



No. 136, November/December 2014

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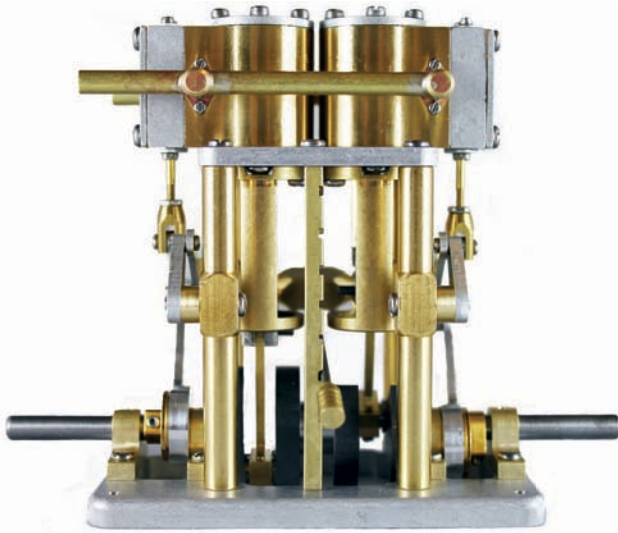
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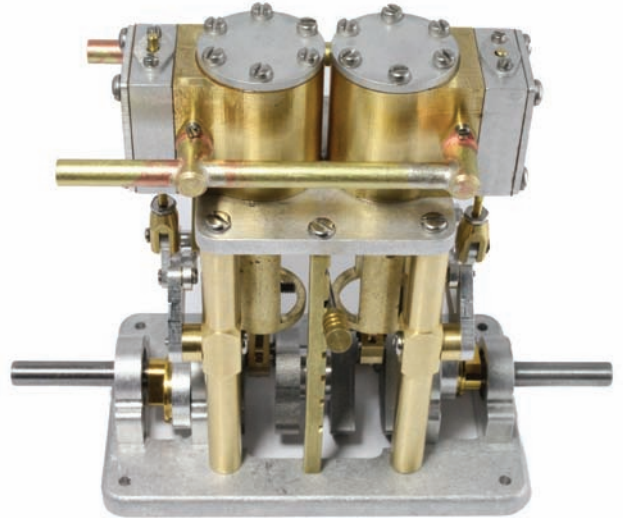


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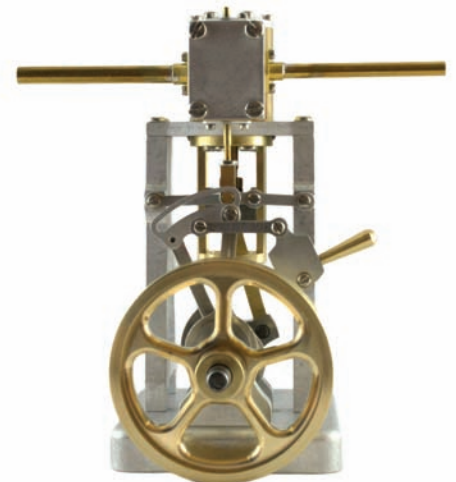
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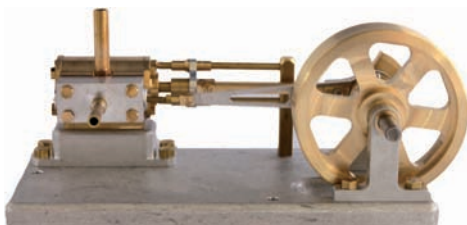


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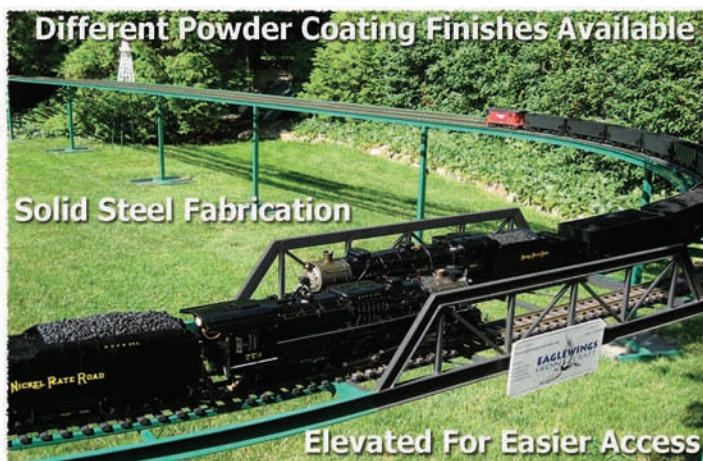
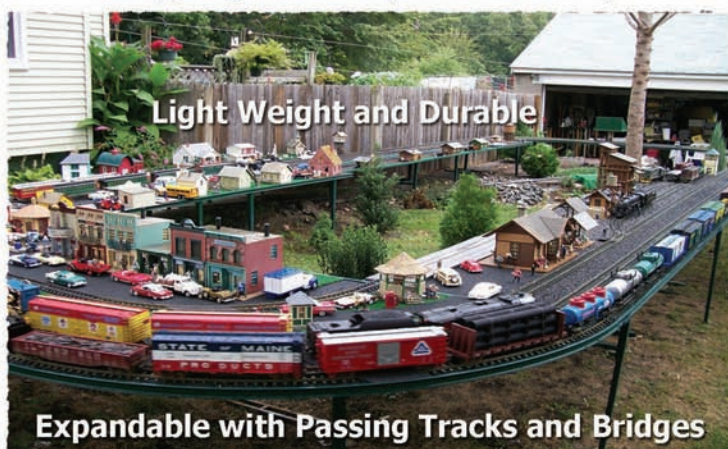
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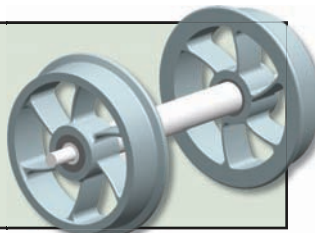
Vol. 24, No. 6; Issue No. 136; November/December 2014

# STEAM IN THE GARDEN

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

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**Latest waybill.** New Train Department items; Accucraft; TrackShack and Accucraft UK; Just the Ticket; Wuhu.



**Scratch building the 1:20.3-scale, four cylinder Heisler. Part Three**

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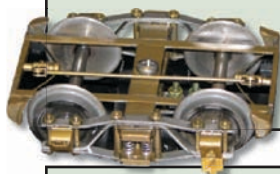
of series wraps up this unique locomotive with the cab and tender. Plus: a single-truck Heisler. **By Bill Allen.**

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**Sacramento steams.** The 2014 National Summer Steamup provides a fun time for more than 150. **By Grover Cleveland.**



**Replacing axles.** The Roundhouse Sandy River No. 24 was loose as a goose and the axle parts were available. **By Bill Courtright.**



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**'Dora' gets a snow plow.** To honor a prize-winning video, the new engine gets a makeover, with more than just the plow. **By Eric Schade.**



**Rivendell & Midland Railroad.** Wrapping up the series on building a ground-based steam layout in North Carolina. **By Les Knoll.**

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## LATEST WAYBILL

### The Train Dept. brings out new items

**N**ew wheel sets, new stationary steam products and some new 1:13.7-scale rolling stock kits highlight the latest offerings from The Train Department of Hazlet, N.J.

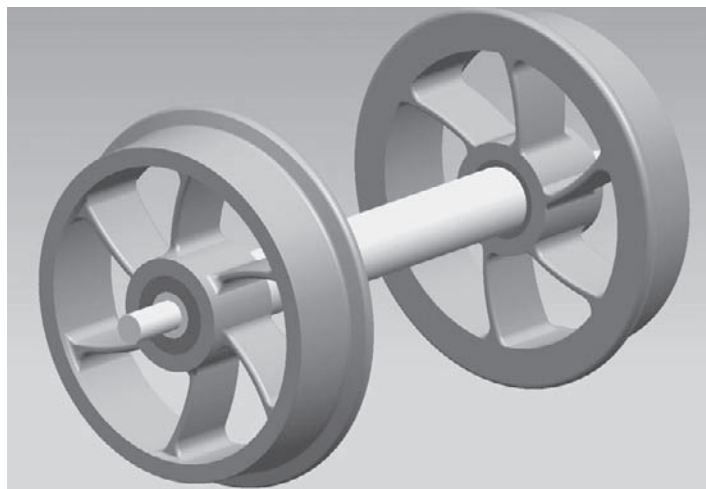
Jason Kovac, the proprietor of The Train Department, said he has commissioned two types of wheels: cast steel wheels for Denver & Rio Grande Western (D&RGW) prototypes, and computer-numeric control (CNC) machined stainless steel wheels for both 1:20.3- and 1:13.7-scale cars.

The cast and machined 1:20.3-scale D&RGW wheels have the prototypically correct Griffin of Denver maker's mark, and have stainless axles that are offered in two lengths to fit "just about any D&RGW rolling stock out there," Kovac said. He said he will also offer replacement bushings to retrofit trucks and a ball-bearing upgrade for Accucraft rolling stock.

The Griffin wheel sets will retail for \$9.50 per axle, Kovac said.

The CNC-machined wheels will be used in Train Department kits and will also be offered individually. The wheel profiles, said Kovac, "have been modeled off the prototypes for better looking wheels" and the tire thicknesses are scaled correctly.

The profiles of these wheels meet the Gauge One Model Railway Association flange-way standards,

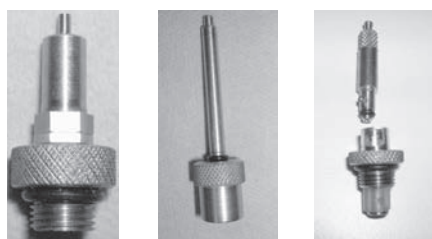


**Wheels a go-go:** The Train Department has commissioned a new line of 45mm gauge wheel sets, including 1:20.3-scale Griffin sets for the Denver & Rio Grande Western (top) and curly-spoked 18-inch wheels in 1:13.7-scale (bottom).

while the axles have 0.115-inch diameter ends. All are electrically insulated.

A 26-inch wheel modeled in 1:20.3 scale is currently in stock, said Kovac, while 1:13.7-scale wheels

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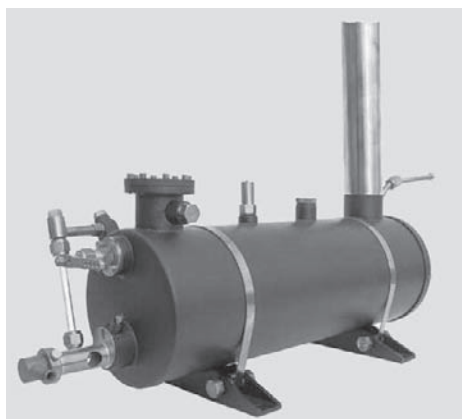
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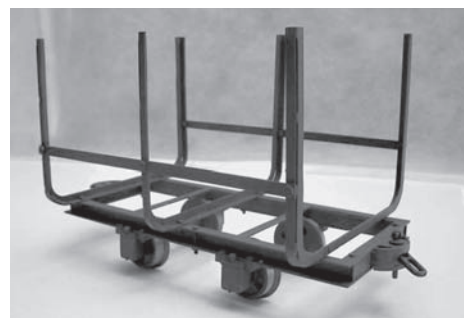
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**Stationary:** Left, Regner's 'Bea' steam motor; above, the new 80850 boiler.



**Cane car:** One of The Train Department's 1:13.7-scale kits for sugar-cane modeling; this is a steel car that comes in a bolt-together kit that includes 14-inch drilled wheels.

based on a 14-inch industrial wheel with four holes, a 16-inch industrial wheel, an 18-inch Sandy River and Rangeley Lakes-style wheel, an 18-inch curly-spoke wheel and a 20-inch Sandy River-style wheel are also now available.

In development, said Kovac, are a 1:20.3-scale, 24-inch wheel and a 1:13.7-scale, 15-inch, seven-straight spoke wheel.

The CNC-machined solid wheels will retail for \$6 per axle, Kovac said, but he is still working on the pricing for the wheels with holes or spokes.

The Train Department is also the North American distributor for Regner Steam & Rail Technology of Bavaria, Germany; Kovac said recently Regner's latest catalog now includes stationary steam items including the "Bea" steam motor kit and an industrial-looking steam boiler, the 80850.

The brass and stainless steel motor kit is about 4¾-inches tall and about 3¼-inches by two-inches around; the base is milled from a single piece of metal. "Bea" uses Baker valve gearing for reversing and it can be adjusted manually or with radio control. The pistons — which are about one-quarter inch with a half-inch stroke — are Teflon-lined.

The boiler is about one-inch wide by 3¼-inches long. It is butane-fired with a single-flue poker burner and comes with a sight glass and safety valve. "Bea" retails for \$557, said Kovac, while the boiler is \$615; the boiler has optional wood cladding, which costs \$17.

Also recently released by The Train Department is a series of 1:13.7-scale sugar cane rolling stock kits. The Bundaberg Cane Wagon Kit includes pre-cut Alder wood parts, laser-cut steel bracing, white-metal axle boxes and 14-inch curly spoked wheels. It is assembled with miniature screws, nuts and nails.

Similarly, the Bundaberg Cane Utility Wagon kit also includes Alder wood parts, white-metal axel boxes, steel link-and-pin couplers and 14-inch curly spoked wheels.

Another kit in the line is the Steel Cane Wagon, which features laser-cut steel, white-metal castings, link-and-pin couplers and 14-inch drilled wheels. Kovac says the bolt-together kit has a skill level of "easy."

Rounding out the line is a bundle imitation cane load; one bundle will fill about two or three cars, said Kovac.

The Bundaberg Cane Wagon kit retails for \$70, while the Cane Utility Wagon kit costs \$55, the Steel Cane Wagon kit is \$65 and the cane load is \$10. Shipping is additional with all.

The Train Department is on the web at <http://www.thetraindepartment.com> and by phone at (732) 770-9625.

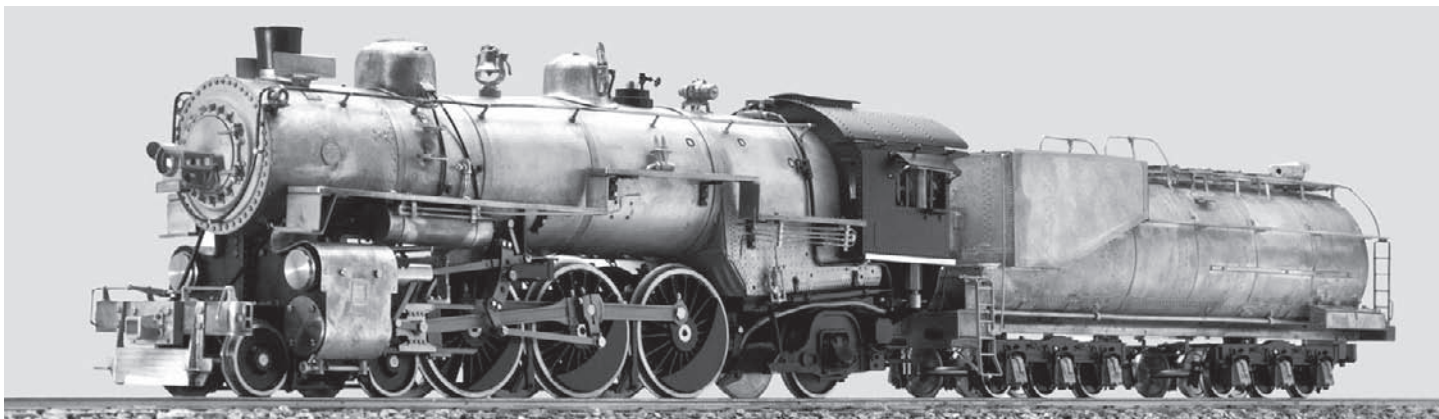
## Accucraft out with two more in 1:32

**T**wo new locomotives that speak to the two homes of Accucraft Trains Co. will be released by the manufacturer in the coming weeks. The first, a Southern Pacific 4-6-2, is based on two restored prototypes; one of which operates on an excursion railroad 10 miles from the company's California offices, while the second — based on the Qian Jin 2-10-2 — was designed and ran in China, where Accucraft has its manufacturing operations.

Southern Pacific commissioned Baldwin Locomotive works to build 15 P-8 class locomotives in the early 1920s. The engines were initially used on the 280 miles between Ogden, Utah, and Carlin, Nev., but were later transferred to California for use between Oakland and Sacramento, as well as to the San Francisco Peninsula for commuter work.

The P-8s were retired in the 1950s, and two of them were preserved. Both initially became static displays — No. 2467 in Oakland and No. 2472 in San Mateo. In the 1970s No. 2472 was restored where it stood at the San Mateo County Fairgrounds by a group of volunteers, who eventually became the Golden Gate Railroad Museum. In the 1980s the





museum found a home at Hunter's Point Shipyards in San Francisco.

No. 2472 was used for numerous excursions on the San Francisco Peninsula throughout the 1980s-2000s, but when the museum was evicted from Hunter's Point in 2006, it moved much of its equipment to the Niles Canyon Railway in Sunol, Calif., owned by the Pacific Locomotive Association. No. 2472 operates regularly on the Niles track, which is a 20-minute drive from Accucraft's Union City offices.

In the 1990s another group of volunteers (which later merged into the Pacific Locomotive Association) took title of No. 2467 and restored it at the PLA's then-operation in Richmond, Calif. The locomotive was used in excursion service, but when the PLA moved south 45 miles to Niles Canyon, No. 2467 was put on permanent loan to the California State Railroad Museum, where it is currently a static display.

Accucraft's model will be 35-inches long, 3<sup>3</sup>/<sub>4</sub>-inches wide and almost six inches tall; it will be



**California to China:** Top, Accucraft's new 1:32-scale Southern Pacific 4-6-2. Bottom, the company's model of the Qian Jin 2-10-2 in 1:32 scale.

able to navigate 10-foot radius curves. The butane-fired locomotive will have 60 psi working pressure, two D-valve cylinders with Walchaert valve gear and include a water-level glass, a check valve, an axle water pump and a hand water pump in the tender.

Accucraft will be selling models numbered both 2472 and 2467; they are expected to retail for about \$4000.

The Chinese QJ locomotives, based on a design from the Soviet Union, were built from the mid-



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**Bit of Britain:** Left, TrackShack's new 'Sea Lion' will benefit a volunteer excursion railroad. Right, new TrackShack open wagons carry owners' names.

1950s through the mid-1980s. More than 4700 of the 95-foot-long locomotives (with an eight-wheeled tender) were built and they were the most numerous steam class to run in China. QJs had drivers that were about 59 inches, cylinders that were about 25½-inches by 31½-inches, and 213 psi of boiler pressure; they produced 62,800 pounds of tractive effort.

The 2-10-2 class had three different names during its lifetime: initially, it was called HePing (Peace), but was renamed during the Cultural Revolution in the late 1960s to FanDi (Anti-Imperialism). According to the web site Railography.co.uk, the FD designation conflicted with the name of another existing class, also abbreviated FD,

so in 1971 it was changed to Qian Jin (Advanced).

As the Chinese began to wind down their reliance on steam in the 1990s, many of the QJ class were scrapped, though three were imported to the United States.

The Iowa Interstate Railroad Ltd. — a Class II railroad that provides freight service between Council Bluffs, Iowa, and Chicago — bought Nos. 6988 and 7081 in 2006 and uses them for excursions. No. 6988 has had its traditional smoke deflectors removed and has an Americanized appearance, while No. 7081 has retained its Chinese looks.

The R.J. Corman Railroad of Kentucky imported No. 7040 and has heavily modified the locomotive and renumbered it 2008.

Both railroads run their QJ-class locomotives in excursion service.

Accucraft will provide six versions of the QJ-class models: No. 7081 in its Chinese livery with alcohol-, butane- or coal-firing, and No. 6988 with its Iowa Interstate livery, also in the three fuels.

The alcohol versions will have a suggested retail price of \$4950, while the butane models will be priced at \$4500 and the coal-fired engines will go for \$5450.

Accucraft's web site is at <http://www.accucraft.com> and its phone number is (510) 324-3399.

### Lots coming out of the U.K.

Isle of Man garden railway dealer TrackShack has commissioned a number of new locomotives and rolling stock from Accucraft UK, resulting in deliveries of a lot of live-steam related products in the coming weeks.

TrackShack had Accucraft build it a new 1:13.7-scale locomotive, "Sea Lion," a Bagnall 2-4-0T live-steam engine. The model is of a two-foot-gauge engine that runs on the Groudle Glen Railway, an all-volunteer excursion railway that is also on the Isle of Man.

Most of the profits from the sale of "Sea Lion" will go to the construction of "Brown Bear," a new Bagnall 2-4-0T locomotive for the Groudle Glen that will



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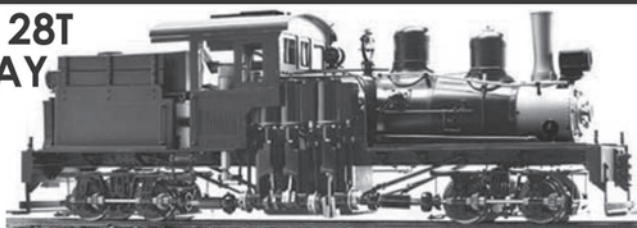
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**Black is back:** Accucraft 1:32-scale LMS Black 5, 4-6-0 pilot model was recently shown in England.

take the place of “Polar Bear,” an engine that was taken out of service but which has been preserved.

The model will be 9½-inches long, 3¾-inches wide and 5¾-inches tall (242mm by 95mm by 146mm). While the company hasn’t yet determined the exact minimum radius, it says it’s “likely to be in the region of four feet.”

The butane-fired locomotive will have a center-flue boiler with a working pressure of 60 psi, simplified Stephenson valve gear, and will come with a displacement lubricator, safety valve, pressure gauge and Goodall valve. Controls will include a steam throttle, a gas regulator and a reverser lever.

“Sea Lion” will only be available through TrackShack; with manual control the price will be £995 (about \$US1625) and with radio control £1295 (about \$US2115).

The Manx dealer has also commissioned Accucraft to build “Mannin,” a model of the last locomotive to be supplied to the Isle of Man Railway. No. 16, built in 1926 by Beyer, Peacock & Co., is larger than most Manx engines. It ran until 1964 and has been in static display since then.

“Mannin” will be 1:20.3-scale, 45mm gauge and operate on a minimum radius of 39 inches (one meter). It will be about 15¼-inches long, 4¼-inches wide and 6⅛-inches tall (360mm by 108mm by 156mm) and weigh in at 9¼ pounds (4.3kg).

It too will have simulated Stephenson valve gear, butane firing, safety valve and pressure gauge, and will have a water-level check valve, water gauge, steam throttle and gas regulator.

A manually controlled “Mannin” will retail for £1410 (about \$US2302), while a radio-controlled version will be £1710 (about \$US2792).

TrackShack is also having new versions of its Welshpool & Llanfair “private owner” open wagons run, with names such as “Consolidated Steam Fishing & Ice Co. Ltd.,” and “Oxcroft — Britain’s best house coal.” This rolling stock comes with 45mm gauge wheel sets installed and 32mm gauge wheels included, which the owner can change out as needed.

A bauxite open wagon with only carriage data markings is also going to be available. These Accucraft-manufactured wagons, made mostly of injection-molded plastic, are exclusive to TrackShack and retail for £38 (about \$US62).

TrackShack and Accucraft UK also recently showed the pilot model of the new London, Midland and Scottish Railway Black 5, a 4-6-0 1:32-scale live steam locomotive. The prototype was designed by William Stanier in 1934 and 842 were built between 1934-1951. Eighteen of the Black 5s are preserved.

The model will be 23½-inches long, 3½-inches

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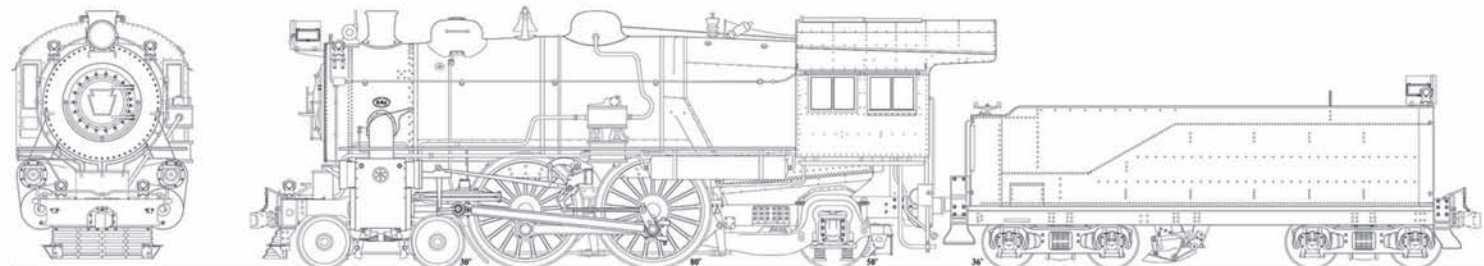
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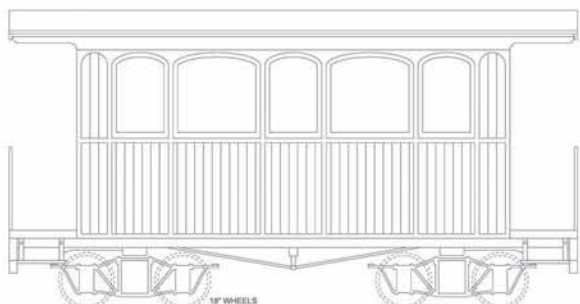
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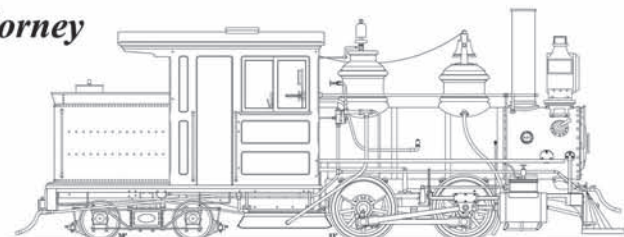


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wide and five inches tall (610mm by 90mm by 120mm) and will operate on six-foot (two-meter) radius curves. The butane-fired locomotive will have a center-flue boiler that will operate at 60psi and sport Walschaert valve gear.

The Black 5 will come in two liveries, LMS No. 5451 and British Rail No. 45237. Estimated retail price will be £2250 (about \$3674).

TrackShack's web site is at <http://www.track-shack.com> and its phone number is 011-44-1624-845977, while Accucraft UK is on the Web at <http://www.accucraft.uk.com> or by phone at 011-44-1694-723799.



**G5 at speed:** The pilot model of Wuhu Bowande's Pennsylvania Railroad G5 on the track at the National Summer Steamup.

### Gauge One kits move to new dealer

Following 2013's death of Peter Marshall, the owner of the United Kingdom's The Wagon & Carriage Works, Just the Ticket Engineering Supplies says it has taken over the Gauge One kits and fittings portion of that business.

Roger Melton, proprietor of Just the Ticket, said he is in the process of ramping up production on a wide number of locomotive, wagon, coach and van kits, as well as stocking the castings and accessories that Wagon & Carriage Works formerly carried.

At one time Wagon & Carriage Works had more than 65 locomotive kits, almost 40 wagon kits and almost 20 coach and van kits in stock, as well as dozens and dozens of parts in white metal, brass, etched brass and bright mild steel.

Just The Ticket, based in Salisbury, England, is on the Web at <http://www.justtheticket.tv> and by phone at 011-44-1980-610058.

### Wuhu to build Pennsy 4-6-0

Next up for Wuhu Arts & Crafts Co. Ltd., the Chinese company said last summer, will be a 1:32-scale live-steam model of the Pennsylvania Railroad G5 locomotive, a 4-6-0 used in passenger service from the mid-1920s through the mid-1950s.

The PRR model closely follows Bowande Wuhu's release of the Rogers Locomotive's 4-6-0, the Illinois Central No. 382, which was made famous in the song, "The Ballad of Casey Jones." Wuhu began delivery of No. 382 in the late summer.

According to the Baldwin Locomotive's 1924 book, "Motive Power Development of the Pennsylvania Railroad System, 1831-1924," the railroad needed a new, powerful locomotive for commuter passenger

service. The overall weight of the G5 — 237,000 pounds — and the lack of trailing trucks generated 41,000 pounds of tractive force.

PRR built 40 of the G5 locomotives in 1923 and 50 more the next year at its shops in Altoona. The G5 locomotives, says the Baldwin book, "combined the virtues of high starting traction with rapid acceleration, which proved desirable assets on suburban service routes."

The G5 is often called "the largest, heaviest and most powerful 4-6-0 built in America."

In addition to PRR service near Pittsburgh, Pa., and Chicago, the locomotives were also used by the Long Island Railroad, which was then owned by the PRR. In addition to leasing PRR G5s, the Long Island also had 31 of the G5s built specifically for its use; the major difference between a LIRR G5 and the PRR version was a larger tender.

Wuhu Bowande and its U.S. agent, Bob Clark of Stoke 'm and Smoke 'm of Mount Airy, Md., have said they are taking orders for the G5, and that they will entertain requests for special orders of the LIRR version of the G5.

The Chinese firm also said last summer it has contracted with Triple R Services of Mount Holly, N.J., to act as its after-sale service and support depot for North America. Triple R, owned by Charles and Ryan Bednarik, will help owners of any Wuhu Bowande products.

Wuhu Brand Arts & Crafts Co., Ltd., of Anhui, China, is on the Web at <http://bowandeusa.com/> or by phone at 011-86-553-2866713. Stoke 'm and Smoke 'm is at (301) 467-3348, while Triple R's web site is <http://www.realsteamservices.com> and its phone is (609) 280-8744.



Scratch building the 1:20.3-scale, four cylinder

# HEISLER

Text and photos by Bill Allen



**Loggin':** Four-cylinder Heisler No. 1 pulls a string of skeleton cars on author's layout. Photo by Eric Moe.

**U**nique locomotives are my focus in building small-scale live steam engines, and the four-cylinder Heisler (designed by Charles Heisler and submitted as a patent — a full-scale one was never built) meets that test. In Parts One and Two, we reviewed making the 1:20.3-scale engine, trucks and boiler. When I had the burner, smoke box and fittings done, I was ready for my first steam test. I still wasn't completely sure the design would work, so I wanted to test it before I went any further.

Rob Lenichek, a nearby hobbyist, was having a steamup, so I brought the Heisler over and set it up on his rollers with a temporary fuel tank. Within just a few minutes the steam rose to 40 psi so I opened the throttle. Nothing happened ... for about five seconds ... which seemed like forever.

Then some water squirted from the drain cocks

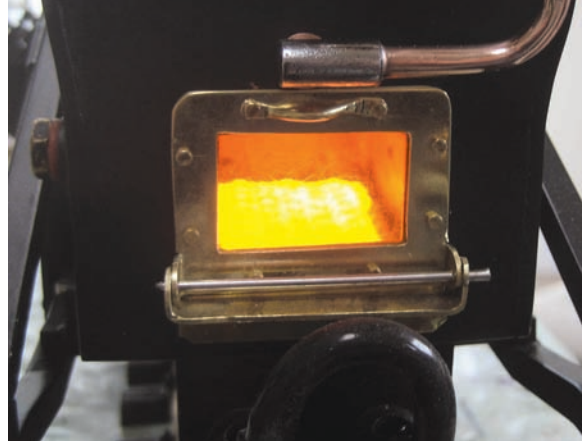
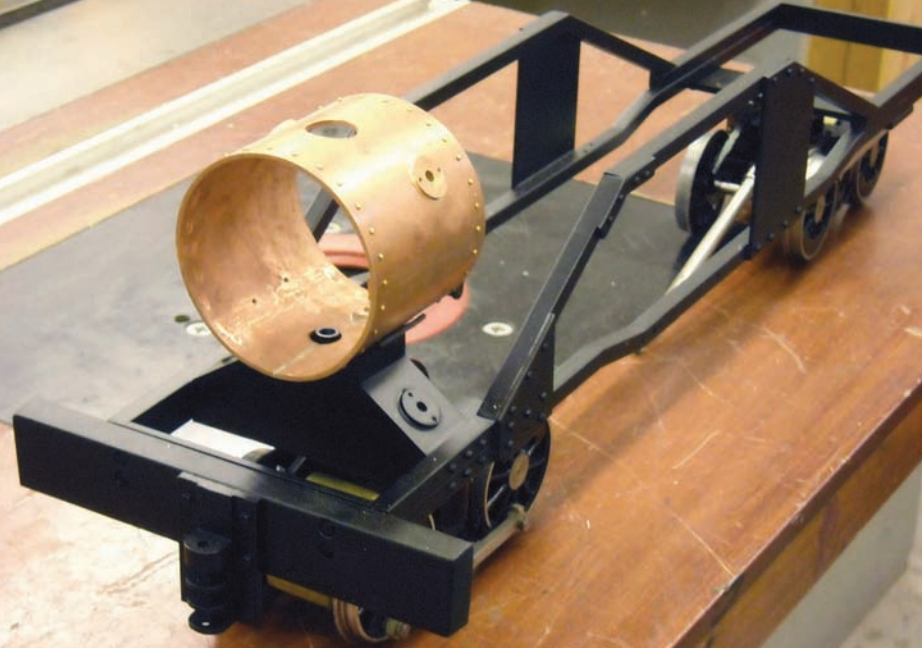
followed by some steam, and it was off to the races. I shut the engine down and put it on the track and it took right off. Comfortable with the performance, I proceeded to finish the project. Subsequent tests, when the model was finished, showed no problem starting out cold with a full consist.

## Boiler fittings and such

The photos of superheated Heislers show two fittings on top of the smoke box with a large diameter pipe going to the cylinder on each side and the exhaust going to fittings on either side of the smoke box mount.

On our Heisler the smoke box mount has a T-shaped pipe inside which comes into the smoke box at the bottom as shown in **Photo 1**. Because of condensation concerns, I used a 3/16-inch super-





**Photo 1:** Left, smoke box is set on mount. Steam line to engine bolts on to flange at upper right of smoke box. Exhaust pipe bolts on to flange on smokebox mount.

**Photo 2:** Right, ceramic burner can be seen through fire door.

heater tube. The larger tube would slow the steam flow down somewhat, keeping the steam in the super heater longer.

The super-heater fittings are shown in **Photos 5 and 6**, while the lagged steam line to the cylinders can be seen in **Photo 8b**. Because the boiler was an off size, I had to make up the smoke box by cutting a pipe down and silver soldering. I didn't use a splice overlap like in the boiler, since there are no pressure concerns here. Rivets were set by hand-drilling No. 60 holes surrounding each end of the smoke box.

A ceramic gas burner is used, but the burner box (**Photo 2**) could be replaced with a grate and ash pan configuration to convert to coal.

I wanted separate lubricators for each side because I wanted to be able to balance the oil output to either side. I found a photo of a three-truck Heisler with a huge air pump. It didn't show both sides, so I don't know if it had two of them or not, but I decided two would work for me.

**Photo 4** shows my models: You can barely see on the pump on the left that between the two cylinders is an open space where the connecting rod would pass through. Instead of a rod, I used a polished stainless tube which is

held in place with industrial adhesive (Loctite 680) and is steam tight.

Holes drilled in the bottom cylinder lead to a tube which runs to the steam line. The top cylinder is hollow and the stainless tube comes up near the top where a threaded closed nut acts as an adjustable restrictor. Finally the top with the threaded hole is silver soldered on and the one with the rivets is the screw-on cap.

The Johnson Bar (**Photo 7**) was cut to shape on my small band saw with a one-eighth-inch blade and filed and sanded to final finish. Although I made several

changes, it is similar to the design shown in the book "Building the Heisler," by Kozo Hiraoka (Wildwood Publications, June 1986). It has a working spring latch handle.

**Photo 8a** shows the two domes (**Photo 8b** is a close up of the sand dome); both were turned in the shop of my friend Dennis Mead on his large lathe, and the base curvature was done on his mill using a boring bar set to the boiler diameter.

A clack valve (**Photo 8b**) is another name for a simple check valve. I don't like to use springs to hold the ball in place in these valves because they increase the pressure on the axle pump. Gravity will keep it on

### Building the 4-cylinder Heisler

California small-scale live steamer Bill Allen became intrigued with a Heisler when he found a patent drawing for a four-cylinder model (one which never existed in real life). Not knowing much about Heislrs, he set about learning about them and building the locomotive, emphasizing the use of compound steam.

#### • Part One — Engine design, construction.

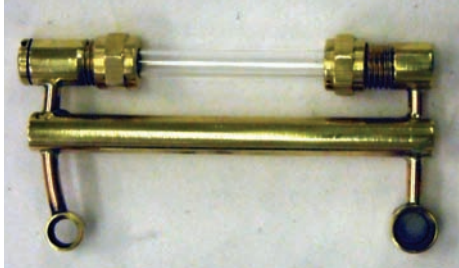
Working up the initial drawings for the cylinders, as well as getting the steam motor built and bench tested (*Steam in the Garden*, July/August 2014, No. 134).

• **Part Two — Frame, trucks and boiler.** Following practice for the 70-ton Heisler, wheels are cast in metal (with help from a 3D printer) and a wagon-top boiler is constructed from copper pipe (*Steam in the Garden*, September/October 2014, No. 135).

#### • Part Three — Accessories, cab and tender.

Adding a ceramic gas burner to the boiler, developing a clack valve, soldering the cab together, adding fuel and water tanks to the tender.





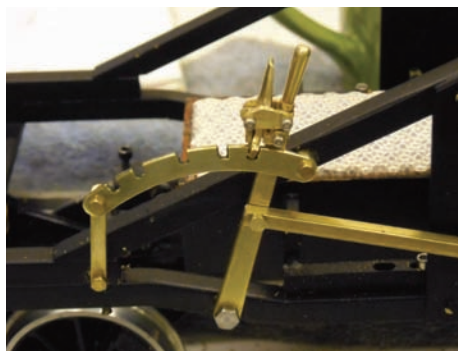
**Photo 3:** Kozo-designed sight glass has a column between the glass and the boiler to absorb surges and make the reading more accurate.



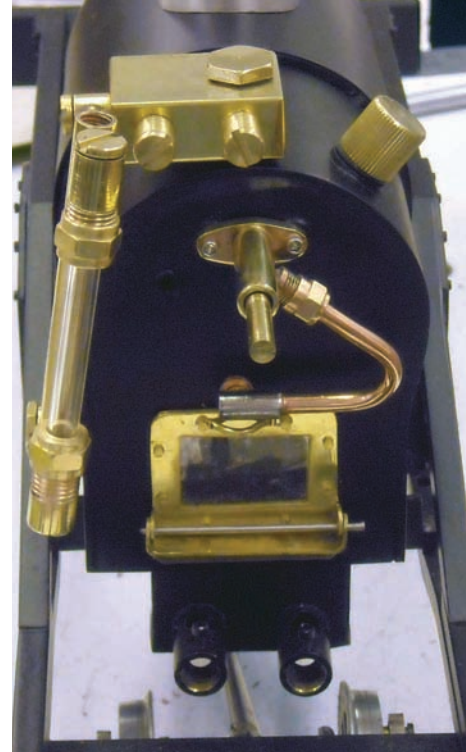
**Photo 4:** Top halves of air pumps are lubricator reservoirs. Steam pipe and valve are at the bottom.



**Photo 6:** Inside smoke box, the T-box connects the super heater to two tubes that go to the flanges where pipes to engine will attach.



**Photo 7:** The Johnson bar is a prototypical design.



**Photo 5:** Throttle picks up steam from a pipe going to steam dome. Curved tube connects to stainless steel super-heater tube.

the seat and the boiler pressure holds the seal.

One caveat is that the ball movement cannot be more than one-sixth the ball diameter. To ensure these proportions, the valve shown was later changed to one with a screw at the top which you can screw till the ball seats and then back off the correct distance.

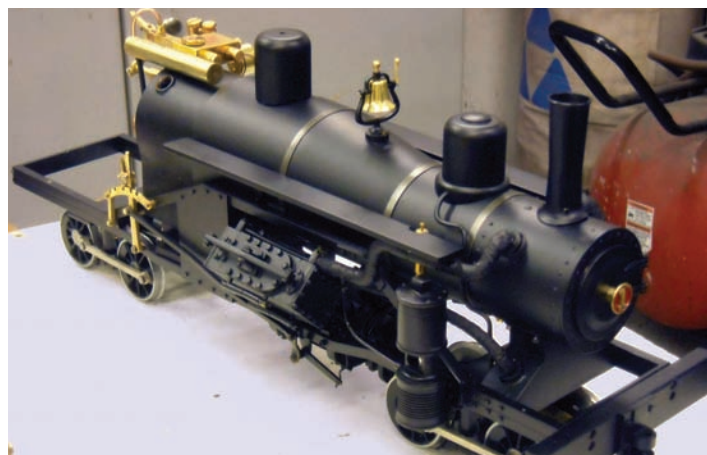
To illustrate the effect of a spring on a check valve ball here is an example: The diameter of a one-eighth-inch ball seat is 3/32-inches (0.093-inch) with an area of 0.0068 square inches. If the spring tension is one ounce, over nine psi pressure is needed to overcome the spring. That amount is added to your boiler pressure and must be overcome for the pump to work.

The whistle is Kozo's design (**Photo 10**). In the past, I have put the whistles under the cab where they are cooled by the air and tend to fill up with water and just gurgle till the engine has been run a while. Mounting it on the boiler with only a one-inch long tube helps that problem but the water that does come out at the start of the run gets in the cab. I am not sure which one I dislike most; time will tell.

## Building the cab

The cab is prototypical to later large Heislrs. It is made from several pieces. The front is cut from a photocopy of my original scale drawing pasted on a sheet of brass.

In the past I would have made the front window frames to size and then soldered them on, but this time I used Kozo's technique of cutting the outside dimension, soldering it on and then cutting the inside



**Photo 8a:** Steam dome, left, and sand dome, right.

opening through both pieces. As I have a great router table, I like my old way better, but this would work for someone who wants to do it with a jeweler's saw.

The front side is a rectangular piece with the window cut out. It is rivet embossed and connected to the rear of the cab via the strip above the door. You can see that the cab window has a slight arch to it, but after painting that detail is lost somewhat.

Behind the door is the U-shaped piece that incorporates the rear side and bunker. The bunker was left empty to accommodate radio control if I decide later to go that way.

The rear piece was drawn out on card stock from my scale drawings and adjusted for fit by setting it in place. This was then used as a pattern for the brass sheet which was cut on the table and band saw, rivet





**Photo 8b:** Sand dome and piping are set in place. Note lagged steam pipe and clack valve below dome.

embossed and bent to shape around a bar matching the radius I needed.

Tabs were soldered to the bottom of the cab pieces for mounting on the cab floor. Because the diamond frame protrudes into the cab, the cab floor had to be made from several pieces. The beading along the top of the bunker was made by ripping one-eighth-inch tubing on the table saw to make a three-quarter round with a slit on the flat side. I would not recommend this unless you have extensive woodworking skills.

## The tender

The tender is mounted on the third geared truck and houses the gas tank and the feed water system.

The fuel tank is made from two-inch copper pipe with 1/16-inch copper ends. There is one one-eighth-inch stay that keeps the ends from bulging out under pressure. Butane is normally under less than 20 psi but if heated up too much it could go over 100 psi, thus the need for the stays.

The solid copper pipe is connected to Simi-Soft silicone tubing (from the online and catalog industrial supplier McMaster-Carr Supply Co.) which is flexible enough to span the distance between the tender and engine. This material is harder and stronger than soft silicone tubing, which is the light blue kind you see in the hobby shops. Clamps are just plastic ties.

The feed water system is in series. That is to say, the water goes through the hand pump to the axle pump and then to the boiler. The reason for this is that if the system runs dry, the axle pump and lines will be filled with air which can cause the pump to lose its prime and stop pumping indefinitely. If this happens on a system which is in series, the hand pump can prime the system with just a few strokes. Looking at **Photo 11**, you can see how the water flows. Water is picked

## A one-truck pony

**T**he smallest Heisler ever built was designed and built for use by highway contractors in the early 1920s, but did not meet with any success. Contractors soon found it cheaper to haul road-building material to the site with trucks, rather than to build track and use a locomotive.

So this little locomotive did not stick with the company that commissioned it, Lake Shore Stone Products, and was returned to Heisler where it was stored in the plant for many years. What its fate eventually was is unknown. In fact, the only information on it is a photograph taken with a wide-angle lens. This loco is often referred to as a One-Truck Heisler but it is technically an 0-4-0.

I became interested in building one of these when after completing my four-cylinder model, I had one set of gears left over. As the cost of these gears was two or three dollars, I couldn't just throw them away. I think it was Scrooge McDuck who once said "People call me cheap but I like to think of myself as being thrifty." Well being the thrifty guy I am, I decided to go to the scrap box and see what I could find to make these gears into the Lake Shore Heisler.

There were some challenges since I had no drawings or measurements; the boiler seemed to be some sort of Scotch Boiler with a return flue and the stack coming out the middle of the cab roof, and the wheels were driven by a jack shaft which was at a different level than the axle line.

I started with the boiler as I had a short piece of copper pipe left over from another project. I used a poker burner similar to the one used in Accu-craft's "Ruby" for the boiler heat, but rather than venting the gas out a stack in the smoke box, I routed it to the back of the boiler with a 90-degree elbow bend just shy of the back head and then through the top of the boiler.

Steamer Larry Newman had done a Heisler using "Ruby" valves and pistons. I used some

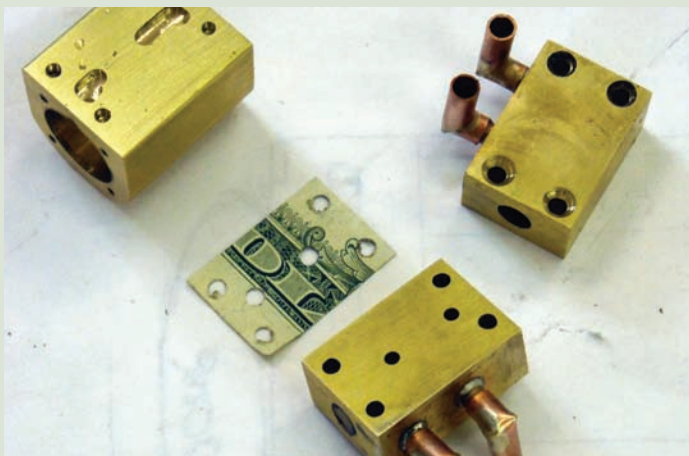


smallest Heisler ever built. It was designed and built for use by highway contractors in the early twenties, but did not meet with success. Contractors soon found it cheaper to haul road building material to the site with trucks, than to build track and use a locomotive. The loco was returned to Lake Shore Stone Products and was returned to Heisler and stored in the plant for many years. What

**Origin:** Only reference to the single-truck Heisler prototype.

of his design, keeping with the valves but making my own half-inch cylinders. I enlarged the valve ports (which will be explained in a future article) and made the





**Cylinders:** Scratch built with a dollar-bill gasket.



**Smoke stack:** On the fire brick for brazing.



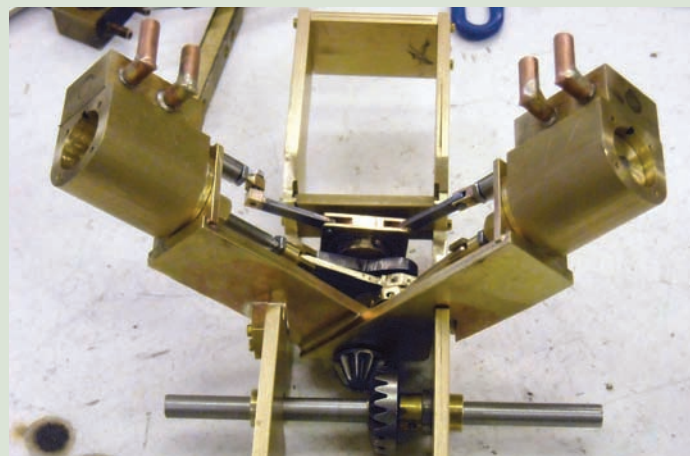
**Boiler:** Return flue goes backward to the cab.

crankshaft similar to the four-cylinder with the pinion gear attached right behind the main bearing where it meshes with the jack shaft ring gear.

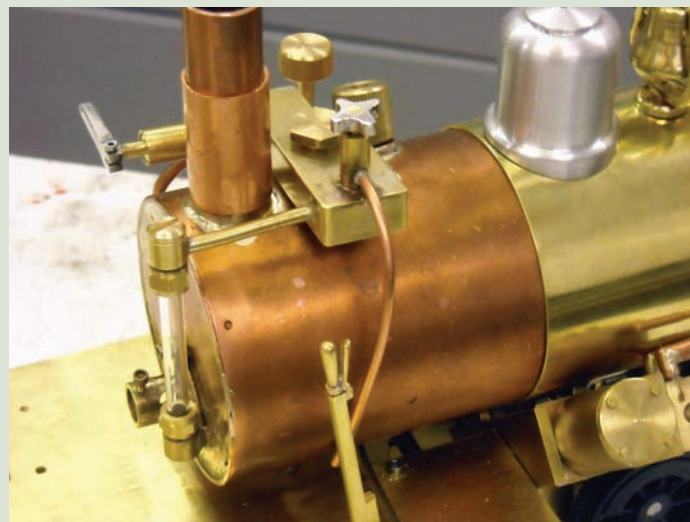
The eight-spoke wheels were cast in Zamac, similar to those Dennis Mead and I made for the four-cylinder Heisler. The cab, headlight, bell and dome



**One-truck Heisler:** Pulling a log consist at National Summer Steamup. Photo by Carla Brand Breitner.



**Frame:** Cylinders and gear are attached.



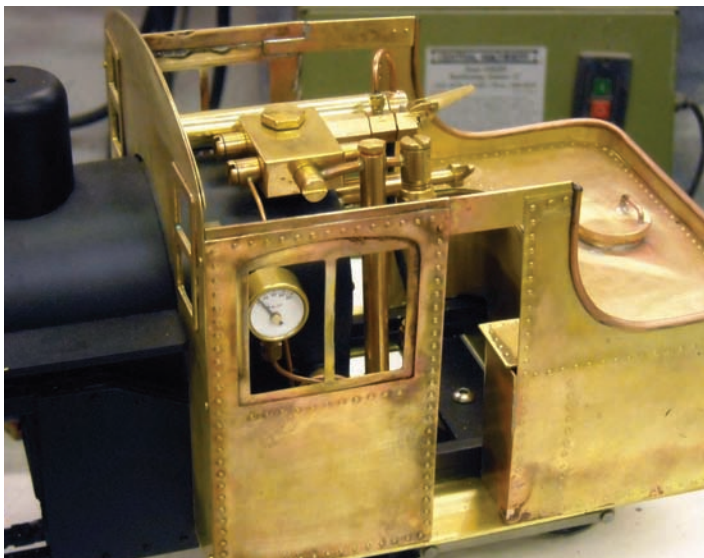
**Cab:** Throttle, water glass, j-bar— and smokestack.

were also similar to the four-cylinder model.

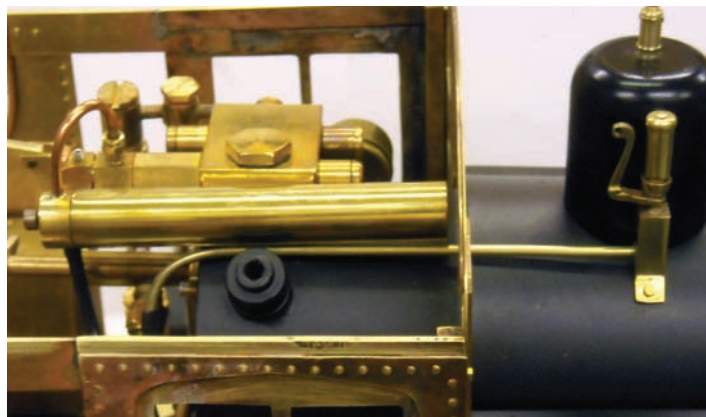
This little guy weighs in at 7½ pounds but easily pulled 28 cars at the National Summer Steamup in Sacramento this year. It is really a fun engine to run.

— B.A.

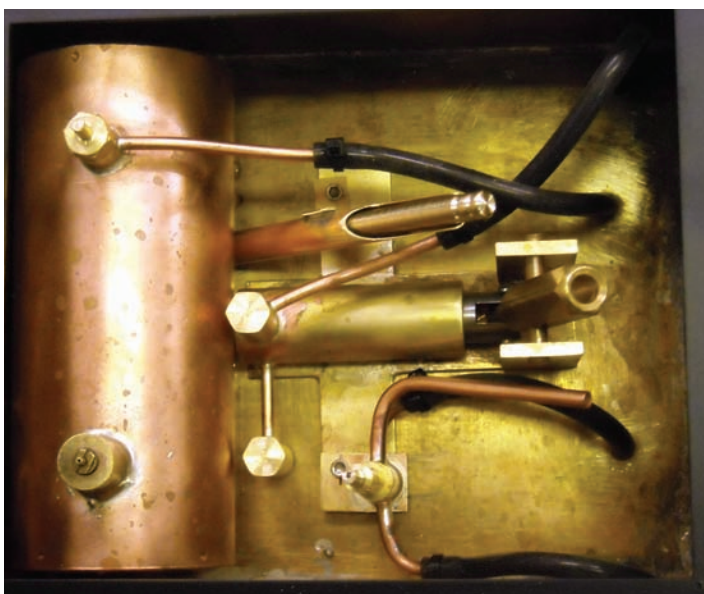




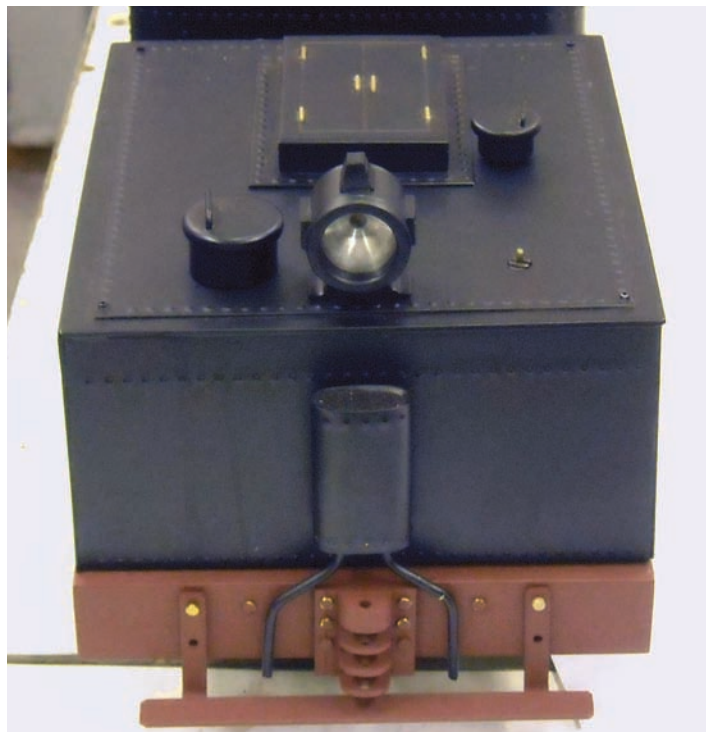
**Photo 9:** Cab is rivet embossed and soldered up.



**Photo 10:** The whistle is in the cab next to the steam manifold, which makes for a short steam tube and less condensation. An additional tube goes to the dummy whistle next to the dome so it shoots out steam when the whistle blows.



**Photo 11 — Inside the tender:** Fuel tank on the left; top to bottom, hand-pump handle and holder, hand pump, bypass valve.



**Photo 12 — Tender items:** Round hatch covers are for gas valve on left and bypass valve on the right. Rectangular hatch is for filling water and pumping it. Headlight is non-operational but is bulb ready. Sand box is non-operational.

up via the inlet check valve shown below the hand pump connected to the pump by a short brass tube. It is then pumped out through the outlet check valve to the black tube at the top right corner in the photo. This goes to the inlet of the axle pump.

The black flexible tube is used because even though the truck is fixed to the tender, there is movement within the truck caused by the spring suspension. From the outlet of the axle pump, water is fed through the tube at the bottom of the picture to the bypass valve, which has two outlets.

The outlet on the bottom is the black flexible tubing partially hidden by the copper tube. This is the line which delivers the water to the boiler. When the bypass valve is opened, the copper tube on the top releases water back into the tank. This tube is posi-

tioned so that you can see the water flow through the pumping hatch.

This was a very rewarding project for me. Besides learning a few new building techniques and an understanding of compound engines and Heisler's unique valve design, I ended up with a one-of-a-kind engine which I will enjoy for years. I would like to thank steamers Dennis Mead, Henner Meinhold and the many people online who helped in the discussions of compounds.



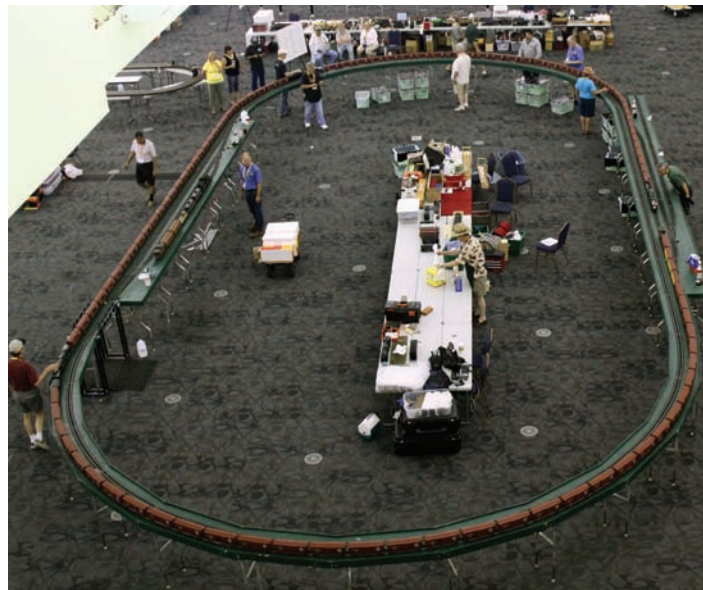
The wallet may suffer, but otherwise a fun time had by all at 2014 National Summer Steamup

# Sacramento STEAMS

Text by Grover Cleveland. Photos by Carla Brand Breitner, Grover Cleveland, Mike Martin & Rick Parker.

**S**omehow I always manage to get in financial trouble at the huge annual steamup out in California. Really, how could I not? Surrounded by an amazing variety of locomotives and rolling stock in different scales and gauges, on eight layouts, how does my wallet just not leap out of my pocket and deposit itself in the hands of a helpful dealer? Can I look at a Big Boy or a coal-fired K-28 and not have desires (of the steam kind)? It is just not possible to ignore the craftsmanship of hand-built steam engines.

This year was no different and my credit card indeed groaned at the end, but the smile could not be removed from my face. The smell of steam oil and



**Triple-header:** An aerial view of three 1:32-scale locomotives (operated by Ryan Bednarik, Pete Comley and Mark Kelley) pulling 107 scale box cars on the 'Paso Robles' layout at the Summer Steamup.

the sound of steel wheels on steel rail, the companionship of good friends and a great organization combined to make this the best National Summer Steamup ever, and I don't say that lightly since I've been attending since the second year, way back in 1998.

The 2014 National Summer Steamup was again held at McClellan Park near Sacramento, July 16-20, in the huge air-conditioned McClellan Conference Center building, with more tracks than ever in the 23,600-square-foot main room. McClellan Park is

also the home of the Lions Gate Hotel, our hosts for the event, which is a comfortable hotel with great facilities. The organizers had arranged a spe-





**Veteran advises newbie:** Longtime steamer Peter Ronney, left, helps first-timer Doug Prescott, right.



**Swap tables:** Filled quickly with many items.

cial room rate for our event and that was certainly appreciated. Nearby were numerous choices for restaurants.

The fun began on Wednesday afternoon when the layouts were being set up. The same hardy crew of volunteers seems to do the work every year; my hat is off to them. Steaming was supposed to start officially that evening but a few engines could be seen earlier; after all, one has to test the layouts. The hall was available each day from 7 a.m. until 1 the following morning, and yes, there were people there that late. The biggest crowds were to be seen on Friday and Saturday.

One of the most fun aspects of the event is that locomotive makers such as Accucraft Trains Co. and Wuhu Arts & Crafts Co. Ltd. (Bowande Wuhu), bring pilot models of their new engines to test out on the various layouts. While specifics won't be divulged about any new locos run this year, it was clear that some interesting and well-detailed 1:32-scale live-steamers are going to be available soon.

During the week several folks availed themselves of the short trip to the California State Railroad Museum, a jewel in the heart of Old Sacramento, featuring a real cab-forward Southern Pacific and



**On-site build:** Jim Hadden making joke rolling stock.

numerous other exhibits. Several took the two-hour trip to visit the 15-inch gauge live-steam offerings at Tilden Park in Berkeley, across the Bay from San Francisco. Others reported their delight in having a cable car ride in San Francisco for the first time.

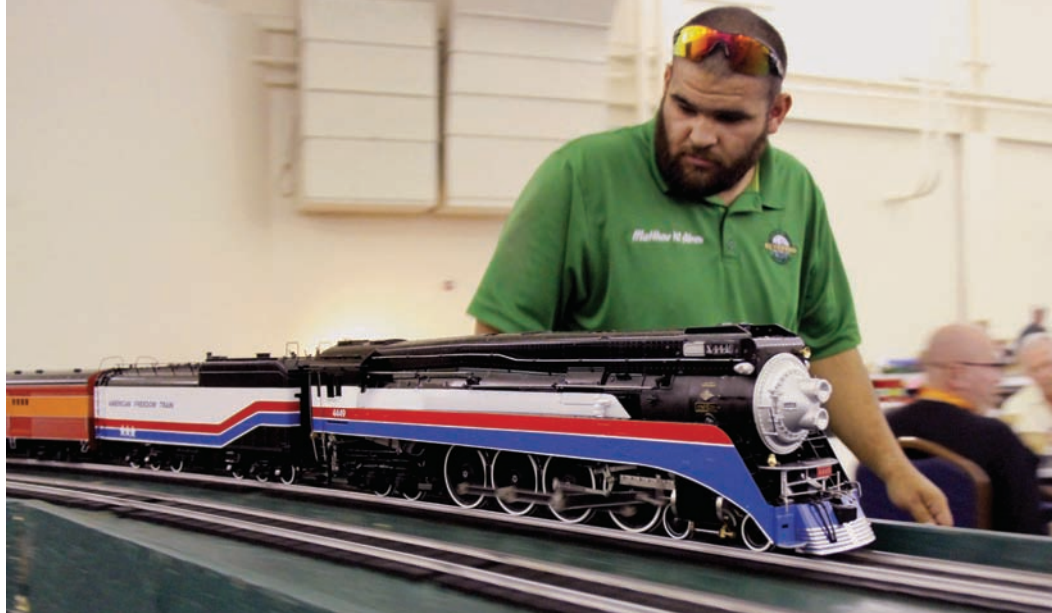
At the steamup hall, it was somewhat deceiving to look around and think that there weren't as many people here as before, but that was because of the availability of eight layouts spread out around the hall. In fact attendance this year was roughly the same, with about 120 steamers and another 40 "observers," plus guests. The Bowande Wuhu crew from China came the furthest to the event; domestically Jason Kovac flew in from New Jersey (or is that "Joisey"?). Ten states and three countries were represented.

## New layout

"Everybody gets track time" has been the motto of the organizers since they took over the event in 2002 and that has certainly been an important aspect, because I saw more folks running trains than ever and fewer waiting for their turn.

Three volunteers bring their personal layouts — Paul Brink of Sacramento, Phil Oldenlage of





**Unique locos:** Left, Bob Sorenson leads a string of ‘Titus,’ an engine he designed. Right, Matt Abreu paces his GS-4 in Freedom Train livery.



**Family business:** Bing Cheng Jr. keeps an eye on the pilot model of the Qian Jin locomotive being built by his father’s company, Accucraft Trains Co.



**Happy steamer:** Arul Tandavan with his ‘Ruby.’

Atwater, Calif., and Glen Simpson of Alamo, Calif. — while the organizers have previously brought four layouts, including the huge “Paso Robles” layout, which has broad 16-foot curves and is 65-feet long.

In addition to the seven layouts available in previous years, Steam Events LLC decided to mount a project to build a new layout for 2014. The group approached Triple R Services of Mount Holly, N.J., and Llagas Creek Railways of Florida, and asked if they would be able to help with such a project. Both suppliers agreed and provided Steam Events with steep discounts on their products. The organizers therefore named the new layout the “Llagas Creek/ Triple R Layout” (except when it’s called the “Triple R/Llagas Creek Layout”) in recognition of that consideration.

The project was led by Jim McDavid from Steam Events; Charles and Ryan Bednarik assembled the base layout in their workshops in New Jersey and then shipped it to Jim’s walnut farm in California’s gold-rush foothills, while Bill Mai and Tom King of Llagas assembled track and switches. Jim and Tony Dixon and Craig Griffin of Steam Events attached the track to the layout.

The Triple R/Llagas Creek Layout is 45-feet long by 27-feet wide, sports 11½-foot radius curves and features dual tracks on decks that are 15-inches wide. It has two steamup bays of 20-feet each, with switches on and off the mainlines. The Llagas Creek/ Triple R layout is made of all-aluminum tube construction, with decking made out of painted Dibond—

— Continued on Page 28





# ACCUCRAFT TRAINS

## MUSEUM QUALITY BRASS MODELS



- D&RGW C-25 2-8-0**
- 1:20.3 Scale, 45mm Gauge
  - Brass & Stainless Steel
  - Limited Production
  - Coal Fired
  - D-Valve
  - Boiler Feed
  - Tender Water Pump

ACCEPTING  
RESERVATIONS

**\$5,250.00**

### EMMA



- 1:13.7 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**\$995.00**

### DORA



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

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### RUBY



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**Starting at \$499.00**

### SHAY - 13T



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**\$2,049.00**

### MOGUL



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

**\$2,049.00**

### MOGUL RGS #11



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

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### MOGUL 'PONCHA'



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

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### CLIMAX



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**\$2,149.00**

### FORNEY



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- Butane Fired

**\$835.00**

### PLANTATION



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- Brass & Stainless Steel
- Butane Fired

**\$999.00**

### AMERICAN



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**Starting at \$2,199.00**

### NA CLASS 2-6-2T

ACCEPTING  
RESERVATIONS



- 1:19 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**\$2,750.00**

### SHAY 28T

ACCEPTING  
RESERVATIONS



- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

**\$2,499.00**

### LNER & BR A4 MALLARD

ACCEPTING  
RESERVATIONS



- 1:32 Scale, 45 mm Gauge
- Brass & Stainless Steel
- Alcohol Fired

**\$3,750.00**

### REBUILT MERCHANT NAVY 4-6-2

ACCEPTING  
RESERVATIONS



- 1:32 Scale, 45 mm Gauge
- Brass & Stainless Steel

**TBA**

### D&RGW K-37 2-8-2



- 1:20.3 Scale, 45mm Gauge
- Brass, Steel, Stainless Steel
- Butane Fired
- Limited Production

**\$5,995.00**

### STREAMLINED PASSENGER CAR

ACCEPTING  
RESERVATIONS



- 1:32 Scale, 45mm Gauge
- Metal Body, Die-Cast Trucks w/ Ball Bearings Metal Wheels
- Available in Unlettered, SP Lark, SP Gray, NYC, SP Daylight, UP Yellow, N&W, Pennsylvania, CP
- Limited Production

**\$300.00/car**  
**\$1,710.00/6 car set**

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# ACCUCRAFT TRAINS

## MUSEUM QUALITY BRASS MODELS

### C&O / VGN H8 ALLEGHENY 2-6-6-6

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- Brass & Stainless Steel
- Limited Production
- Butane Fired
- D-Valve

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RESERVATIONS



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### UP 4-8-8-4 BIG BOY

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Production Limited to 75 Units
- Butane Fired
- D-Valve

IN STOCK



\$8,995.00

### N&W 4-8-4 J-CLASS #611

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Production Limited to 75 Units
- Alcohol Fired
- D-Valve

ACCEPTING  
RESERVATIONS



\$5,750.00

### CP 2-10-4 SELKIRK #5935

- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Alcohol Fired
- D-Valve

ACCEPTING  
RESERVATIONS



\$5,995.00

### PENNSYLVANIA T1 4-4-4-4

- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Alcohol Fired
- D-Valve

IN STOCK



\$6,050.00

### SP M-6 2-6-0

- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- D-Valve

IN STOCK



\$2,750.00

### LNER 'TORNADO' 4-6-2

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel, Butane Fired

ACCEPTING  
RESERVATIONS



\$4,250.00

### DECAUVILLE 0-4-0T

ACCEPTING  
RESERVATIONS



- 1:19 Scale, 45/32mm Gauge
- Brass & Stainless Steel

\$1,695.00

### C&O STEEL CABOOSE

ACCEPTING  
RESERVATIONS



- 1:32 Scale, 45mm Gauge
- Brass & Steel Construction
- Limited Production

\$450.00

### DB CLASS 45 010 2-10-2

ACCEPTING  
RESERVATIONS



- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- D-Valve

\$4,526.00

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**Pennsy at rest:** A K4 cools down after a fine run.



**Teach:** Chuck Stubbs, right, shows grandson Zachary Johnson how to fill an engine with butane.



**Adjustment:** Bob Clark works on a new Wuhu G5.



**32mm:** Ric Collins and his custom coal burner.

— Continued from Page 25

brand aluminum/polyethylene composite boards.

The purpose of the new layout was to provide yet another set of tracks to minimize or possibly eliminate wait times for steamers. It worked, and with the seven other layouts available — for a total of 17 loops — there was always somewhere to run. Nice work all around!

### Swap tables, dealers' room, clinics

I arrived early on Thursday morning to find that the swap tables had already filled up. Soon folks began to drag unused tables from other areas to fill out the swap area, and this seemed to happen quite often as the amount of material available seemed to always be on the edge of overflow.

Nearby, the dealer room hosted 10 suppliers to the hobby and was extremely active during the two hours daily that the room was open.

Represented were: Accucraft Co. of Union City, Calif.; Cab Forwards by RMC of Queensbury, N.Y.; Custom Model Products of Concord, Calif.; Dave Frediani of Sonora, Calif.; The Train Department of Hazlet, N.J.; Triple R Services of Mount Holly, N.J.; Silver State

Trains of Henderson, Nev.; *Steam in the Garden* of Newark Valley, N.Y.; Sunset Valley Railroad of Lake Tapps, Wash., and Wuhu Brand Arts & Crafts Co. Ltd. of Wuhu, Anhui, China.

For many, the six clinics, given Thursday through Saturday, were highlights of the steamup and all were well attended:

- Bob Sorenson of Las Vegas presented “Building ‘Titus,’” on his scratch-built locomotive project.

- Kevin O’Connor from Sacramento’s S Street Unit Shop gave his famous clinic on gas firing, always popular.

- Master mechanic Dave Hottmann, based in Cherokee Village, Ark., talked about “Air Tuning and Basic Operating Theory.”

- Father and son, Charles and Ryan Bednarik, held forth on “Coal Firing, Romance and Realism.”

- Bill Allen of Woodside, Calif., presented “A Tale of Two Heislars” (remarkably similar to the series concluding in this issue).

- The BAGRS Project Engine/Basic Project Loco was discussed by Mike Martin, the Santa Clara hobbyist who designed the scratch-built locomotive.

**More photos:** Once again, the photo staff outdid themselves and we have more great photos than we could print; they’re on the Web at:  
<http://www.steamup.com/nss14>





**Firing:** Mike Laine, ready to light up his bashed 'Dora.'



**Coloradoans:** David Lindholm, from Colorado, with RGS No. 41.



**Inspection:** Alan Redeker takes a look at Accucraft's new S.P. P-8.



**Achtung:** An Aster Deutsche Bundesbahn Br 01 at full steam.

Saturday night is the occasion of several popular events. The annual BBQ dinner was every bit as good as in other years and tables were packed with tired and hungry participants. After the dinner everyone gathered in the main hall for the awarding of door prizes and recognition of various individuals' contributions to the steamup and to the hobby.

One of the most important features of the event is the Ron Brown Memorial Steamup Enthusiasm Award. This is in honor of the late editor and publisher of *Steam in the Garden*; Ron founded the magazine with his wife Marie in 1990 and worked as its editor for the next 20 years.

Tom King was given the honor this year, though sadly he was not present. Tom is a long-time live steamer from San Martin, Calif., and was chosen for his dedication to having fun at the Summer Steamup, always bringing humor to the proceedings, in addition to being the event's on-site track and layout repairman. This year's steamup was the first he'd missed since the founding in 1996.

In addition, Clark Lord, Bill Turkel and Sonny

Wizelman were recognized by the Steam Events crew for their commitment to the Summer Steamup over the past dozen years. All will retire from the management of the organization by the end of December. (In addition to Craig Griffin, the other two new members of Steam Events will be steamers Chris Coley of Morgan Hill, Calif., and Bob Sorenson.)

Closing out the evening's program was the awarding of door prizes (yours truly actually won something) and then more steaming and a lot of packing up and saying of goodbyes.

Sunday morning had light attendance, with just a few of us hangers-on. The last steamer snuffed his fire just before noon and the stage was struck in less than two hours.

I left this year's Summer Steamup with a hole in my wallet but a big grin still on my face, and I vowed to return next year, and every year. If you attended you know exactly what I mean; if you have never been here you should come and find out for yourself.

Next year's National Summer Steamup will be held at the same venue, July 15-19; see you there.



The Roundhouse Sandy River No. 24  
was loose as a goose, so it was time to replace the

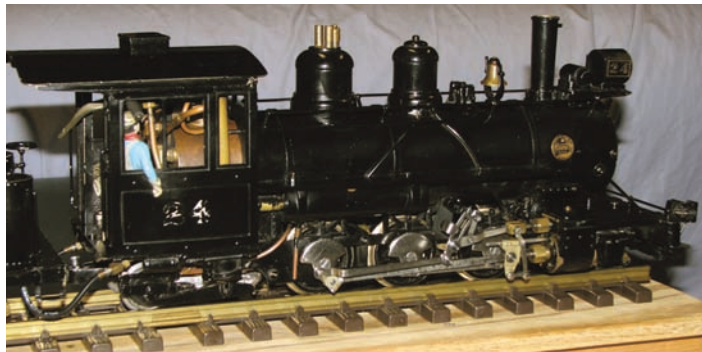
# AXLES

Text and photos by Bill Courtright

**Y**ou might ask, why does anybody need to replace axles of all things? Locomotives from Roundhouse Engineering Co. Ltd. run their axles in bronze bearings that are pressed into the frame. For two years I'd known that the drivers on my Sandy River and Rangeley Lakes Railroad No.

24, especially the rear set, were loose as a goose. At the 2013 International Small-Scale Steamup at Diamondhead, I talked to English steamer John Shawe about it and he said it was the axles wearing, not the bearings.

I decided to do nothing about it as my No. 24 was running as smooth as ever, not appearing to be suffering from increased play. This year at Diamondhead, though, I saw another coal-fired locomotive built by Shawe, a Fowler (originally) owned by Jeff Young of suburban Toronto, Ontario. This locomotive was showing a serious limp, and Jeff had replaced axles on this loco before. Jason Kovac of



**No. 24:** The author's Roundhouse Sandy River & Rangeley Lakes Railroad locomotive.

The Train Department had the needed Roundhouse parts on hand, and by the next day Jeff had replaced his axles and his locomotive was running smoothly once again.

This led me to buy the parts since they were right there, no waiting, no ordering from England, and no shipping and handling. Being inspired by

Jeff and his quick turnaround, I finished replacing my axles as well as some small shoulder screws yesterday.

My main axle showed the worst wear; the non-concentric area underneath the bearing had one side worn down 0.029-inch. The soft steel axles act like sacrificial anodes, preserving the bronze bearings. This was worse noticeable wear than on Jeff's axle. (I don't know if I saw his worst axle or not.)

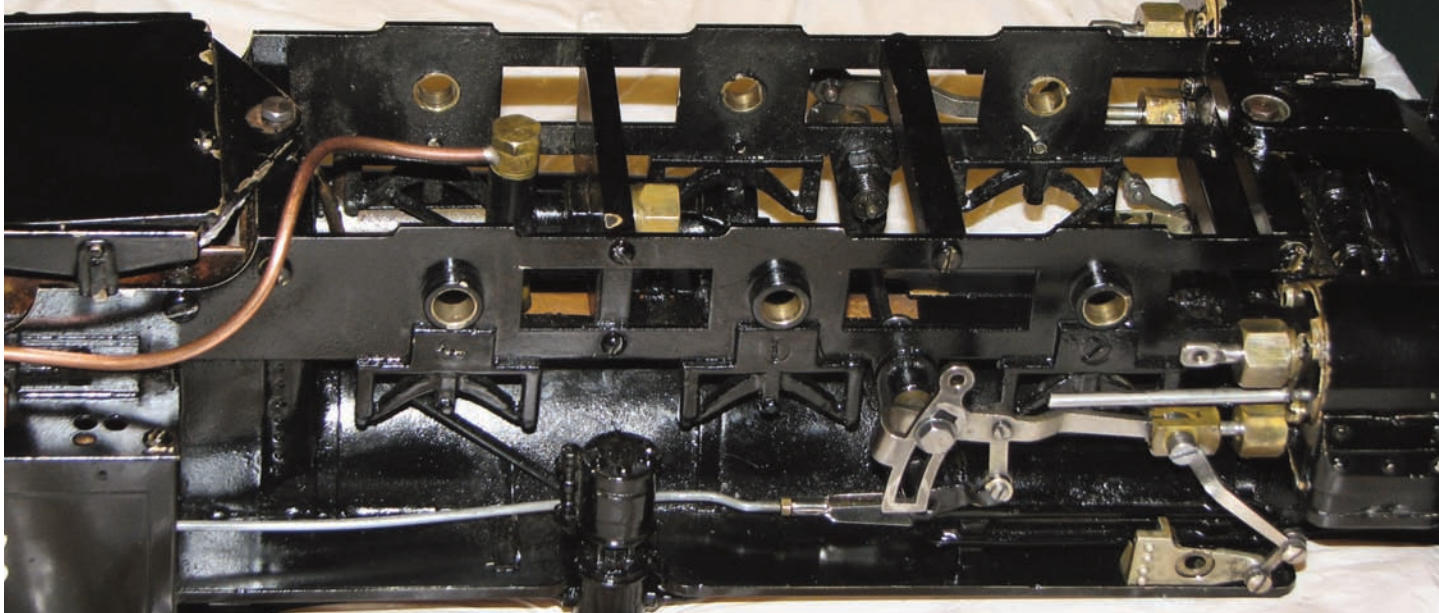
Replacing the axles turns out to be a much easier job than replacing bearings. It looks like the Roundhouse people know what they are doing.

The job was easy enough once I removed as much of the running gear as I could, so that I could get support on the bottom while unscrewing the top. I used three standard screw dies stacked for support and this worked well. I didn't want to ruin the screws holding the axles in, but then I saw that new

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*This article originally appeared in the Houston Area "G" Gauger, July-August 2014, and is reproduced here with permission.*





**Belly of the beast:** *The underside of the locomotive after the linkage and axles had been removed.*

screws were provided with the new axles. It's a good thing they come with their own screws as they were a different size than the ones on my old axles.

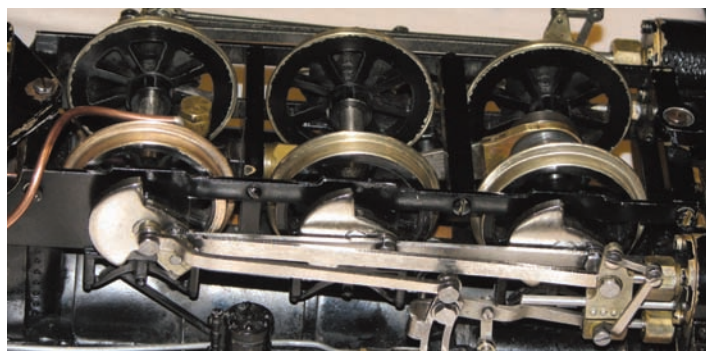
Still, these screws were in darned tight, but support made it possible to get them out. What makes this job easily doable is the little machined square on the end of each axle — quartering is automatically correct. Any mistake you make is going to be 90 degrees off.

I drew pics of both sides of the running gear before disassembly. Valve gear did not have to be taken apart. Oh, by the way, I oil these bearings before every single day of running; I guess the runs last longer than the oil.

I ran into two problems with this short job. I wanted to replace the main drive pin on the main drivers, but this operation is not so straightforward. A new hole on the new pin has to be drilled in exactly the right place for the valve linkage, and a new roll pin installed. I would rather have this assembly done by Roundhouse. I know this pin has a lot of wear on it because of all the wear on all of the other little pins you can replace. I bought all the little pins Jason had left, but I still need more.

The second problem was a real hoot. On No. 24 there are detail “springs and equalizers” screwed onto the frame. For 16 years every once in a while I would notice the loco would not move unless I gave it a little sideways jog, and then it would take off liked a scalded rabbit.

This didn't happen all the time, as a result I just didn't snap to what was happening. When I removed the wheels I had the, “Aha” moment. The ends of the detail screws would catch the wheel spokes every once in a while. The screws chipped paint off the wheel spokes in places easily seen with the wheels off. I ground those offending screw ends off with a rotary tool (Dremel). I masked the whole locomotive with clear plastic (Saran Wrap) but still got plenty of



**Success:** *The new axles are installed.*



**Mix-and-match:** *Accucraft arch-bar trucks (with Roundhouse wheels) on No. 24's tender.*

brass particles all over everywhere. It was sleeting here yesterday but I took the loco outside and gave it a water spray wash then compressed air to finish cleaning everything. I still have some work to do with cotton swabs (Q-Tips) in some small recesses. The bearings were easy to clean as this wash was done prior to reassembly.

The loco is back together now.

The pics show before and after, plus one shot of my Accucraft arch-bar trucks (with my Roundhouse wheel sets) bought the first year Accucraft came to Diamondhead.

I didn't sleep much at all the night Sandy River No. 24 lay in pieces.



# To honor a steam-video win, the prize 'Dora' gets a **Snow plow**

Text and photos by Eric Schade



**L**ast year, I entered my snow-plowing video, “Blizzard on the Winnegance and Quebec,” into *Steam in the Garden’s* “Steamie Video Awards,” and won first place. I was excited to receive a “Dora,” the starter steam locomotive from Accucraft Trains Co., and a trophy, as my prize.

Now that I had a “Dora,” though, how could I make her my own? I am not one to leave well enough alone. I thought it would be fun to add a snow plow to recall the “Blizzard” video. My thinking in doing this work was to make the details large and chunky to help “Dora” look small but businesslike, if a bit quirky.

I started by making the plow itself. I used an old olive oil can for the material. I cut the top and bottom off with a can opener then cut it into useful sheets using my old paper cutter. The paper cutter does a fine job of making nice neat straight slices in the tin plate from a can.

Regular scissors work well for other cuts. I didn’t make any drawings or careful measurements but just went at it. I made two wings for my butterfly-style plow just by eye. They ended up needing some trimming later on, but I figured that I had a lot of tin plate and could play without any cost.

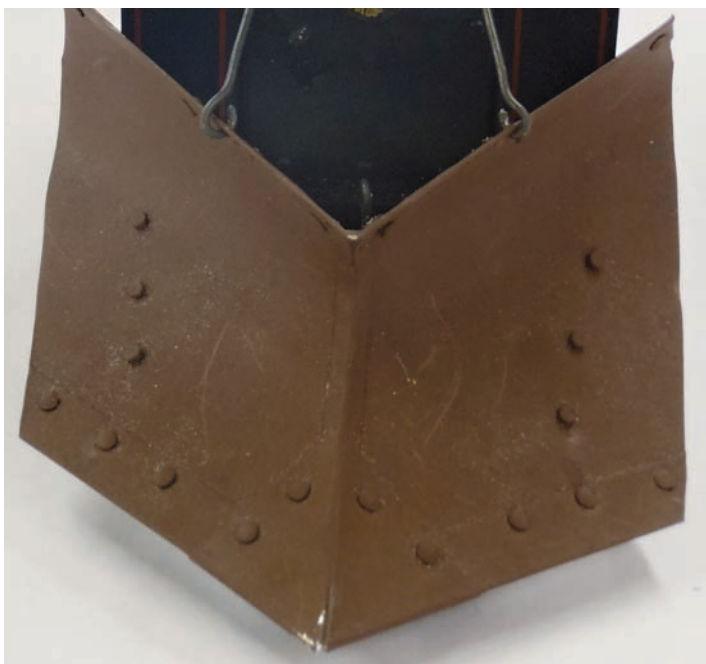
I folded a strip to reinforce the bottom cutting edge of the plow, cut a piece to join the two wings and riveted them all together using escutcheon pins pushed through

drilled holes, clipped off and hammered to flare the back side.

I didn’t carefully lay out the rivets but just located them by eye to give a backwoods look to the plow. I added some other bits to dress up the joint between the two wings and to tie them together.

The plow is mounted on a wooden beam which fits against the engine’s buffer and is held in place by a pin through the coupler. This is a simple installation which didn’t require modifying the engine. It did leave the plow a little floppy. To stiffen the plow, I added two “stays” which would hook into the plow





**Rivets:** *Hand placed without any lay out.*

and somewhere up on the smoke box.

A spray of red primer on the plow gave it a good rustic look. A shot of the same primer on the cab roof tied the plow and engine together visually.

Well, most snow falls at night, so we would need a headlight. I had an extra oil headlight I had made for another project. It was 7/8ths scale and large ... but what the heck, I thought, it looks good!

I made a bracket with a platform for the light that would be screwed to the top of the smoke box. It also had two holes to catch the plow's "stays." I drilled and tapped (threaded) four holes in the smoke box next to the smoke stack. This is part of the boiler but outside of the volume which holds water so I didn't have to worry about it being steam tight.

I wanted to make my engine a bit more unique. I decided that a wood burner's smoke stack would do the trick. I had experimented with making one some time ago using some bronze mesh that I had in my junk box. I started by cutting a circle of the mesh and molding it with my hands into a dome shape. It was easy enough, but to attach that to the smoke stack took some thinking.

I started by making a ring from strip brass (silver soldered closed) this would allow me to rivet strips up over the top of the dome of mesh which would hold it in place. I then made a cone from some copper flashing. This was made by starting with a partial disk like a pie with a slice or two missing which was then rolled closed.

The seam could then be silver soldered, which made it very strong yet still able to be formed. I smoothed the shape, then bent the rim of the cone vertically so that it would fit into the bottom of my ring of mesh.



**Unique:** *Wood-burning stack with bronze mesh.*

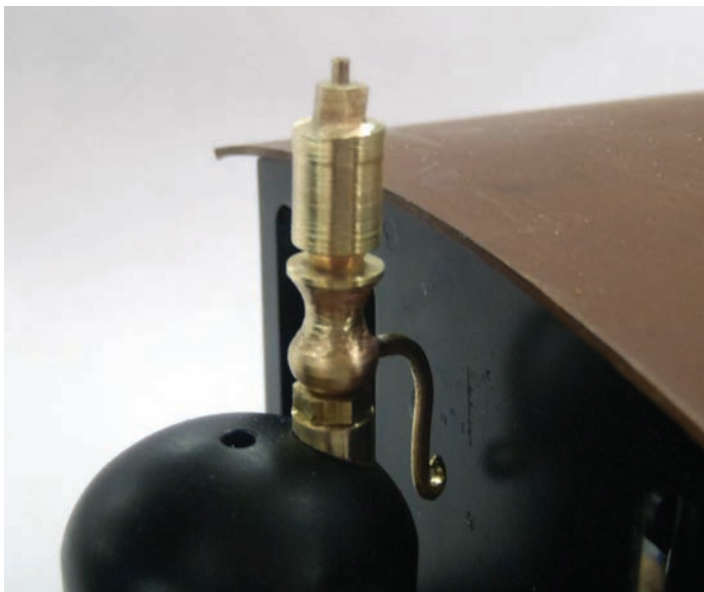


**Stack:** *Pipe slips over existing 'Dora' chimney.*



**Changes:** *New stack and headlight add to look.*





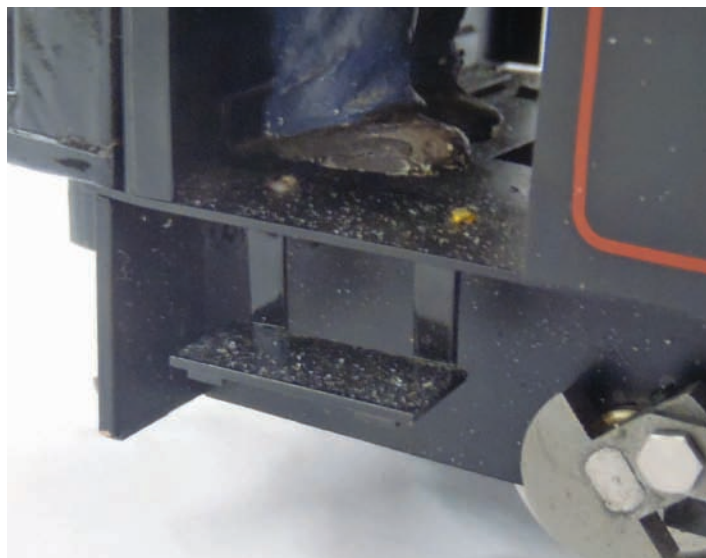
**Whistle:** *Cut on lathe and threaded to fit dome.*



**Side tanks:** *New hatches and a bell were added.*



**Rear tank:** *Made larger with some copper flashing.*



**Added steps:** *Left over from some 'Ruby' projects.*

The point of the cone needed to be cut open and also flared out to match the chimney pipe. I actually used a pipe that was big enough to slip over Dora's stock chimney. I locked the cone, chimney pipe and mesh ring together with silver solder and some small screws. A little flat black barbecue paint and the stack looks the part of an old time wood burner.

I added a brass whistle to the dome. I made the whistle on my lathe and threaded it for a 2-56 screw. Because the whistle is mounted on the back of the dome rather than the middle, it doesn't fit flat against it.

I cut a piece of tubing at an angle to fill the angled space. I drilled and tapped a hole in the dome and threaded on a 2-56 stud (a screw without its head) and screwed the whistle down snugly. I marked the "back side" on the whistle, unscrewed it and added a brass "lever" with a bit of silver solder. Once the whistle was back on, I bent the lever down to its final shape.

The stock side-tanks on "Dora" are nicely shaped and have a nice red pin stripe. I didn't really want to get rid of them but they needed something. I decided to add fill hatches to each and a bell to one side.

I machined two hatches from brass rod, threaded them to for a 2-56 thread and soldered on a handle. Again, using a stud, the hatches just screw into a threaded hole in the top of the tanks. I machined a bell on my lathe and using a saw, drill and files made a yoke and stand for it. This too was screwed into a hole on the top of the fireman's side tank.

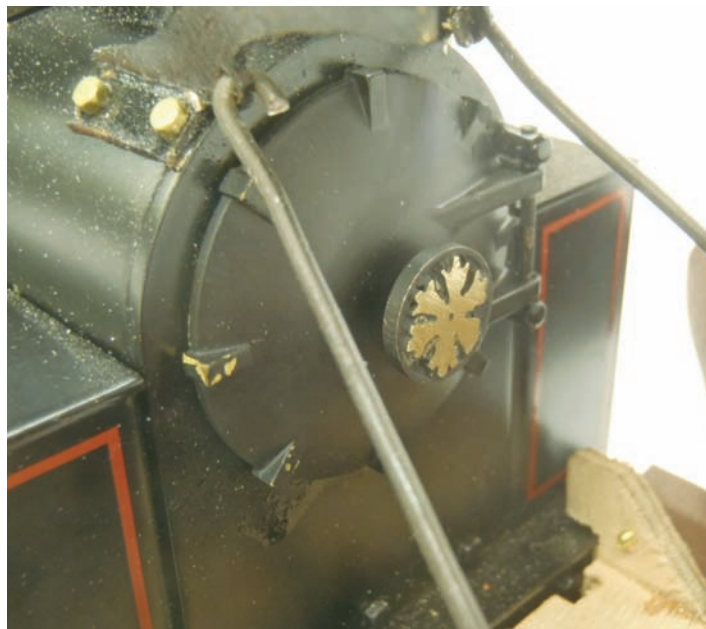
The rear tank supplied with "Dora" looked too small to balance out the large butterfly plow on the front, so I made a new rear tank just a bit bigger from some of my copper flashing. A scrap of house wire forms a lip around the top edge. The parts were then silver soldered together.

I added steps under the doorway to the cab. These





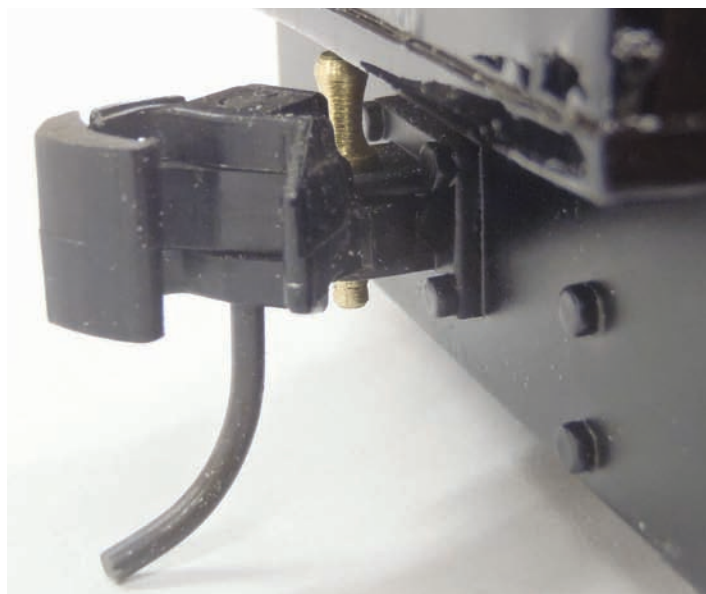
**Snowflake:** *Jeweler's saw, files, unprintable words.*



**Number plate:** *Replaced 'Dora's' No. 7 on smoke box.*



**Back end:** *New tank, coupler and 1:20.3 engineer.*



**Coupler:** *Kaydee in 'Dora's' pocket with pin.*

are just steps left over from some “Ruby” projects I had in my scrap box. I bent the vertical brackets so that I could screw them to the bottom of the cab deck. A pair of 1-72 screws into threaded holes holds them securely.

Just for fun, I changed the “7” on the number plate to a snowflake. I machined the number plate to clean off the paint and to give a nice big flat surface to decorate. I spent quite a lot of time working on some brass scrap with a jeweler's saw, file and some unprintable words, but ended up with a nice little brass snowflake. I then silver soldered it onto the plate. I cleaned the flux off and painted the whole thing with black barbecue paint. When it dried, I polished the paint off the snowflake with a fine file.

As all the rest of my equipment uses couplers

from Kaydee Quality Products Co., I needed one for “Dora.” I found an offset-shanked coupler in my parts bin that fit the “Dora's” coupler pocket and was the right height. I made a nice brass pin which fit snugly in the hole in “Dora's” coupler pocket to hold the Kaydee in place.

A big thank you to the staff of *Steam in the Garden* for the award of the “Dora,” which is a neat little engine that runs well. She is simple to operate and looks good with her changes.

The addition of a fat 1:20.3-scale engineer standing on the foot plate brings her to life. I like to make my own components but if you want to do something along these lines, plenty of good detailed parts are available from sources like Accucraft itself, Trackside Details or The Train Department.



Third time is a charm for this ground-based steam layout

# Rivendell & Midland RR

Text, photos and illustration by Les Knoll, P.E.

**A**fter building two live-steam layouts in Illinois in the 1990s and 2000s, my wife Ruth and I built a new home in Lake Norman, N.C., in 2012. On the newly reincarnated Rivendell & Midland Garden Railroad, though, quality would trump quantity — the North Carolina lot was much smaller than my space in Bartlett, Ill. What had been 10-foot diameter curves in Illinois would be five-footers in North Carolina and No. 4 switches would replace the No. 6s of the earlier layout.

The new layout is on the ground and the beautiful wooded North Carolina scenery can't be beat. In the last issue, I addressed the design and early construction of the new layout, including my practice of naming my railroads and their towns after locations in the stories of J.R.R. Tolkien, notably the journey taken by Bilbo Baggins in "The Hobbit."

The concept railroad is set in 1910 and is a single-track mainline linking Midland City — the main terminus and largest city on the line — with the logging town of Hobbiton, the town of Rivendell and the ore docks at Brandywine River, then continuing through to the Misty Mountains and the Mordor Loop.

Despite all best efforts, the back end of the lot was still four to six inches lower than the portion closest



**Picking up logs:** *The Hobbiton's Shay at Lothlorian.*

to the house. This meant that a berm had to be constructed on the back end of the railroad, effectively raising the track work almost six inches.

Even though this was a lot of earth-moving work, all manual, it turned out to be an advantage since all the track work was now significantly elevated above the surrounding ground. This made the track work look more realistic and helped greatly with drainage and reduction of washouts.

Leveling of the track was checked with every section that was laid. Track laying started at the Rivendell yard and terminated at either end of the pond. It was hoped that the two ends of track would meet



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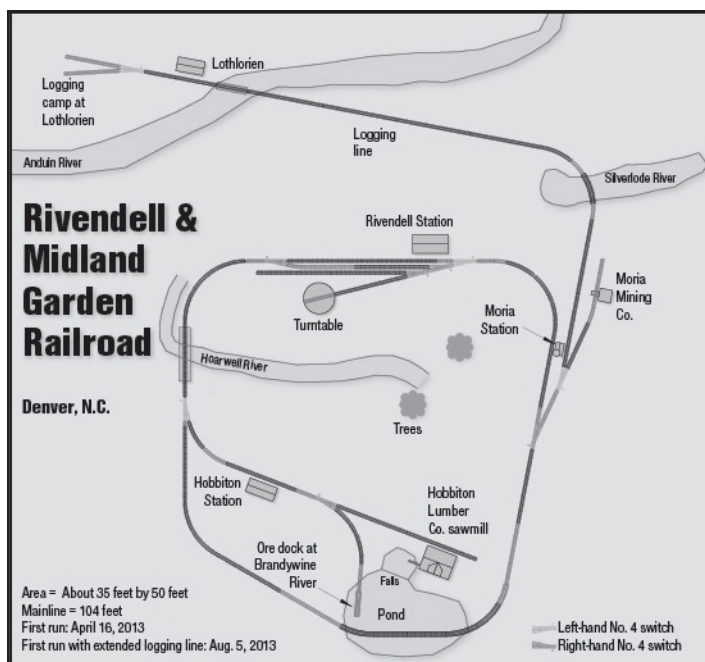
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at the same elevation at pond's edge since the long trestle bridge was to be perfectly level.

Expensive laser levels were not used. Instead, the tried-and-true method of using a water level (a technique first practiced by ancient Egyptian engineers) was adopted. Even with the best of efforts, there was still an inch-plus variation in height when the mainline came back upon itself after its 104-foot run. This was made up in two long straight runs of track with less than one-half-percent grade. Since the railroad has settled, the grade has become negligible.

The idea of a perfectly flat 35-foot by 50-foot plot of land does not hold up well with the North Carolina "gully washer" rains. In the railroad's first season, I soon found that several drainage ditches — more like mini-rivers — had to be dug in several areas of the railroad property. This was mostly because of the front and side yard sloping toward the back, carrying all the drain water with it.

Gutter drains were also in the worst possible places. They were easily diverted by buried water conduits, but two main trenches had to be dug. These turned out to be a golden opportunity for more bridges. This is so much like full-size railroading in that these features were placed where they were actually needed, not at the whim of a modeler.

The "golden spike" was

driven and the first continuous run made on April 16, 2013. Not only the day after tax day, it was the same date the Chicago Rivendell & Midland was completed exactly 13 years before.

Even with robust and fine-quality track and turnouts, this railroad, like any other, had to go through its fine-tuning period. Even before track was laid, switching tests on sections of track in the garage showed that much of the rolling stock, including locomotives, would have to have their wheel gauge corrected to run through the precision-made turnouts from Switchcrafters of Albany, Ore., without derailing.

The lead and trailing trucks on the 2-8-0 Consolidation and 2-4-4-2 Mallet had to be rebuilt with longer swing arms to consistently negotiate the No. 4 turnouts, especially when backing. Leveling of the turnouts side-to-side was also very important; otherwise wheel sets can more easily "pick the points," especially in backing.

The locomotive modifications were made, and with properly leveled track a train will snake through the yard ladder at Rivendell or the spurs at Moria without incident. Since the track freely floats on ballast, all levels have to be checked periodically.

The Rivendell & Midland is an operator's layout. Its design follows the old-school philosophy of hobbyist and model-railroad author John Allen that a railroad ought to "go somewhere" and "do something." As realistic an operating scheme as possible was the ultimate goal, combined with preserving the scenic beauty of the surroundings and avoiding a busy, cluttered appearance.

There are four switching areas: The first is the origination point of the line at Hobbiton. Here there is the sawmill for the Hobbiton Lumber Co. and the nearby spur to the ore dock at the Brandywine River, inspired by the Dolly Varden mines of British Columbia.

The next switching point is the yard at Rivendell, the largest town on the railroad. The yard has a

passing siding, a single-ended siding and engine turning facilities. Engine servicing facilities such as water and coaling are available here. An engine house or roundhouse may be added in the future.

The third switching area is Moria, the final terminus of the main line, with its John Allen-inspired witch's hat station. A short spur leads — *Continued on Page 40*

## Building Rivendell & Midland

**A** relocation to North Carolina meant that live steamer Les Knoll needed to build a new layout. As opposed to his Illinois ground-operation layouts, this one would need to emphasize quality over quantity.

### • Part One — Design, early construction.

Using a 2D computer application to lay out the railroad; differences between Illinois and North Carolina (*Steam in the Garden*, September/October, 2014, No. 135).

➤ **Part Two — Operating philosophy.** Finishing construction and how Les uses the new railroad.





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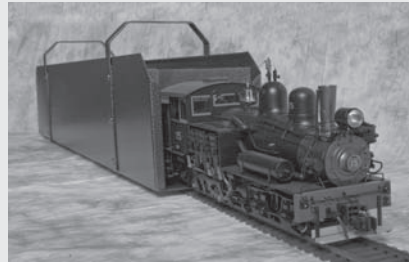
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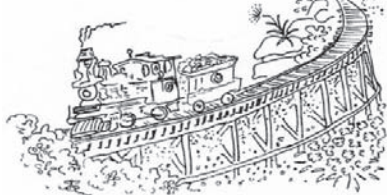


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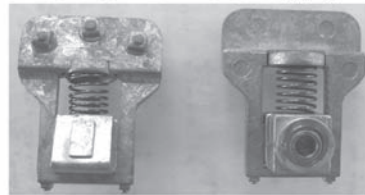


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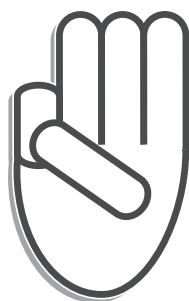


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**Dropping empties:** *The Climax pushes hoppers up to the Moria Mining Station.*

— Continued from Page 38

to the Moria Mining Co., a large scale version of Malcolm Furlow's Saratoga Mine, which ships raw ore to the ore docks on the Brandywine River.

The branch line spur off the main line at Moria runs behind the Moria station, connecting the 65-foot logging line along the edge of the actual woods to the town and logging camps at Lothlorien, the fourth switching area with two sidings for car sorting, freight and logging traffic.

When logging traffic will allow, the portion of the spur behind the Moria station can be used as a freight spur for Moria. Incoming logging trains must then switch cars on the freight spur to the mining spur before proceeding over the logging line. This leads to more operating possibilities.

The railroad has a number of modes of operation. The most basic is peddler freight service, often with a mixed consist, from Hobbiton, through Rivendell, and eventually terminating at Moria with potential pick-ups and drop-offs at all towns and industries. An extended peddler run can be made by backing on the logging spur to Lothlorien and switching loads and empties there. Two spurs are available at the logging camp so cars can be sorted. To lengthen the run, several turns around the track can be made between stops.

A return trip can be simulated simply by completing the loop back to either Hobbiton or Rivendell, or by backing from Moria to the Rivendell rail yard and performing the actual turning operations for true point-to-point operation. Peddler freight duties are performed either by Rivendell & Midland's 2-8-0 Consolidation or the 2-4-4-2 Mallet, which it shares with the Hobbiton Lumber Co.

Passenger runs follow the same basic route. In addition to main line stops, an additional stop at the dis-

tant logging camp town of Lothlorien is made by backing down the logging line from Moria to Lothlorien.

Usually all passenger cars except the combine are cut off at Moria prior to the Lothlorien run and re-join the train after it returns from Lothlorien, to continue on to either Rivendell or Hobbiton. This is backwoods, branch line railroading all the way, real grass-roots narrow gauge stuff.

The Consolidation or the Mallet can do the main-line passenger runs. The Consolidation reluctantly makes the runs through to Lothlorien because of close clearances on the bridge which crosses the stream near the logging camp there (deliberately constructed this way). The Mallet rarely ventures back there; that's essentially geared locomotive territory. This coming year may see a widening of that bridge.

The two main industries on the railroad each have their special operations. The Hobbiton Lumber Co. has lumber camps at the furthest reaches of the line, the logging camps at Lothlorien. A Shay is dispatched from either the Hobbiton sawmill or from the Rivendell yards if it has just been serviced there. It can be deadheaded with just a cabooses, or have a train with empty log cars to deliver to the logging camp. The log train travels on the mainline, crossing the curved trestle bridge over the lower pond, and arrives at the Moria station where it takes the switch to the logging spur leading to Lothlorien.

There are two sidings at Lothlorien where empties and loads can be exchanged. The full log cars are taken from Lothlorien to Moria, then on the main line over the trestle bridge and back to the sawmill at Hobbiton. To add to the action, especially if a good number of log cars are involved, the Shay can pick up full cars at the Lothlorien logging camp and drop them at the spur behind the Moria station. The

— Continued on Page 42



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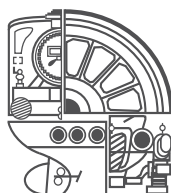
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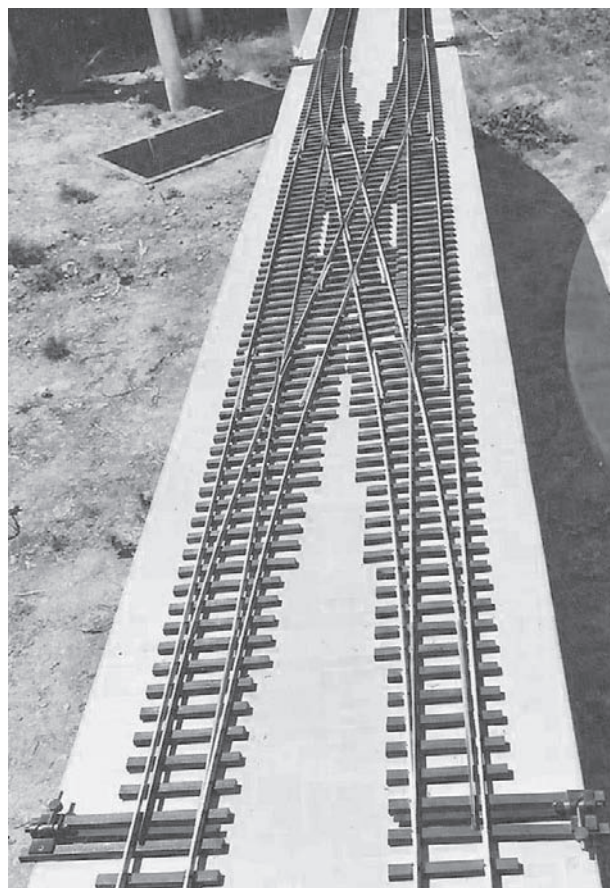
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**Freight across the Brandywine:** *The 2-4-4-2 Mallet carefully negotiates the trestle over the pond.*

— Continued from Page 40

2-4-4-2 Mallet can then come to Moria, pick up the log train and make the run back to the mill, simulating larger logging operations and using two steamers in the process.

The Moria Mining Co. operation was inspired by the Dolly Varden Mines of British Columbia, as described in Darryl Muralt's book "Steel Rails and Silver Dreams." The mine structure was inspired by Malcolm Furlow's "Saratoga Mine" featured on his HO<sub>n3</sub> layouts seen in *Model Railroader* and *Narrow Gauge and Shortline Gazette*. Needless to say, scaling this structure up from HO was no small undertaking. The structure is over three feet tall.

As with the Dolly Varden prototype, the motive power owned by The Moria Mining Co. is a small Climax. This locomotive is dispatched from either the Brandywine River docks or the Rivendell yard and travels back across the curved trestle bridge to Moria where it picks up loaded ore cars at the Moria Mining Co.

The ore cars — which, by the way, were scratch-built scale-ups of the popular Gould HO ore cars — are hauled back from Moria, over the trestle and back to the ore dock at the Brandywine River, a scaled down version of the Dolly Varden dock at Alice Arm, British Columbia.

The reverse procedure can be done to return empties to the mine. I hope to make covers for the ore cars representing ore loads so the cars can easily be converted from "loaded" to "empty" cars. Smaller scale modelers often use this trick.

Even though the names of locations on the railroad are taken from Tolkien's works, there is nothing

at all whimsical about this railroad, as is sometimes the case on garden railroads. You won't find wizards with pointed hats at the stations or trolls working at the sawmill or in the mines.

The logos for the railroad are based on Denver and Rio Grande prototype. The number of structures is kept minimal, only enough to define the various areas of the railroad.

A final touch on the railroad was the lighting of the structures and switch stands. The view from our screened porch at night is nothing short of spectacular, from the glow of the work floor of the Hobbiton sawmill, to the multi levels of the huge Moria mines ablaze with light, to the faint glow of the distant station lights of Lothlorien.

The design and building of this railroad has shown that better does not have to mean bigger. The saying goes that the one with the most toys wins; I tend to think it's the one with the best toys. Having the woods and lake as a backdrop makes the railroad much more appealing.

A concentrated design effort resulted in retaining most of the features of previous layouts, many improved features, and many additional features, in a much smaller space. The smaller amount of trackage combined with more robust and more finely made track components have resulted in much less maintenance and smoother running.

Two things I learned while running this railroad: Having a railroad in the woods means having to clear your track of forest debris far more often; and doing operations and switching in live steam consumes surprisingly more water than continuous running. Watch those sight glasses!



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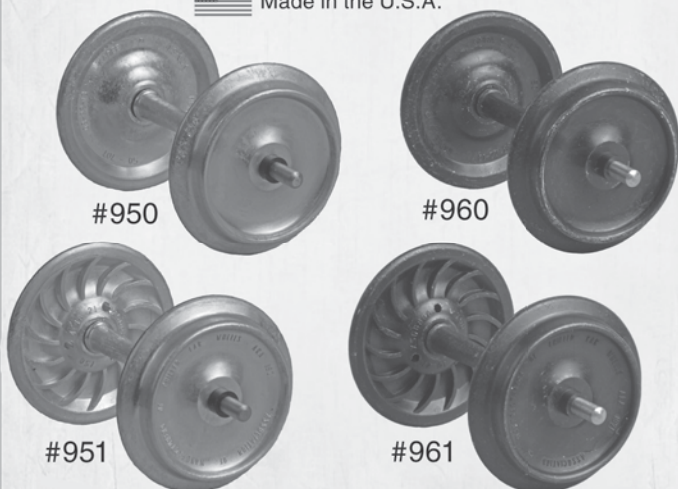
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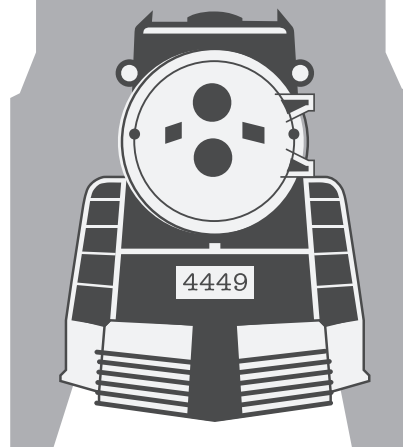


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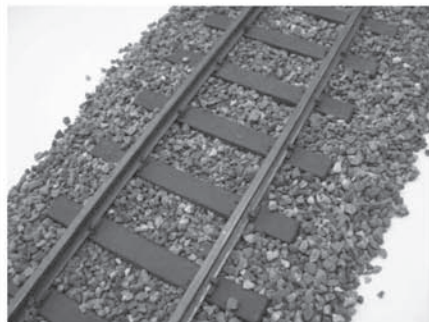
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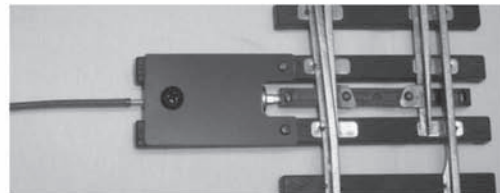
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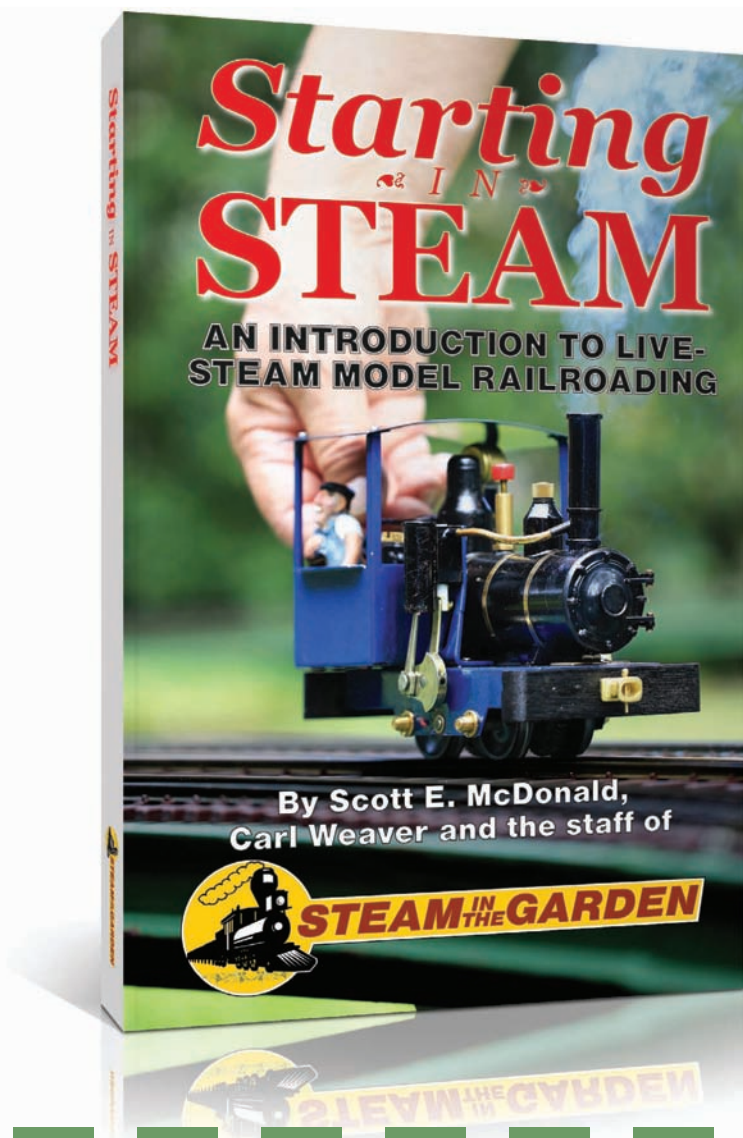
## A BEGINNERS' GUIDE TO LIVE-STEAM MODEL RAILROADING

"STARTING in STEAM" is a new 174-page book designed to help not only small-scale live steam newcomers, but veterans as well. Written by the staff of *Steam in the Garden* magazine, the book has just been released and provides a wealth of information on how the locomotives work, how to run them, how to care for them and how to have fun with them.

"STARTING in STEAM" includes 10 chapters, with titles such as "Choosing your first locomotive," "Butane-firing basics" and "Getting help." Additionally, the book features an extensive glossary that addresses not only the specifics of live-steam model railroading but also general railroading terms such as "cylinder," "piston," "switch" and "Whyte notation."

"STARTING in STEAM" is available both in paperback and digital versions. The paperback retails for \$9.95 in the United States and for a limited time we'll provide free shipping (Canada and overseas is higher). The digital version is \$5.95 on the web site; single copies (as well as bulk purchases) are also available by calling (607) 642-8119.

<http://www.steamup.com/starting/>



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### BR41 in 1:32 scale

Our first German live-steam model train, the BR41 is a 2-8-2 brass and stainless steel G-gauge locomotive, 29½-inches long, 3⅜-inches wide and 5⅝-inches tall. It's butane fired by a ceramic burner.

**This locomotive won the Drawbar Pull Certificate and Trophy at the 2014 International Small Scale Steamup at Diamondhead.**



Limited to 50 sets released worldwide

### No. 1 'Falk'

A Gauge 1, 1:20.3-scale, 0-4-0 brass, live-steam model of a locomotive built in San Francisco and used as a Pacific Northwest logging engine. With axial pump, it runs more than 10 minutes. 21½-inch radius. 8¾-inches long, 4¼-inches wide, 6-inches tall (222mm by 109mm by 151mm).



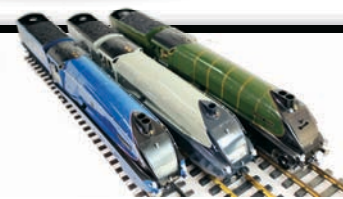
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### U.S. Porter in 1:20.3 scale

This 0-4-0 loco is simple and easy to operate, yet it is also a fine-scale brass model. 8¼-inches long, 3½-inches wide, 5⅝-inches tall (210mm by 90mm by 137mm). 45mm gauge. 3.6 pounds (1.65 kg).

Limited to 100 sets released worldwide



### BRITISH A4 in 1:32 scale

Brass and stainless-steel 4-6-2; G-gauge with whistle. 27-inches long, 3½-inches wide, 5-inches tall, 13 pounds. Single-flue, butane-fired boiler, runs more than 60 minutes with automatic water pump.

Reservations accepted



### NEW! 1:32-scale CHINA'S 'BIG BOY'!

Three Qian Jin 2-10-2 locomotives still operate in the United States. The model will be offered with a butane ceramic burner or coal firing and can be supplied with radio-control or as R/C ready.



### LMS STANIER CLASS 8F in 1:32 scale

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New ceramic burner 8F



### BRITISH BLACK 5 in 1:32 scale

All brass model of LM&S' 4-6-0; G-gauge (45mm) with whistle. 24¼-inches long, 3½-inches wide, 4¾-inches tall, 11 pounds. Single-flue, 60-65 PSI boiler, reinforced buffer beam and cab frame; runs more than 60 minutes with automatic water feed.

New ceramic burner Black 5

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## TIMETABLE

**Nov. 28, 2014** — Gauge One Turkey Trot, Pennsylvania Live Steamers, Collegeville, Pa. Info: <http://www.palivesteamers.org>.

**Jan. 11-18, 2015** — International Small Scale Steamup and Arts Festival, Diamondhead Inn and Suites, Diamondhead, Miss. Called “the most important small-scale event in the United States,” Diamondhead includes 24-hour steaming, a “flea market,” seminars, dealer tables, a festive meal and extracurricular activities. Diamondhead Inn & Suites: (228) 255-1300. Info: Patrick Darby, [k5pat@bellsouth.net](mailto:k5pat@bellsouth.net), (985) 867-8695; <http://www.diamondhead.org>.

**Feb. 13-15, 2015** — Presidents’ Day Steamup, Electric City Trolley Museum (Steamtown), Scranton, Pa. Info: Clem O’Jevich Jr., (570) 735-5570 or [wrunloco@aol.com](mailto:wrunloco@aol.com).

**April 10-12, 2015** — Cabin Fever Model Engineering Expo, York Fairgrounds & Expo Center, Toyota Arena, York, Pa. Displays of all types of model engineering, including Gauge One live steam. Info: <http://www.cabinfeverexpo.com>.

**April 23-26, 2015** — Spring Steamup, Staver Locomotive, Portland, Ore. Info: <http://www.staverlocomotive.com>.

**July 5-11, 2015** — National Garden Railway Convention, Crowne Plaza Airport Hotel, Denver, Colo. Info: <http://ngrc2015.com>.

**July 15-19, 2015** — National Summer Steamup, Lions Gate Hotel, McClellan, Calif. Multiple layouts, more than a dozen loops, 38,000-square-

foot steamup hall; open 7 a.m.-1 a.m. Clinics, dealers’ room, door prizes, swap tables, Saturday night BBQ. Lions Gate room reservations: (916) 643-6222 (<http://www.lionsgatehotel.com>). Info: <http://www.summersteamup.com> or (650) 898-7878.

**Sept. 2-5, 2015** — Thirty-fifth National Narrow Gauge Convention, Royal Sonesta Galleria Hotel, Houston, Texas. Layout tours, modular layouts, clinics, dealers. Info: <http://www.nngc-2015.com>.

## Regular steamups

**Southern California Steamers.** Contact Jim Gabelich for dates, places and other pertinent information. (310) 373-3096. [jfgabelich@msn.com](mailto:jfgabelich@msn.com).

**On the Brink Live Steamers.** Wednesday, and occasional weekend, greater Sacramento, Calif., steamups on elevated live-steam tracks at two locations. Info: Paul Brink (916) 635-1559, [paulbr@aol.com](mailto:paulbr@aol.com).

**Puget Sound Garden Railway Society.** Two steamups per month, one at the Johnsons’ on the second Saturday and a steamup at a member’s track on the fourth Saturday. Info: <http://psgrs.org/livesteamtimetable.html> or call Pete Comely at (253) 862-6748.

**Pacific Coast Live Steamers.** Irregularly scheduled backyard steamups, mostly in S.F. Bay Area. Info: <http://www.p-c-l-s.org/>.

**Michigan Small Scale Live Steamers (MSSLS).** Info: <http://www.mssls.info>.

**Greater Baton Rouge Model Railroad Club Open House and Gauge One Steamup.** Info: Ted Powell, (225) 236-2718 (cell), (225) 654-3615 (home), [powell876@hotmail.com](mailto:powell876@hotmail.com).

**Upstate N.Y. Steamers.** Several steamups per year in various locations around Western New York. Info: <http://www.tinyurl.com/upstatesteamers>.



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*Steam in the Garden* is the only magazine devoted entirely to covering the small-scale live-steam hobby. Since 1990 the magazine has taken readers inside the railroads and inside the workshops of the leading modelers and shown how fun and easy live steam model railroading can be. Six times a year, *Steam in the Garden* gives subscribers a look at the current trends in the hobby and reviews the latest products available.

Are you a builder of live-steam models (or do you want to be)? *Steam in the Garden* has detailed articles that explain how experienced builders create those once-in-a-lifetime projects that can't be found anywhere else.

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*Steam in the Garden* has a new editor, but the magazine is sticking to its 20-year history of giving hobbyists the best information, illustrated profusely, in an easy-to-read format. Fill out the form below and subscribe today to *Steam in the Garden*.

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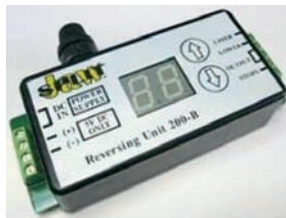
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