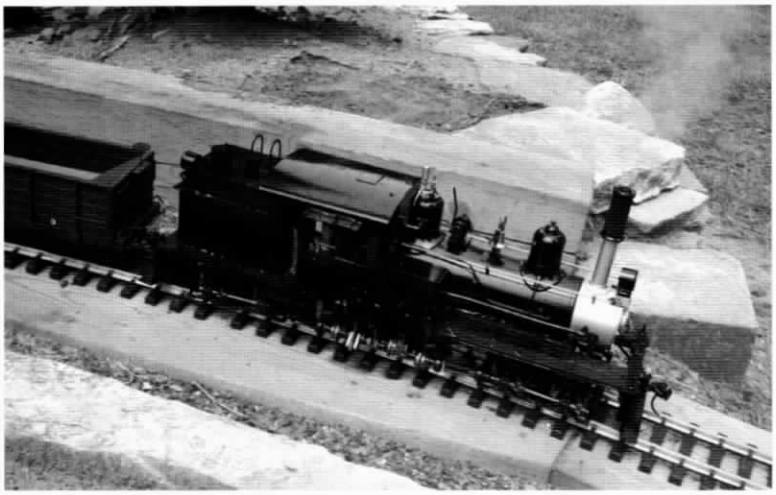
Running a railroad in Ottawa

Four years ago, Ken Brunt, a large scale modeler from the Philadelphia area, came to visit with us here in Ottawa. Ken enjoyed himself and spread the word. Each year since the group of visiting Americans has grown. Beginning in the second year, the visit has become affectionately known as ***The American Invasion.*** The American Invasion has blossomed into an annual weekend event hosted in Ottawa by the Ottawa Valley Garden Railway Society (www.ovgrs.org). This year some 16 guests from 5 states made the journey to Ottawa to enjoy the weekend's activities. For the first time, live steam also put in an appearance.

The normal activities for the American Invasion include a formal operating session. During this session, two-man crews operate trains forwarding freight cars as per computer generated manifests and train movements are controlled by a dispatcher. A more complete description of one of these operating sessions can be found at the conclusion of this article.

Last fall, during a steamup held by the Upstate NY Live Steamers, the prospect of holding a Jack Verducci inspired operating session with live steam was discussed. The live steamers present thought it

A group shot of the participants in the formal operation on Saturday morning.



Above and below right: Doug Matheson's Accucraft Shay with Roger Caiazza in the engineer's seat steams toward Blue Mountain mine with a cut of ore jennies.

would be a fun challenge, and thus the live steam participation with the sparkies at the American Invasion was born.

The host railroad, the Ironwood Peter's Pond and Western is the home railroad of well known large scale railroader Fred Mills. Fred is the Godfather of the OVGRS and his railroad serves as the club home for the Society. The railroad is not designed for live steam – it has a point to point trackplan with a little over 800 feet of mainline and, more importantly, it has a hill and dale grade profile that would be a real test of any live steam equipment. The trackage is, however, laid out so that accessibility to the locomotives is almost always within arms reach.

Friday afternoon, July 15, Tom Bowdler, Roger Caiazza, John Spencer and I met at the IPP&W to test our locomotives to gauge their capabilities for Saturday's planned operating session. Tom's Accucraft C-16, John's Pearse Colorado and Roger's Pearse Nevada are all radio controlled, while I operated my manually controlled Accucraft 3-cylinder Shay. The tests demonstrated that the locomotives were up to the task of moving the assigned tonnage, but also revealed the importance to an engineer of knowing the railroad.

Saturday, for the formal operation, 23 operators were busy manning 3 yard switchers and 9 mainline trains. Three of those mainline trains were steam powered. Tom's C-16 headed Train #1, The Pond Express; John's Pearse Colorado had train #11, a passenger local on the drawbar; while Roger was the engineer on my Shay with an ore drag. Each of the passenger trains had some switching to do to wye the train for the reverse trip, while the ore train had considerable switching on its route. There was also the usual challenge of getting through the heavy traffic on the IPP&W single track main. Dispatcher Peter Bramah, himself a 3.5 inch gauge live steamer, did his best to keep the steam powered trains moving.

Below: John Spencer's Pearse Colorado during Friday's trials to determine locomotive capabilities.

The operation was very successful with steam showing what it could do. Tom had been a bit skeptical at the outset but ended by say-

Above: Tom Bowdler's Accucraft C-16 with the Pond Express heads into Ironwood.

ing that he wanted a more challenging assignment next time. In the post mortem discussion a number of points came out that are useful in considering for anyone who would participate in a session like this with a steam locomotive.

1) A reasonable run time is essential. Water can be added easily with a Goodall valve but having enough fuel for a run is important. Getting over the IPP&W main for a freight train can take as much as 2 hours with switching assignments, so refueling stops should be minimized. An hour's runtime from a tankful of fuel, although not essential, is a good benchmark. The Accucraft 3-cylinder Shay is well known for its short run time, so I modified mine – these changes are outlined in the closing paragraphs.

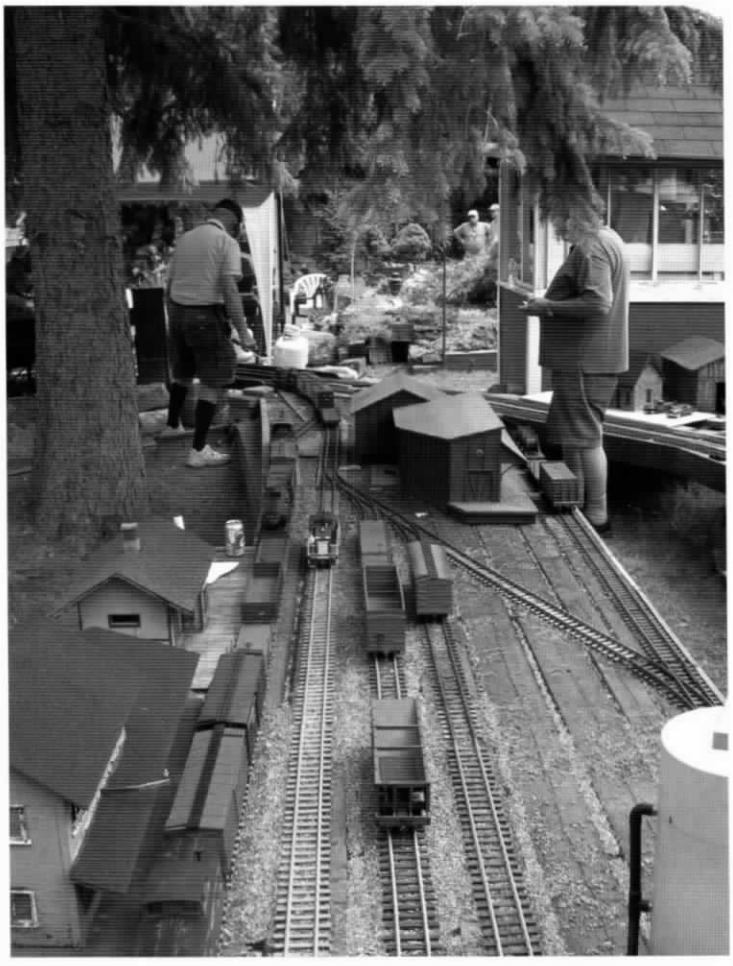
2) The locomotive must be well controlled, especially on grades and for switching. The control issue has two aspects. One of these is the ability to slow the loco on a downgrade or to add more steam going up. The R/C gear, once tweaked, seemed to do quite nicely. The second aspect is low speed performance. It is difficult to conduct both switching and backing movements if the loco will not run at a scale speed. Tom had no trouble with his Accucraft C-16 and John and Roger found the Pearse locomotives only slightly more challenging.

3) The locomotive has to have sufficient tractive effort to move the freight on the grades. The C-16 has a very heavy tender for example, which diminishes its pulling capacity significantly. But even so, the locos that were on hand all were powerful enough to move the short trains typically run on the IPP&W over the grades involved.

4) Most importantly, the operation is also a test of the engineer. He needs to understand the capabilities of his charge and as well have knowledge of the railroad. The IPP&W has a ruling grade westbound of a relatively short 3% climb uncompensated for a semicircle of 4 foot radius track. We were worried about this grade and the engineers prepared for it. We did not fully realize that later in the westbound run came the real test – an 80 foot long grade at a steady 2%. A locomotive that started the climb without enough boiler pressure could stall on the hill.

It was a grand event, steam and sparky power sharing the honours, great food and great people.

Below: A general view of the yard at Glen Hammond with the dispatcher cabin in the background at the right.

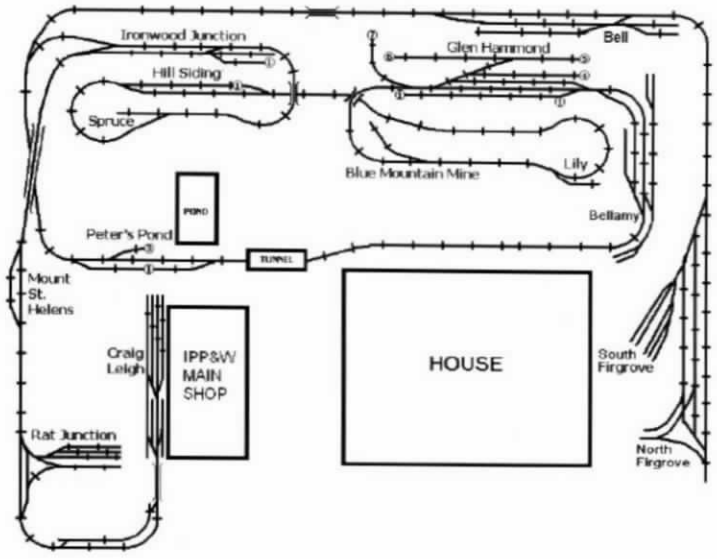


A cut of cars waits on a siding for the arrival of the local freight.

Host Fred Mills (center) explains the rules of the road to John Spencer (left) and Tom Bowdler.

Doug Matheson leans in to make an adjustment as his train passes another waiting on a siding.

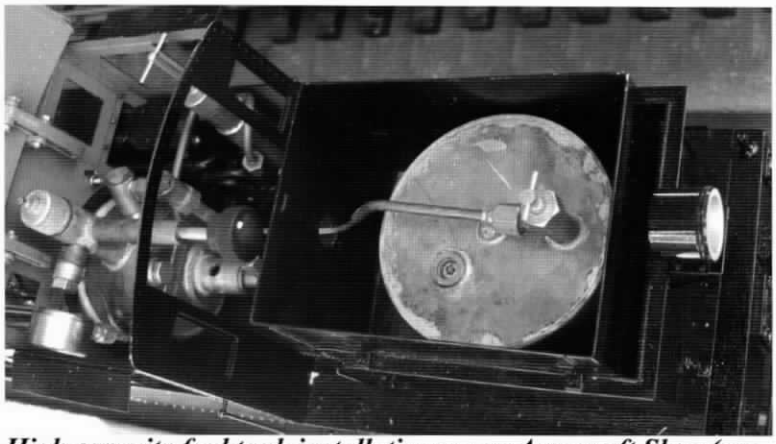
From the participants' comments, steam will return to next year's Invasion.



An Operating Session on the IPP&W

The IPP&W hosts a weekly operating session each Saturday morning. Typically about 15 operators are on hand to man the mainline, yard and dispatcher assignments. The railroad was specifically designed and built for this style of operation – the trackplan is point to point (see the schematic), trains are accessible to the crews that walk with their trains and control has traditionally been battery R/C with manually thrown switches. Kadee couplers are universally used.

The operating sessions feature a variety of train movements. Yard crews are assigned to the two largest yards; the mainline trains are a mix of through freight, way freight and drags and both express and local passenger service are also included. All trains have specific work to do which is contained on a computer generated manifest. The IPP&W began using the RailOp software (www.railop.com) this year and it has been very successful.



High capacity fuel tank installation on an Accucraft Shay (see text for details) extends running time.

All trains operate as extras – we do not use a fast clock nor a timetable. Train movements are controlled by a dispatcher who accords priority to higher class trains. Dispatching is by track warrant or its 19th century equivalent, manual blocks. Train crews communicate with the dispatcher by hand held radio, essentially seeking clearance to occupy a portion of the single track main. The dispatcher gives or denies the clearance and establishes the meets as the trains move.

During the operating session at the American Invasion, a total of 9 mainline trains were simultaneously run, switching more than 100 cars during the session.

Modifications to an Accucraft 3 Cylinder Shay

The Accucraft 3 cylinder Shay has the reputation of being a nicely detailed, smooth running and powerful locomotive. It also has earned the distinction of having a short run time. The designers at Accucraft must have known its appetite for water as the stock loco comes with a tender mounted hand pump. But the loco has an appetite for fuel as well.

My initial tests showed that on the bench with a low fire, I could get 22 plus minutes from a tank of the 70/30 butane propane mix that is commonly used in our cold weather climate. Out on the railroad with a string of ore jennies in tow up those steep grades, 18 minutes was the longest run I ever achieved and shorter was the norm. To successfully run the Shay in the operations environment of the IPP&W, a longer run time was essential.

Consultations with the folks on the Steam Forum at MyLargeScale.com (www.mylargescale.com), especially Dave Hottmann and Dwight Ennis, gave me a number of ideas. Further discussions with experienced steamers Tom Bowdler and Charles Bednarik crystallized what I wanted to do.

The hand pump in the tender was removed and the tender filled with the largest fuel tank possible. The lubricator needed to be enlarged as well to compensate for the increased runtime. Lastly, a Goodall valve using the quick-connects was installed. Since I did not want to practice silver soldering on a pressurized fuel tank, I asked Norm Saley to do the in-

stallation of a tank 5.5 times the size of the original Accucraft tank. He did a superb job on both the fuel tank and the lubricator.

The Shay now more than meets my expectations. A tank of 70/30 mix lasts from 1.5 to 2.5 hours, depending on the load and grades and waiting times on sidings. During that time, the Shay is an absolutely voracious consumer of water. It uses, with an average fire that keeps pressure about 25-30 pounds, at least 10 ml of water per minute. I try to add 50 ml or more every 5 minutes when I am running so that the steam pressure is not lowered too much at the water stop. During the two hour run, I keep the big jug of distilled water handy!

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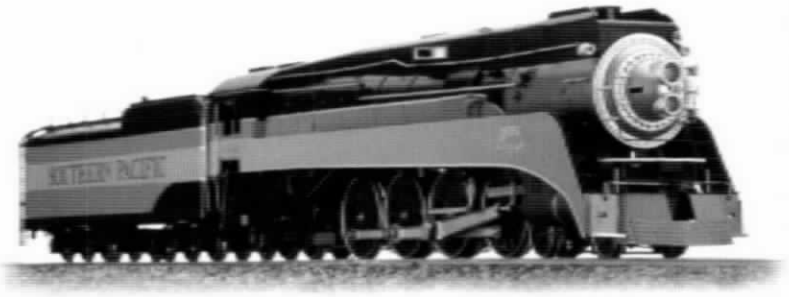

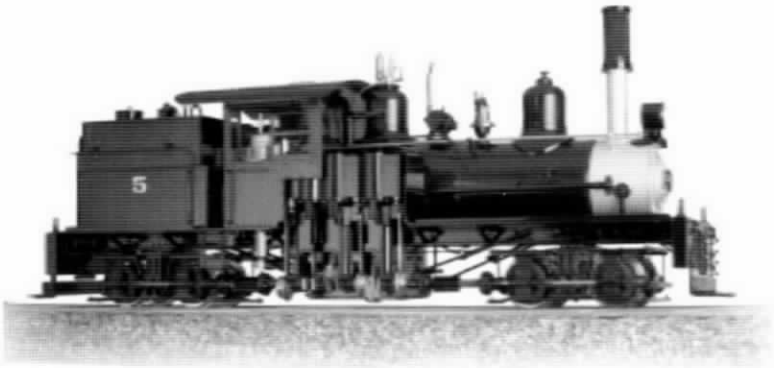

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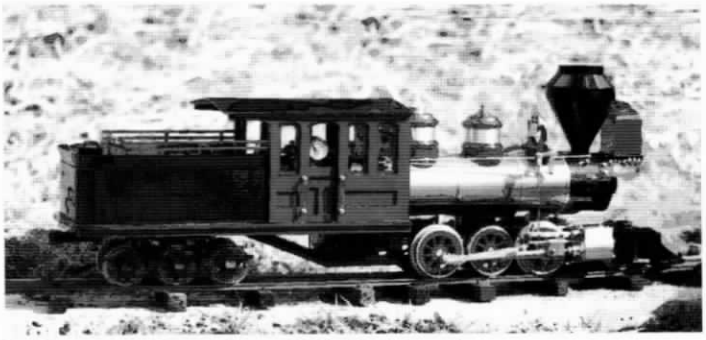
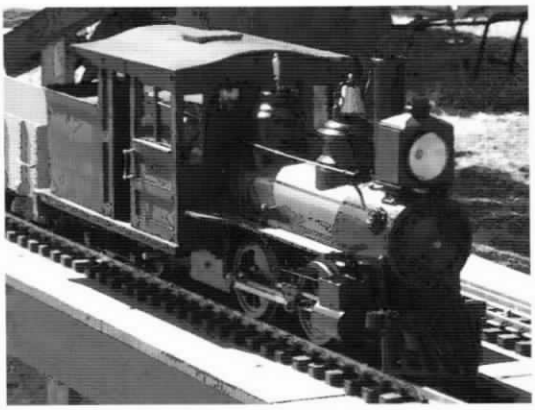
e-mail: crosscreektrains@direcway.com



Mason Bogie 20.3 Scale



Portland Forney 7/8 Scale

SWAP SHOP

Wanted: Aster Grasshopper, kit or built. Contact Alex Azary at 734-769-9898 or e-mail shaysteam05@comcast.net (85)

For Sale: COLORADO & SOUTHERN # 22 Gauge #1 ASTER Live Steam Locomotive. Runs well. Has FM radio control of throttle, reverse, and the whistle by Larry Bangman. Fuel system reworked so that it works. Also has electric drive on pump with on-board batteries. LED in headlight, also fitted carrying case. $2500 or might consider trades. Dave Conroy 239-283-8323 or LIBERTYBOAT@JUNO.COM (85)

For Sale: ACCUCRAFT RUBY 1 in original box, never steamed - 2 gondola cars and caboose - $275 all - I pay shipping (lower 48). Robert Mayer, 5307 E Corkery Rd., Spokane, WA 99223 e-mail: mayerville@msn.com phone: 509-4438034 (85)

For Sale: Two older (early 1990's ?) Jeff Saxton 1:20 scale Westside Lumber Company Kits. One kit is for a 24' Deckless Log Flatcar and the other kit is for a 22' Russel Skeleton Logcar. I didn't buy these kits new but got them as part of a model trade. After looking at everything, it looks like both kits are complete. These kits include the trucks, but need wheel sets. $50.00 for both kits including postage within the US. Over seas buyer pay shipping at cost. ALSO...Eight axles of spoked LGB metal replacement wheels - Part # 67319. Six of the eight have never been taken out of their packages (two axles per package), the other two have been unwrapped, but never actually used. $36.00 includes shipping within the US. Overseas buyer pay shipping at cost. Payment accepted via PayPal, money order, or cashiers check. Will ship upon receipt of payment. E-mail with questions - scottandnancy@charter.net (86)

Swap Shop listings are offered at no charge as space permits. No dealers and no phone-in ads, please! Send your listings to SitG, PO Box 335, Newark Valley NY 13811 ● fax to 253-323-2125 ● e-mail to <rbrown54@stny.rr.com>. Ads must contain sellers name, plus address and/or phone number. Ads will be run one time only unless previous arrangements are made.

END OF THE LINE

Clearing It Up

In the last issue we talked about Regner's Willi, and the Train Dept. featured that loco in their ad. The photo of Willi showed it with hook and loop couplers (LGB-type), which apparently caused some problems for a few of our readers. Rest assured that the production Willi locos are fitted with link & pin couplers, and NOT with hook and loop! Feel better now?

New Web Site

Richard Finlayson deserves a big THANKS! from all of us for his years of service to the hobby with the old web site. He also deserves a break to give him some time to relax and do some steaming. So... thanks, Richard! Hope to see you at a steamup somewhere soon.

Our new web site (steamup.info) is now up and running. It's not fully functional at the time I write this, but hopefully the fine tuning and debugging process won't be long and drawn out.

We hope that you will use the new site and will take the time to offer suggestions for improvement. Just send your suggestions to me at rbrown54@stny.rr.com and I promise that I will do my best to give all of our readers and viewers a site to be proud of, and one that will serve as a forum for the sharing of information and ideas to make our hobby even greater than it is.

Plans for future expansion include a page for a Calendar of Events, an index of articles that have appeared in *Steam in the Garden* over the past 16 years, more photos, articles, links to other useful sites and more. What would you like to see there?

And Finally...

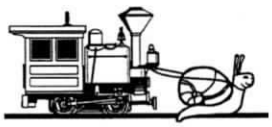
A big THANK YOU to all those who have contributed articles, drawings and photos over the years. Keep 'em coming!

Happy Steaming to all!

Ron

ADVERTISERS INDEX

Please tell our advertisers,
"I saw it in SitG!"



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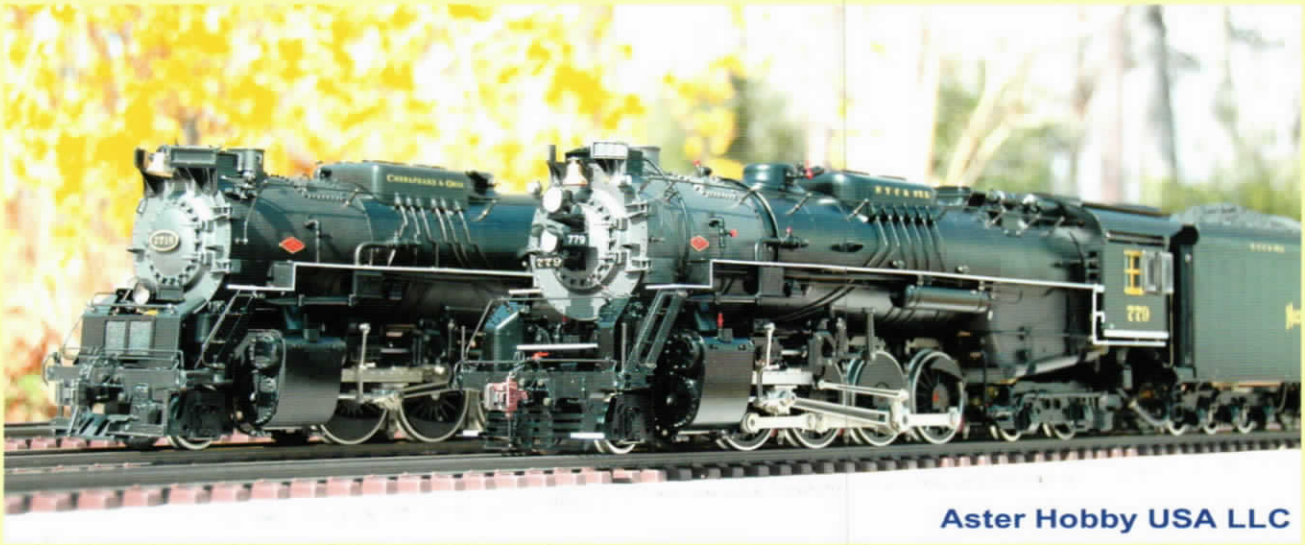
The stunning Nickel Plate Berkshire # 779 is still available in kit or factory assembled version.



The above picture shows a slightly modified NKP Berkshire #779 in the foreground and a highly modified conversion to C&O "Kanawha" in the background.

First picture of the new Aster prototype

Southern Railway "Bulleid Light Pacific", also known as "Spam Can".

The "Spam Can" is projected in two versions; Southern Railways "Spitfire" as shown, and in the later British Railways livery "Winston Churchill". Projected production release is Summer 2006. Reserve your preferred version early. Check our website for more details.

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