

The N&W Class J No. 611 electric-to-steam

Conversion

Text and photos by Charles & Ryan Bednarik

All of us who have developed an interest in the railroad hobby were drawn to it for myriad reasons: a love of a road name, the power, the speed, torque, style, regional or country connections or even childhood memories influenced our choices in how we engage the hobby.

A friend of ours, Bob, would debate with us what the best steam engines were — as most of us have in our lives. The discussion would range from tractive effort, drawbar horsepower, speed, road name, production numbers, to what really made a proper locomotive — whittling down to whether or not the only “real engines” were ones that had smokestacks.

When we attended a train event, he would venture to his favorite and while we would move toward our interest in steam power. So much so, that we would chase and ride our favorite, the Chesapeake and Ohio J3a No. 614, a 4-8-4 “Greenbrier,” while he would do so with the Norfolk & Western Class J No. 611, which is an impressive streamlined 4-8-4.

Since those early years of seeking opportunities to experience the “real thing,” the best one can do on a regular basis is to operate a model live-steam locomotive. Unfortunately, commercial offerings in Gauge One live steam have not presented either Nos. 614 or 611 as production models.



At one point in time, Aristo-Craft considered producing a C&O No. 614, but chose instead to make the Mikado. Garden Railway Co. imported an N&W Class J model, produced by Samhongs of Korea, in the early 1990s, but the model was an electric-powered, highly detailed offering and we still desired the sleek, black C&O locomotive.

In 2006, the 50th year since No. 611 was last in revenue service for the N&W, we took a visit to the Virginia Transportation Museum in Roanoke. This gave us pause to reconsider No. 611 as a live-steam Gauge One model. We had hoped that with the anniversary of the famed N&W locomotive that the upcoming U.S. Aster offering would be the Class J 4-8-4, but the Nickel Plate S3 2-8-4 Berkshire was chosen instead.

Then an article was published by fellow hobbyists



Tear-down: The electromechanical components are removed from the Samhongsu 1:32-scale No. 611.

in the *Gauge One Model Railway Association Newsletter and Journal*, on how they converted an electric locomotive to live steam. This was inspiring, but we had reservations: how to obtain a base model, would the major components be useful and did we have the skills necessary to convert the locomotive?

A decision was made if a No. 611 could be found, then we were confident that we could convert it. The search was on — with many opportunities slipping beyond our grasp. Finally, on eBay there was the earlier version Class J No. 600 for sale. When we reached the owner he indicated that model was sold, but he had another available, the last one in his collection. Thus the quest has begun to have a representation of (arguably) one of the finest steam locomotive ever to grace the iron ribbons: N&W No. 611 had arrived.

Why model this particular steam locomotive? The N&W Class J was the most powerful 4-8-4 to run for any U.S. railroad, and one of the finest steam locomotive designs ever produced. The J's combined large cylinders, high steam pressure, and low drivers to generate a high tractive effort of 80,000-pounds, without a booster engine, and stood out for a Northern. The J's were famed for their dual-service capability, pulling long freights or running passenger trains at a consistent 70-plus mph.

Automatic lubrication at over 200 points and roller bearings on all rotating points (axles, main and side rods, valve gear, wrist pins) permitted 15,000-plus miles-per-month usage and 1½-year intervals between shop visits. The engine could perform at a level equal to the Pennsylvania Rail-

The N&W Class J No. 611 series: electric-to-steam conversion

How do you get a live-steam model of a locomotive you've always loved? Charles and Ryan Bednarik — owners of Triple R Services of Mount Holly, N.J. (www.realsteamservices.com) — decided to convert a 1:32-scale, electric N&W J Class No. 611 to live steam. In this five-part series, they walk readers through their process of removing the electromechanical pieces and adding in the boiler and fittings.

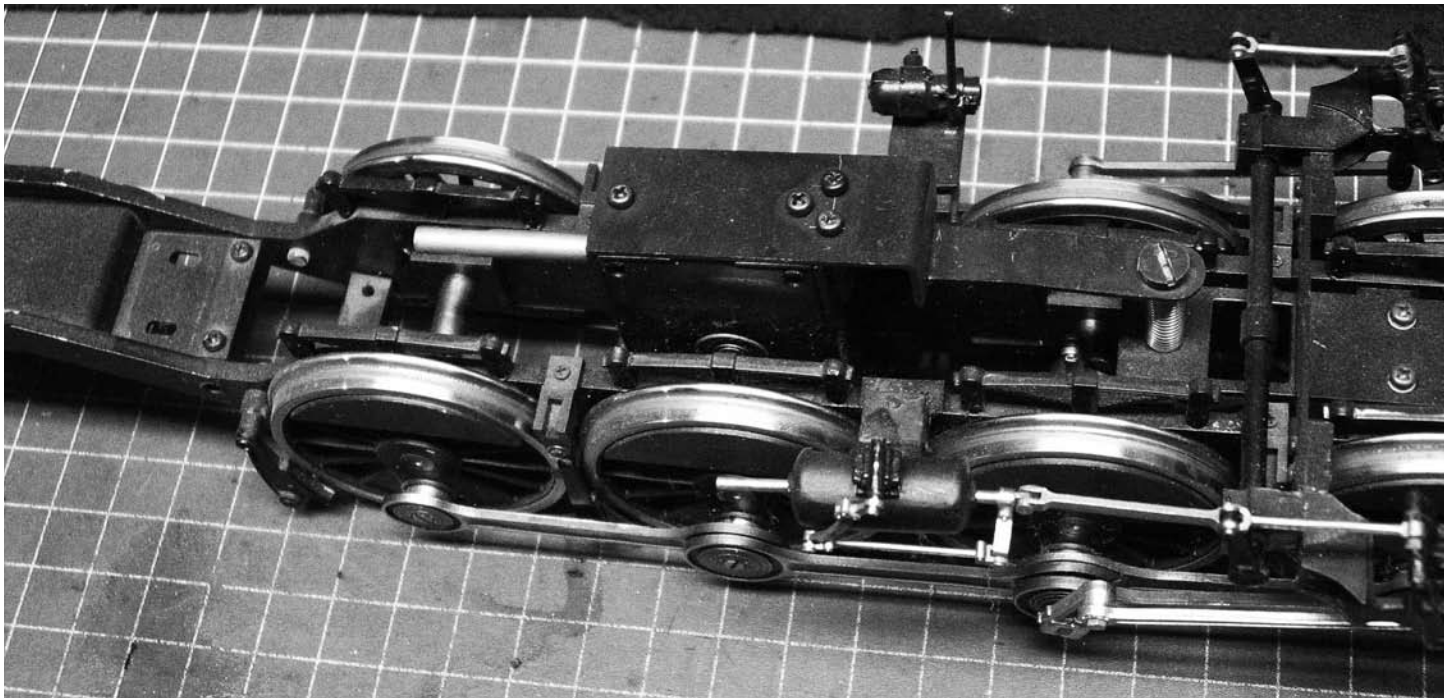
■ **Part One:** Background; general overview of conversion up to the finish of electrical removal.

Part Two: Overview of swap; focus on chassis, cylinder, suspension, running gear, tender mods, and build expectations.

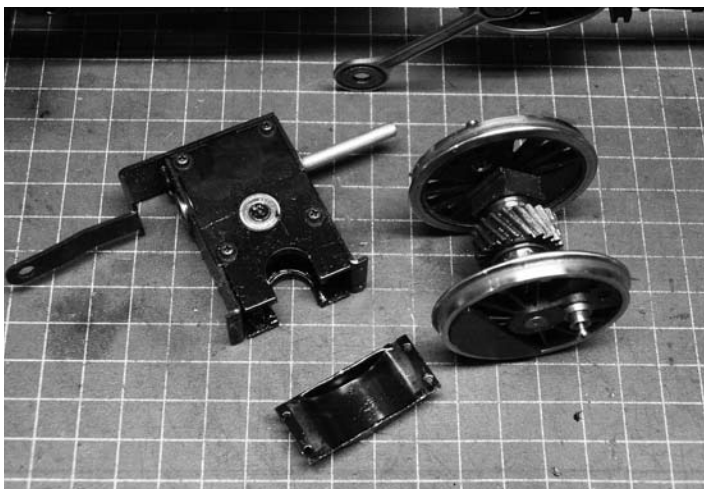
Part Three: Basic components — cylinders, steam lines, axle pump and running gear.

Part Four: Basic components — boiler, back head, exhaust and plumbing.

Part Five: It's alive — completed and running.



Looking hopeful: *Two large Canon coreless motors and bevel gearbox unmounted easily.*



Gearbox: *Mounted to the axle, the wheels would have to come off before the gear could be removed.*

road T1 or the N&W A locomotives. Then there is the beauty of its streamlining that added form to the function. Finally, the Class J is a symbol akin to that of the “Alamo,” as the N&W was a last bastion for revenue steam service on the major American railroads.

How about the model itself? It is certainly a fine scale model with great deal of detail in all the right places. Spot on with the drive wheels, running gear, suspension, along with the impressive streamlined body work, cab and super-detailed back head matches with a tender fitted with an auger screw, opening water hatches, even the tool boxes have miniature hasps and hinges that keep the doors closed. The entire engine and tender is enveloped with the proper paint scheme and a distinctively streamlined

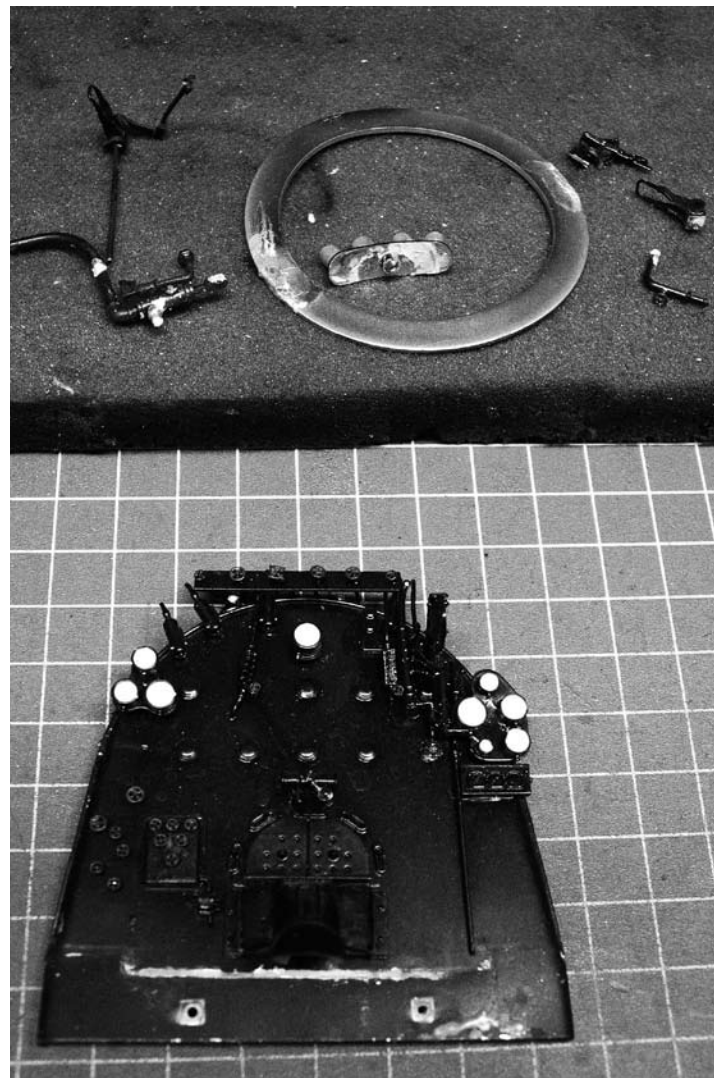
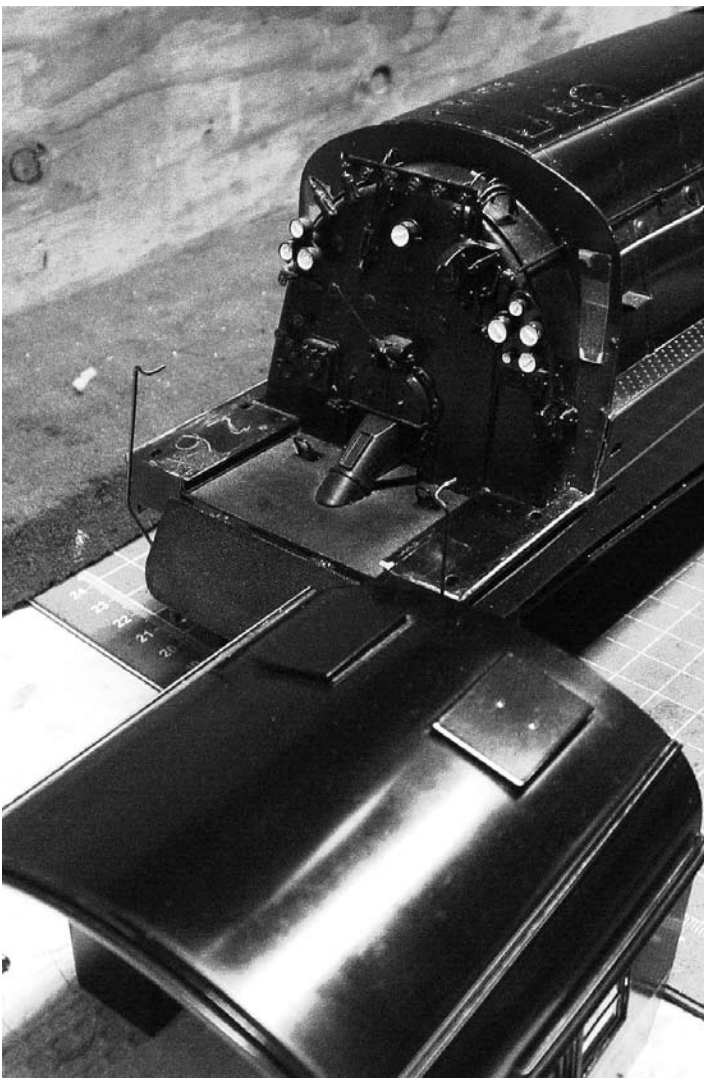
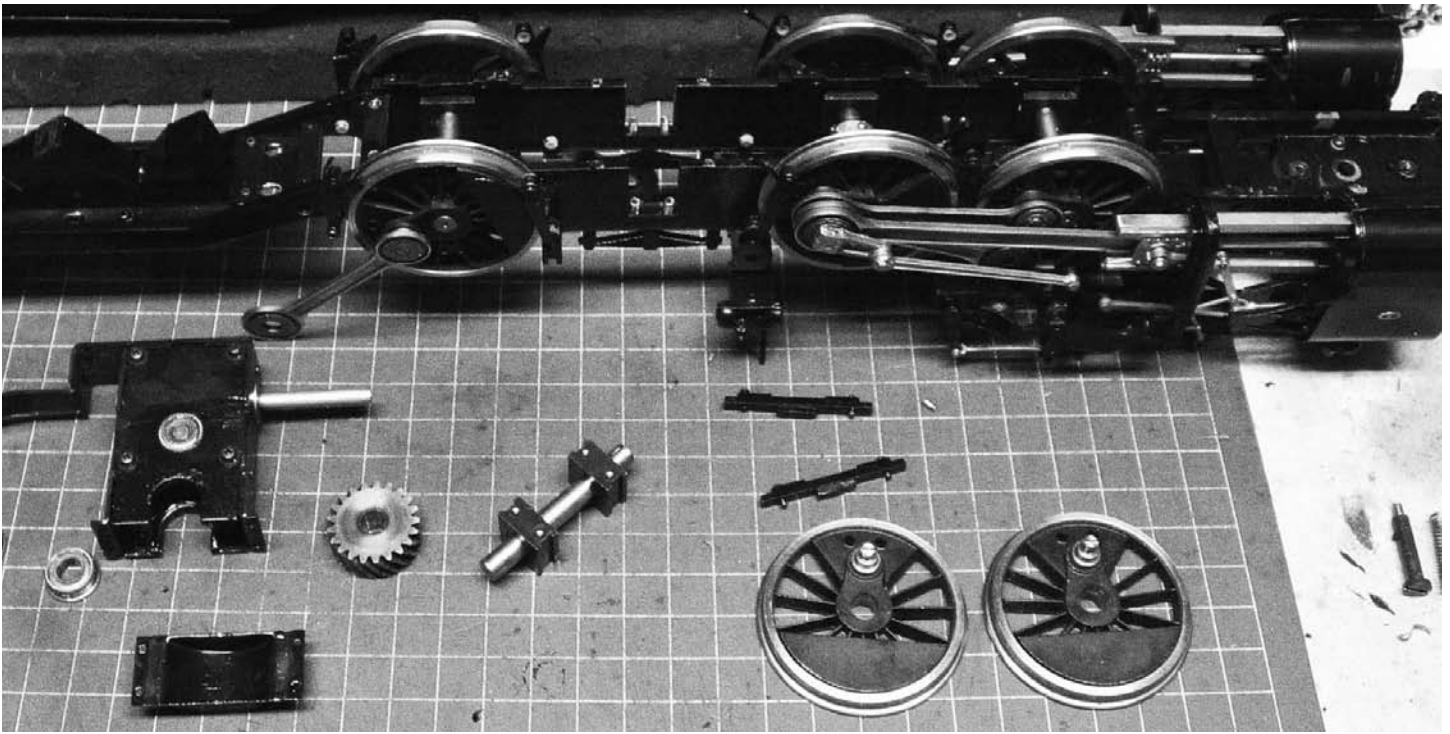
shell. Given it is 1:32 scale with the correct bits and pieces, all that was needed would be a steam power plant, steam lines, fittings, cylinders, valves, safeties, water pump, check valve, exhaust, blower, throttle, oiler — all the usual components that are standard to a ready-to-run live-steam model.

Earlier, we mentioned developing the confidence that we could convert the electric model of the N&W J Class to a live-steam model: This evolution for us was founded through the numerous opportunities to repair, build and upgrade Gauge One live-steam locomotives the hobby has given us over the years.

The turning point in the skill level was the building of various Aster locomotives along with research and development on improving the Accucraft GS-4. The latter was done in collaboration with Gordon Watson of Argyle Locomotive Works in Australia, in regards to both the GS4 and Accucraft’s AC-12 cab forward.

The knowledge gained from what is necessary to make a working model culminated from many books (Kozo Hiraoka, Martin Evans, John van Riemsdijk), magazine articles and most importantly, fundamental skills developed from taking apart and putting back together locomotives from a variety of manufacturers, including Aster, Accucraft, Pearse, Aristocraft and Argyle, with each giving unique insight to techniques used or needed.

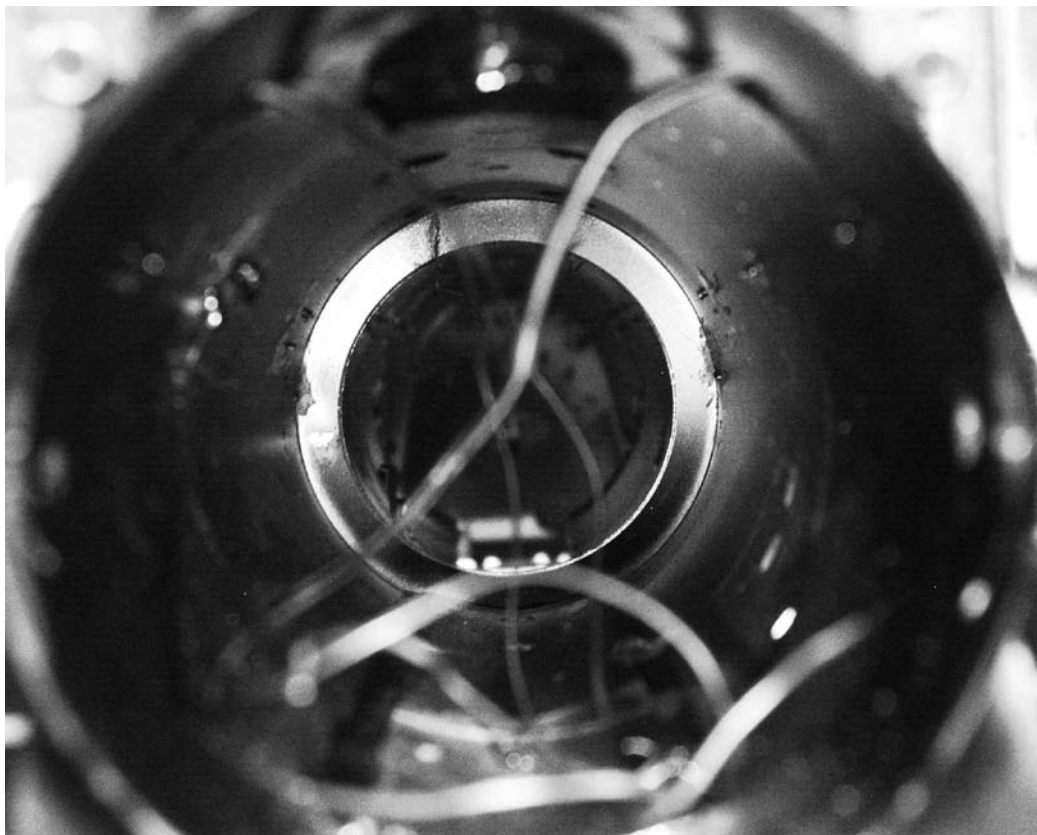
In particular we learned what our limitations would be (both time and skill), where to fill in the assistance needed and how to seek the resources necessary for a retrofit of this engine. We were able to locate the extensive works drawings from



Further progress: Top, wheels — and gears — were removed with care from the axles; bottom left, the backhead attached to the boiler shell; bottom right, the backhead after it had been taken off.

the N&W Historical Society. A trip to the Virginia Museum of Transportation to again inspect the No. 611 for a better understanding of application from plans to build was helpful.

Then a partnership with Justin Koch for a critical aspect of the conversion: boiler and cylinder work. Justin made a big impression on the eastern U.S. small-scale live steam scene with his own conversion of an Accucraft electric K27 to a coal-fired steam engine in 2008. His boiler work has been impressive and meets all standards acknowledged by the hobby, built to ASME and Australian boiler codes, and undergoing the G1MRA process for boiler testing.



Shell of itself: *Inside the boiler shell after the components were removed.*

Getting started

The starting point was getting rid of the electric components. Without the convenience of a builder's manual, the disassembling of the engine was as much exploratory searches as it was a process of seek-and-find-access in order to remove the electronic components.

Step one would be to remove the boiler shell allowing access to the inner electrical of the motor, circuit board and gears. Upon a quick examination, we found that the job of getting inside the engine seemed to be very straight forward. The task of dismantling the locomotive was started with location of mounting screws for the boiler shell — two in the rear and one in the front.

Once the shell and cab were separated from the frame, removal of the electric circuit board was in order. A couple screws and disconnecting of wires later, the disassembly was well underway. This was followed by unmounting the two large Canon coreless motors and their bevel gearbox. Things were looking very hopeful; perhaps the first portion could be done early.

However, next up was an object that would take a considerably larger amount of work, the main gearbox. The gearbox was mounted onto the axle before the wheels were pressed on and had to be removed in similar fashion. The driver had to be taken off the frame and one wheel removed from the axle. This can be a concern at times if the wheels are of a poor

metal quality or a porous casting — the wheel's fine spokes can crack when pressing it off the axle.

Taking things slowly and cautiously is recommended, so that any problems can be resolved quickly. Fortunately, the wheels on No. 611 were a high quality casting and separating the wheel from the axle went well. Once the gearbox was removed, the driving wheel had to be re-quartered. This was easily accomplished with a commercially available jig from Metalsmith Ltd., a supplier in the United Kingdom.

The boiler shell was next on the list, with an internal baffle and the very large (six-pound) balance weight removed to allow the paper mockup of the boiler to be fitted. One final obstacle remained, the super detailed backhead needed to be removed. The problem was that the backhead had been soldered with the same melting grade of solder that was used for the rest of the shell.

Wanting to preserve the detailing, the decision was made to cut the boiler shell at the seam that joined the backhead to the rest of the shell. This was the better choice rather than trying to de-solder the plates at the seam and risk the detailing falling off in the process through the heat-sink effect.

The successful removal of the original electric components allowed for a work session with Justin and Ryan focusing on fittings necessary to configure a boiler drawing.

The next installment in this series will cover the design and fitting of the boiler to the chassis.