

Who designed the first GG1? Not Raymond Loewy!

Classic Trains®

THE GOLDEN YEARS

Summer 2009
DISPLAY UNTIL
AUGUST 5, 2009

GG1

75
YEARS

GG1

Special section on
America's most famous
electric locomotive

Photo timeline, cutaway drawing, engineer's memories, and more!

PLUS

All-steam, all-color photo gallery

Wartime adventure on the Rio Grande

Milwaukee Road night switch job

Trains to the Indy 500 • **Southern Railway roundhouse**

Pennsy GG1 4854 rolls
east at Hunter Tower,
Newark, N.J., in 1955

www.ClassicTrainsMag.com

\$6.95



Vol. 10 • Issue 2

man, and after college and military service (Army Corps of Engineers), joined Missouri Pacific as a management trainee and spent 27 years with MP and UP as a field operating officer. He now is v.p.-transportation for the Montreal, Maine & Atlantic. This is his second CT byline, following a piece on CB&Q's *Fast Mail* in Fall 2006.

Jim Shaughnessy ["One Sunday in November," page 43], of Troy, N.Y., is a prolific railroad author and photographer. "The Shaughnessy Files" appears in each issue of CLASSIC TRAINS.

Hampton C. Wayt ["Donald Dohner: The Man Who Designed 'Rivets,'" pages 30-35] is an industrial design historian and researcher. He became interested in Dohner after interviewing several of his Pratt Institute students, who often mentioned that he had designed the GG1. As a rail enthusiast whose grandfather worked for the PRR, Hampton was intrigued and decided to investigate. Research into Dohner's life yielded photos of the models that he created for the project. This article, his first with CT, marks the first time Dohner's involvement with the GG1 has been publicly recognized. Hampton thanks the following people who provided information and photos: Pamela Dohner, Jonathan Lippincott, Christopher T. Baer of the Hagley Museum and Library, Michael K. Burshtin of Amtrak, Robert B. Watson, Chuck Blardone, and Budd Steinhilber.

Karl Zimmermann ["Two Ways to Skin a 'G,'" pages 44-49] has long been an active rail historian, preservationist, and writer; one of his books is *The Remarkable GG1* (Quadrant Press, 1977). This is his 10th CT byline. He's on the left with Raymond Loewy on ex-PRR business car No. 120 at the 1977 GG1 4935 ceremony. ■



ALCO

**A YEAR OF DEMONSTRATIONS
A HALF CENTURY OF SERVICE**

ALCO'S DL-640 LOCOMOTIVE

by Christopher MacDermot and Richard Steinbrenner


A history of a locomotive of which only 27 were built. Book includes: 150 color photos plus B&W, publicity releases, maps, plans & technical reports- all in a full descriptive text. 178pp.

See your dealer or order online at: www.ontrackpublishers.com

ON TRACK PUBLISHERS, LLC \$64.95 + \$6 Shipping


16 Mt. Bethel Rd. #281, Warren, NJ 07059 **732-469-3503**

Available from the C&NW Historical Society



Wrecking Folio is an Archives reproduction book of a C&NW manual on handling wrecks that involve cranes and involve the use of other techniques. A roster of cranes which is found on page WK-13-1. The book was last updated in 1955, but some material was added, including a roster of "modern" cranes, found at the back of the book.

A number of pages deal with handling diesels. A few pages deal with passenger cars.
\$35 postpaid.



Tales of the Rails is an Archives book by E. M. (Gene) Lewis. It gives an overview of the history of rail use in the United States, and then details rail use on the C&NW. Types of rail, and the abbreviations used on the rail itself, are included. It also has information on rail failure.

While this book tends to focus on the C&NW, it should appeal to a wider audience who may not find such material elsewhere. **\$11 postpaid.**

TO ORDER, send a check to
C&NWHS:
C&NWHS - CT
P.O. Box 1068
North Riverside, IL 60546
Visit us at www.cnwhs.org

1 YEAR Membership:
Includes 4 issues of the *North Western Lines* magazine. \$32.00 each.

Membership benefits:
Quarterly Publication • Annual and Regional Meetings
Active Archives • Modeling Information

Judged by many readers as the premier magazine in its field.



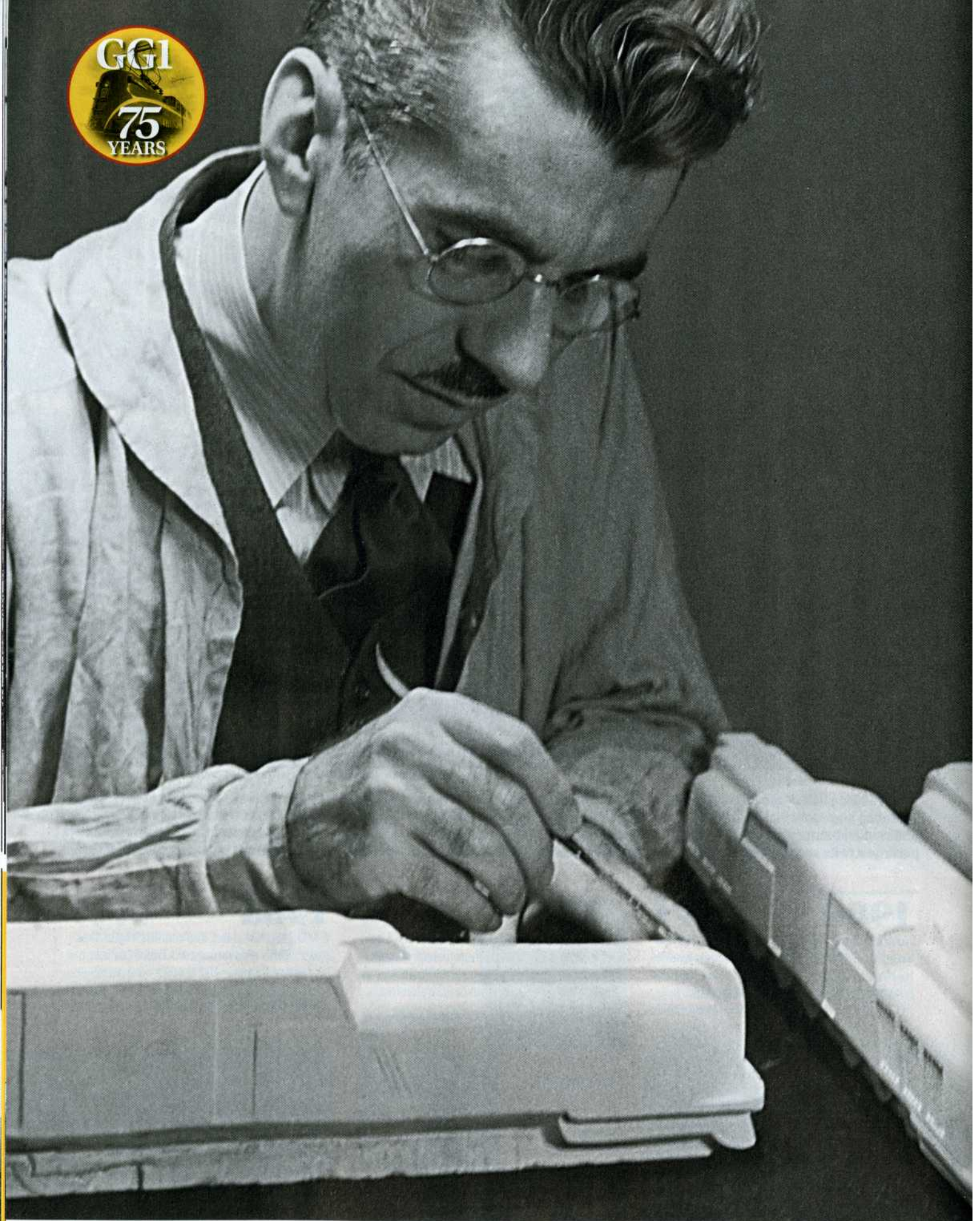
Published quarterly for members of Shore Line...
80 pages of informative articles reflecting past and present with beautiful color and black and white photography.

Share the experience, Join us in Shore Line today!
Dues are only US \$29. per year (US \$50. Canada and other international countries.) *Back issues are available.*

SHORE LINE

P.O. Box 425
Lake Forest, IL 60045
www.shore-line.org

Name _____
Address _____
City _____ St _____ Zip _____



Donald Dohner: The man who designed 'RIVETS'

Long overshadowed by the flamboyant Raymond Loewy, the true designer of the GG1 was a major figure in his day

By Hampton C. Wayt

Few would deny that the GG1 is one of the most beloved locomotives in railroad history, and whenever any object reaches such an iconic status, its admirers are anxious to associate a name with its creation. For nearly 75 years, only one name—that of famed industrial designer Raymond Loewy—has been linked with the design of the GG1. But new information has surfaced which indicates that another well-respected industrial designer of the era—Donald Roscoe Dohner—was, as primary designer on the project, responsible for the design of the GG1 prototype locomotive, lovingly nicknamed “Rivets” for its riveted carbody shell.

Born in 1892, Donald Dohner was highly regarded as both an industrial designer and a design educator. In 1934 he started the first degree-granting, industrial-design program in the United States, at Carnegie Institute of Technology (now Carnegie-Mellon University) in Pittsburgh. One year later he moved to Pratt Institute in Brooklyn, N.Y., where he developed the industrial design curriculum that has made Pratt one of the leading design programs in the world to this day.

Dohner’s career as an industrial designer began in East Pittsburgh with Westinghouse Electric & Manufacturing Co. (WEMCo), for which in 1930 he was named head of the new “Art in Engineering” department. In this capacity, Dohner was placed in charge of the design of the products manufactured in all 25 WEMCo plants across the country. During his four-year tenure at Westinghouse, Dohner would be credited with the design of more than 128 products,



William D. Volkmer collection

Donald R. Dohner poses with three plaster models depicting his designs for what would become the GG1. Though slightly different from one another, their influence is apparent in the first GG1—“Rivets”—pictured at Broad Street Station, Philadelphia, in late 1934.

Jonathan Lippincott collection



CLASSIC TRAINS collection

PRR's dissatisfaction with its P5a 2-C-2's (like 4701 at Manhattan Transfer, N.J., in the early 1930's) prompted it to try a 2-C+C-2—the GG1. After a P5a engineer died in a grade-crossing accident, a safer cab arrangement was sought, resulting in Dohner's center-cab GG1 design.



Louis A. Marre collection



John P. Ahrens

Dohner's 1929 "visibility" cab design for Westinghouse diesel switchers (above left) presaged his GG1 configuration of five years later. The same concept of a central cab between two stepped hoods can be seen in New York Central's S-class third-rail electrics, first built in 1906.

ranging from ashtrays to locomotives.

In 1998, the Industrial Designers Society of America, which is the professional organization of industrial designers, posthumously awarded Dohner with its highest honor, the Personal Recognition Award, for his outstanding contribution as a pioneer industrial designer and industrial design educator.

Design antecedents

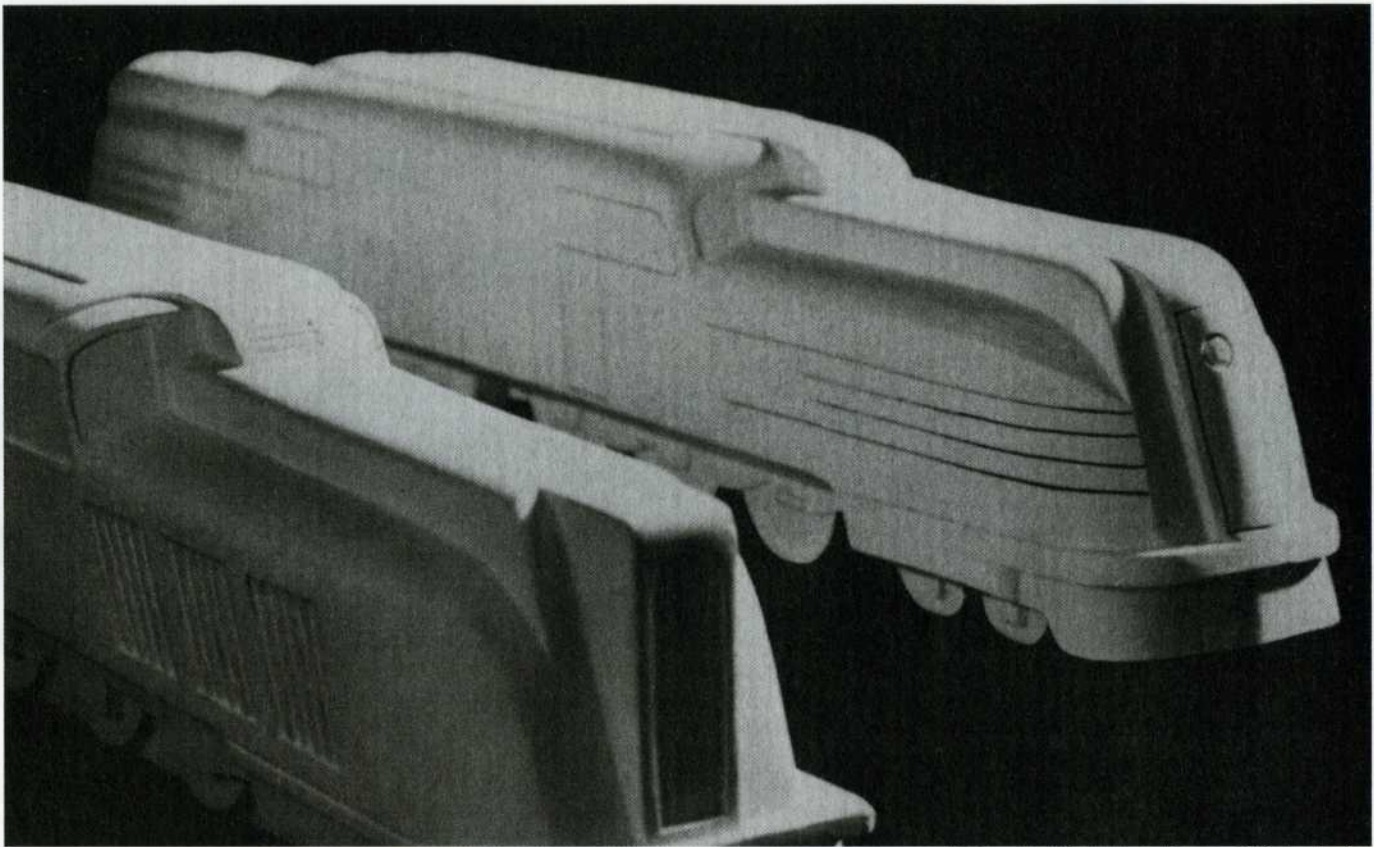
The name Westinghouse has long been associated with the railroad industry, and as such, Dohner found himself in a prime position to work on several locomotives and trains. His earliest known involvement came in 1929, when he designed a diesel-electric switcher for Westinghouse. Available in single-engine, end-cab or dual-engine, center-

cab configurations, the switchers possessed what Westinghouse termed a "visibility" cab, a feature that embodied a stepped hood to permit the use of a window facing the tracks for a view past the hood. In its center-cab version, Dohner's switcher was not conceptually dissimilar to two earlier electric-locomotive designs: New York Central's class S-1 motor of 1906 and Milwaukee Road's EP-2 "Bipolar" of 1919. Switchers are stubby by nature, so for his final touch, Dohner applied a special orange-and-blue paint job to give the units the appearance of being lower than in actuality. The switchers were deemed a success, reportedly selling based solely on the paint scheme.

More exciting than the switchers was Dohner's design of the New Haven's

streamlined diesel-electric train, the *Comet* of 1935, which was co-engineered by Westinghouse and the Goodyear Zeppelin Co. Dohner's greatest achievement in railroad design, however, would be his work on electric locomotives for the Pennsylvania Railroad—in particular, the GG1.

Rather than being designed in Pennsylvania's own shops, the GG1 was engineered at the Baldwin Locomotive Works under the direction of consultant engineer George Gibbs. Representatives from General Electric, Westinghouse, PRR, Baldwin, and Gibbs' own company, Gibbs & Hill, met regularly with Gibbs at the Baldwin plant near Philadelphia to make the project a reality. The railroad commissioned the new design for a high-speed passenger electric loco-



PM Magazine, Vol. IV, No. 4; Hampton C. Wayt collection

Even without pantographs, the basic elements of the GG1 design are apparent in these two Dohner plaster models, both of which are more sophisticated and cohesive than Rivets as it would actually be built. At the time, the first U.S. streamlined trains were just hitting the rails.

tive with an articulated 2-C+C-2 wheel arrangement because its existing fleet of P5a-class 2-C-2 box-cabs was proving unsatisfactory.

Gibbs received permission to start the GG1 project on January 3, 1934, which, by coincidence, was the very day that a P5a collided with a fruit truck at a grade crossing in Deans, N.J., killing the engineer. The operating cabs on the P5a's, which were located at each end of the carbody, offered little protection for the crew. Safety of the locomotive crew would be a top priority for the future GG1 and for that very reason, by March 1934, a "steeple cab" configuration was chosen for the GG1—perhaps inspired by Dohner's visibility cab switchers of a few years earlier.

Dohner's own writings indicate that he created six plaster design proposal models for the project, and photographs of three of these recently have been discovered. (None of the six models is known to exist, and photos of the other three have yet to surface.) Created at the very earliest stages of the project when the greatest leeway for the design was possible, the models exhibit a wide variety of treatments.

Just as Dohner's first designs for the GG1 were taking shape, the Pennsylvania decided to construct a second exper-

imental electric of a different configuration as a possible alternative to the Gibbs design. This 2-D-2 motor would be designated class R1. Whichever of these two locomotives proved superior in tests would be approved for production (the victor, of course, was the GG1). Pennsy also decided to order 28 additional P5a's, but the accident at Deans left the details of their carbody designs uncertain. The railroad made numerous studies in an effort to strengthen the existing P5a box-cab, but despite marked improvements, the efforts were eventually deemed unsatisfactory. It was then decided to redesign the P5a to match the center-cab design of the GG1. This version would become known as a "P5a modified." The R1 would likewise receive the GG1's shape. Subsequently, the designs of all three locomotives would be handled at Baldwin and their details discussed simultaneously.

Comparing the models

Of the three known Dohner models, one closely resembles what would become the GG1. The minutes of a meeting held at Baldwin on April 17, 1934, describe two distinctive features found on this model—the cab skirting and the headlight mounted in the front door. The headlight in the door would make

it into production; the skirting would not. Curiously, a half-inch-scale wood model strikingly similar in design to this Dohner plaster model, and possessing these same two features, also has recently surfaced [see sidebar, page 35]. The construction methods used in the making of the wood model indicates that it was made in PRR's own shops.

Either model could have been at that April meeting, but one clue indicates that the Dohner plaster model predates the wood model, if only slightly. Both feature horizontal stripes on each end, the Dohner model having four thin lines (two long, two short) and the wood model five thick lines. One end of the Dohner model, however, was later altered to have the same stripes as the wood model over top of its original four. Examination of the wood model also reveals that these stripes are carved heavily into the carbody, indicating that they were meant to represent air-intake louvers as well as a striped paint scheme.

One of the reasons that Raymond Loewy's involvement in the GG1 project has been revered for so many decades is the great improvement of the production GG1's design over that of Rivets. Yet, close scrutiny of the Dohner models shows that all of them are more sophisticated in shape and more cohesive in



H. L. Broadbelt collection

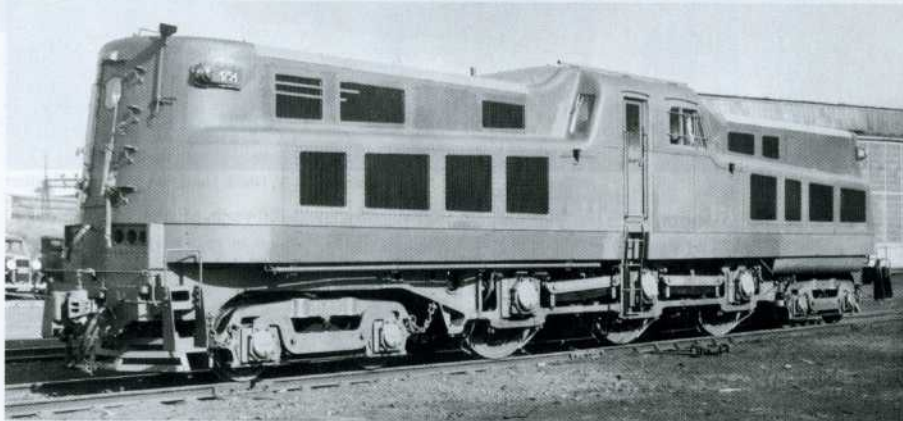
No longer just a plaster or wood model, the first GG1 stands in full-sized steel outside Baldwin's Eddystone, Pa., shops, awaiting shipment to Erie, Pa., for completion by GE.

The legendary Loewy

Ironically, the GG1 project would be a seminal turning point in the careers of both Dohner and Loewy. At the time of his work on the GG1, Dohner was actually a better-known industrial designer than Loewy. And it was at this moment that Dohner chose to leave the design field to become an innovator in industrial-design education. He eventually returned to designing in 1943, but his sudden, tragic death later that year precluded him from regaining the level of recognition that he held during his Westinghouse years. The GG1 was perhaps the last and greatest design of Donald Dohner's professional career. At the same time, however, Loewy's involvement in the GG1 and his continued work for the PRR would thrust him into the limelight that Dohner had lost.

Why haven't we heard of Dohner and his work on the GG1 before? There are many possible reasons. One is that Dohner's and Loewy's relationships with the Pennsylvania Railroad and the GG1 project were quite different. Dohner was a Westinghouse employee working with Baldwin on the project, and had limited contact with the PRR itself. Loewy, however, worked directly with Pennsy's top brass and later became the road's personal design consultant. Naturally, there would be no need for the

More on our Web site
See video clips of "Rivets" and other GG1's in action at www.ClassicTrainsMag.com



H. L. Broadbelt collection

Dohner's carbody configuration—designed initially for the GG1—was adapted for use on the one-of-a-kind R1 2-D-2, as well as the 28 P5a modifieds, including No. 4754, at Baldwin.

design than Rivets is—despite the fact that Rivets was based on these models. In fact, the smooth shape of these models is not far off of the production GG1's. How can this be?

There are several possibilities. For starters, the Dohner models were created early in the project, probably before the engineering of the locomotive had been fully determined. More importantly, PRR paperwork indicates that the development of the GG1's design continued for nearly two months after the engineering drawings for Rivets were completed (five months *before* Loewy's involvement). The only thing we conclude from this is that the shell design of Rivets was not what was intended for the production GG1's. With the knowledge that the experimental locomotive was rushed for testing, it is easy to accept that the shell design was also rushed. After all, the railroad didn't even know if the GG1 or the R1 would

be chosen for production.

The PRR hired Loewy in November 1934 to further the development of the GG1 design for mass production. However, the sophisticated shapes and continuity of design evident in the Dohner models create some doubt as to how much Loewy actually contributed to the final design. One of Loewy's greatest accepted contributions is that of welding rather than riveting the body. Yet the complicated shapes of Dohner's designs would have been difficult to execute with the riveting process, making one wonder if the railroad might have already had welding in mind before Loewy was on the scene. A striped paint scheme also existed before Loewy, as can be seen on the Dohner and wood models and on Rivets itself. Interestingly, a memo from GE indicates that the early striped scheme found on Rivets was not actually designed by Dohner, but by a GE employee.

Dohner's design, rendered in wood

This early, half-inch-scale GG1 design proposal model, believed to have been constructed in the PRR's shops in April 1934, has surfaced recently after being in the collection of Randall Ross of Greensburg, Pa., for the last 40 years. Ross was already an avid rail enthusiast at age 8 when he received it. The story goes that the Ross family attended church with a man who was somehow involved with the Penn Central merger, and the man's daughter and Randall, who were the same age, were friends. One day the man was asked to clean out the PRR office in Philadelphia where the model was stored. Everything was to be thrown away, but the man didn't have the heart to dispose of the model. Instead, he took it to church and gave it to his daughter's train-crazy friend, Randall.

The model is very similar in design to one of the three known Donald Dohner plaster models. While it could be suggested that this is one of his three "missing" models (those for which no photos are known), several points suggest otherwise. The most obvious is that Dohner's models are plaster, while this one is wood and metal and similar to other models known to be built in PRR shops. Another is that Dohner modified the vents on his model to resemble ones like those found on this model, further suggesting that someone else created this model, and at a later date. Yet the similarities between the models are undeniable.

The earliest detailed description yet found of any proposed GG1 design comes from the minutes of a meeting

held at Baldwin on March 29, 1934, found at the PRR archives of the Hagley Museum and Library in Wilmington, Del.: "The doors at the ends of the hoods present difficulties on account of the proposed slope of the ends, of the heavy wind pressures, and of the necessity for easy and safe passage from one locomotive to another when double-heading at high speeds. Several schemes are being studied." The nose of the wood model is completely vertical, in contrast with the plaster model it resembles, and would certainly be a solution to the railroad's concerns. The belief that the wood model was constructed by PRR would suggest that this model was its own interpretation of Dohner's design.

The Hagley's collection also reveals that the cab skirting found on both models was of great interest, as described at a meeting on April 17, 1934: "Access to flexible leads and also to driver springs makes use of skirt under sides of cab difficult. Appearance requires it, however, even if it has to be made removable." As we know, the skirting never found its way onto any GG1, and no records were uncovered to indicate why the skirting was not used. However, it is fairly easy to guess that the mechanical considerations outweighed the esthetics.

Randall Ross is still an avid railfan, and even has a 7½-inch-gauge miniature railway in his backyard. When he wanted funds for another locomotive for his pike, last year he offered the GG1 model for sale on the Web site discoverlivesteam.com. The model sold and now is in my collection.—Hampton C. Wayt



Lista's Studio of Photography

The 40-inch-long wood model forecast many features which would be found on Rivets, although running-gear skirting was omitted.

PRR to promote the name of Donald Dohner, the employee of another company, especially while paying handsome sums of money to its own consultant.

In reality, however, it was not the Pennsylvania Railroad that promoted the name of Raymond Loewy, but Loewy himself. Loewy, whose propensity for self-promotion is well recognized, had a p.r. staff dedicated to that purpose. In fact, only a few weeks after his GG1 design work was approved, and four months before the first production GG1 emerged from Altoona Works in April 1935, Loewy gave lectures at both the Pratt Institute and the Stevens Institute promoting his contribution to the GG1. In contrast, Donald Dohner was a

modest man, who despite numerous published writings throughout the 1930's chose to espouse design philosophy and technique rather than his own personal achievements. This modesty, combined with his early death, has left Dohner all but forgotten.

It is not known whether Loewy knew of Dohner's prior involvement in the design of the GG1, but if he did, he certainly made no mention of it. It is, however, certain that Loewy knew of Dohner's reputation. For instance, both men were featured among the top 10 leading industrial designers in the United States in the February 1934 issue of *Fortune* magazine. And many of the students Dohner trained at Pratt Institute be-

came designers in Loewy's own firm.

Now that Donald Dohner's significant involvement in the design of the GG1 has been uncovered, how will history treat his role? Will he suddenly be elevated to the same status as Loewy, just as he was in 1934 when the GG1 was being designed? Or will his involvement in the project be discounted because of Loewy's overpowering legacy? Naturally, the answer to these questions will be sorted out in due time. Whatever the result, the next time you're near Strasburg, Pa., stop by the Railroad Museum of Pennsylvania. There, you can stand next to the prototype GG1—"Rivets"—and think of the man who designed it: Donald R. Dohner. ■