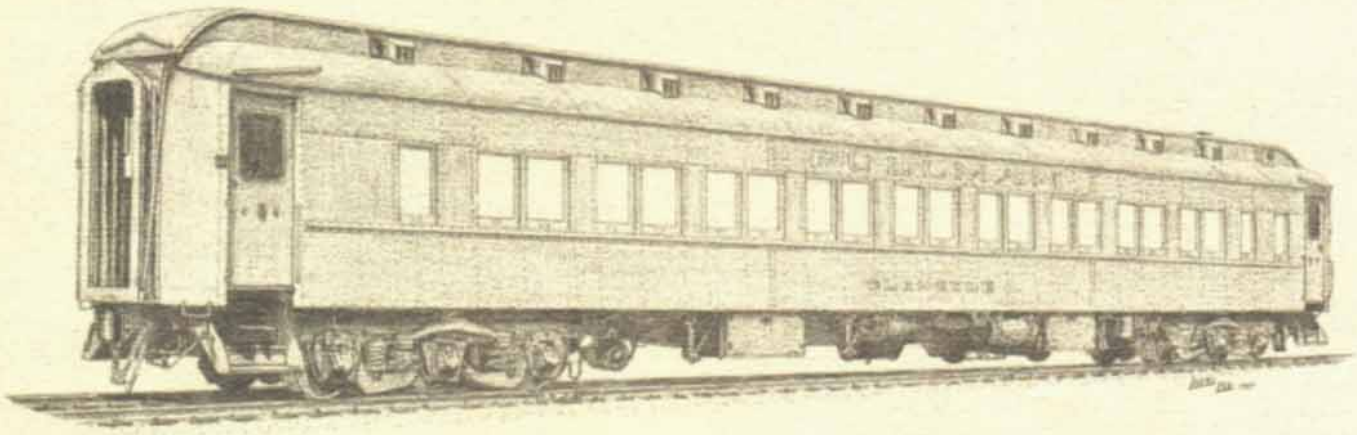
PULLMAN

SLEEPING CAR

GLENGYLE



A National Historic
Mechanical Engineering Landmark

The Age of Steam Railroad Museum
Southwest Railroad Historical Society

Dallas, Texas
August 27, 1987

The American Society of
Mechanical Engineers

"Green aisles of Pullman cars
Soothe me like trees
Woven in old tapestries . . ."

William Rose Benét

NATIONAL HISTORIC MECHANICAL ENGINEERING LANDMARK

PULLMAN SLEEPING CAR
GLENGYLE
1911

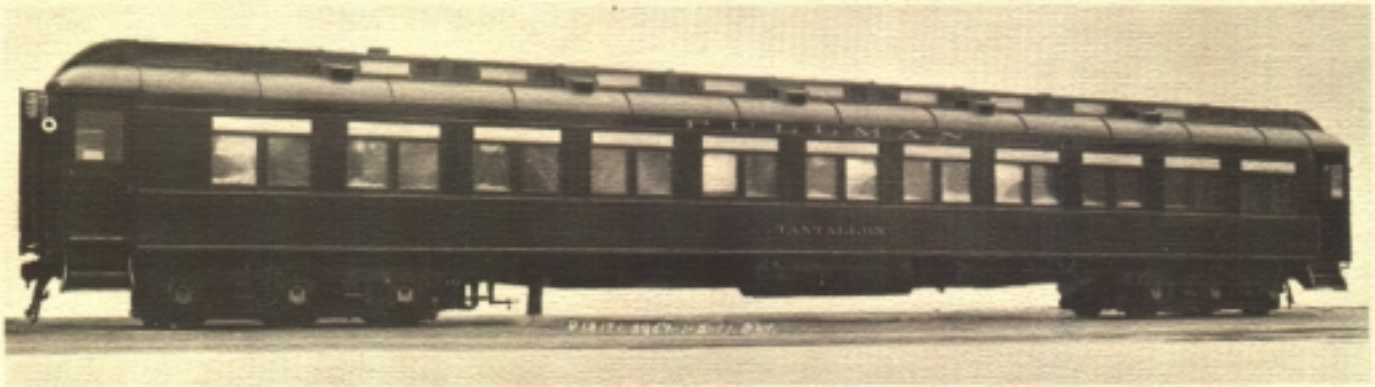
THE GLENGYLE IS THE EARLIEST KNOWN SURVIVOR OF THE FLEET OF HEAVYWEIGHT, ALL-STEEL SLEEPERS BUILT BY PULLMAN. THE DESIGN WAS INTRODUCED IN 1907 AS A MARKED IMPROVEMENT OVER THE WOODEN VERSION THEN IN USE. SOME 10,000 WERE BUILT, IN VARIOUS CONFIGURATIONS, THE LAST IN 1931. THE GLENGYLE IS ORIGINAL IN ITS INTERIOR ARRANGEMENT AND MOST OF ITS COMPONENTS.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS - 1987

PROBABLY NO NAME is more closely associated with railroad travel than that of George M. Pullman. Although Pullman did not invent the first car with sleeping accommodations, the sleeping, lounge, and parlor cars built, and usually operated, by the company he founded in 1859 were the last word in luxury rail travel for over a century. That reputation was firmly established by the late 1890s, after the Pullman Palace Car Company had gained a virtual monopoly on the sleeping car business with its extravagantly ornate wooden "Palace Cars." These cars featured luxurious interiors while their highly varnished exteriors were lavishly decorated with gold-leaf striping and scrollwork. Interestingly, although the interiors reached their height of Victorian opulence during the 1890s, the elaborate exterior gold-leaf striping and scrollwork had been dropped by 1895 in favor of the classic dark "Pullman green" body with gold Roman lettering. After 1900, the ornate interiors with crystal lamps, stained glass, and inlaid woods gave way to the simpler mission style, although the quality of the woodwork remained excellent. Mechanically they were well engineered and solidly built cars. Pullman recognized the safety and marketability advantages of many inventions during that period, such as the enclosed vestibule and diaphragm for passage between cars, the Westinghouse air brake, Janney knuckle couplers, steam heating, Pintsch gas lamps, and, later, electric lighting. Once these were proven devices, Pullman incorporated them into its cars. It must be noted, however, that Pullman was not the originator of these devices, nor was it the driving force behind their initial development.

By the turn of the century, Pullman was quite comfortable with its products, production methods, operations, and business in general, but other developments in railroading were soon to have a major effect on the entire operation. Since 1855, there had been various experimental cars built wholly or partially out of iron and steel, but they generally were heavier and more costly than wood cars, and thus not well received by the railroads. Trains, however, grew longer, faster, and more numerous in the 1890s, and one unfortunate result was more severe damage and injury when accidents occurred. It became clear that a stronger car structure was needed, and by 1905, steel underframes were becoming common on otherwise wooden cars. The surprising leader of this effort was the U. S. Post Office, who sought increased safety for its employees who worked in Railway Post Office cars. Pullman eventually rebuilt over 600 of its best existing wood cars with steel underframes, but this provided only a partial solution to the total problem, because in collisions, one car often rode up over an adjacent car's underframe, and telescoped through its wooden carbody with disastrous effects. Cast steel end structures fastened to the underframe helped, but they too were only a partial solution until they could be integrated into the complete carbody structure.

In 1903, the Pennsylvania Railroad began con-



Pullman chose Tantallon *for photographs representing Lot 3867.* Glengyle *was identical in original appearance. (Pullman Neg. 13171)*

struction of a tunnel under the Hudson River between Hoboken, New Jersey and New York City, along with a massive new station in midtown Manhattan. This, when completed in 1910, would allow its trains direct access to the city center, using newly developed electric locomotives through the tunnel to underground station platforms. A continuation of this tunnel under the East River would provide access to servicing yards on Long Island, and in 1917, the New Haven Railroad's line to New England across the Hell Gate Bridge. (The 1907 AC electrification of the New York-New Haven portion of this line was, in 1982, designated ASME's 76th Landmark, jointly with the Institute of Electrical and Electronics Engineers.) Because of some recent wrecks and fires involving wood cars in subways in Paris and New York, the Pennsylvania's engineers began to seriously explore all-steel passenger car designs. Their work led to an all-steel subway/commuter car in 1904 for the Long Island Railroad, a Pennsylvania subsidiary, and to the famous P-70 coach, first produced in 1907. was developing its own steel car during this period, and built a prototype coach in its Sacramento Shops in 1906, although this car had a wooden interior. Other major roads and car builders were also beginning to investigate metal car designs about this time, and several other experimental steel coaches were constructed.

Cars for first-class service were another matter. In common with other American railroads, Pennsylvania did not design and build the sleeping, parlor, and lounge cars for its finest trains, such as the *Broadway Limited, Congressional Limited,* and *Florida Special,* which were to operate through the new Hudson River Tunnel and Pennsylvania Station. Many of these trains were "all-Pullman" so Pullman engineers and top management clearly saw the need to begin manufacturing all-steel sleeping, parlor, and lounge cars for them, even though it meant significant design changes and a major investment in production facilities. In his book, *The American Railroad Passenger Car,* John H. White, Jr., outlines a meeting of Pullman directors, including J. P. Morgan, president Robert T. Lincoln, and chief engineer Richmond Dean to consider all-steel car construction. Dean later described the 1906 meeting:

> The directors considered and disposed of some unimportant routine matters, and then Mr. Lincoln-Robert T. Lincoln, then president of the Company-raised the question of steel construction. Before he had uttered three sentences of his preliminary statement, Mr. Morgan interrupted:
>
> "Can we build all-steel cars?"
>
> Mr. Lincoln turned to me, passing the question along, and indicating that it was my time to talk. It had come more suddenly than I had expected. But I replied:
>
> "Certainly we can;" and while I was pulling myself together for the detailed exposition, Mr. Morgan went on:
>
> "Then I move that we proceed to do it."
>
> The motion was adopted; nobody wanted to see my plans and estimates; nobody asked any more questions, and we just went back to the works and proceeded to build steel cars.

With this decision, the Pullman Company, as it was now known, had committed itself to building steel cars. It was, however, anything but an easy task to accomplish. Chief engineer Dean and his staff went to work, and designed a prototype steel sleeping car, using available structural shapes wherever possible. They were undoubtedly influenced by the Pennsylvania's P-70 coach, but

chose to depart from that design in several areas. Instead of the P-70's straight, fabricated box-girder center sill, a deep fishbelly structure was used, and cast-steel trucks were specified, rather than the fabricated trucks developed by Pennsylvania. There were also numerous differences in structural details and mechanical systems. Pullman's Calumet (Chicago) Works completed the prototype car, a 12-section, 1-drawing room sleeping car named *Jamestown,* in 1907, and it was exhibited at that year's Master Car Builders' Convention. *Jamestown* was essentially a steel version of Pullman's most common wood car, and to make it appear identical to the wood cars, a number of purely decorative details were included, such as scribed sides and false truss rods on the underframe. Even the rivets and screws were countersunk and puttied over so that they did not show. Though comfortable and pleasing in appearance, *Jamestown* had one major problem: it was much too heavy. No official weight was ever released, but most sources believe it was at least 160,000 pounds, compared to 120,000 pounds for the typical wood Pullman of the time and 113,500 pounds for the P-70 coach. *Jamestown,* later renamed *Talisman,* and finally *Middletown,* saw over thirty years of regular service, but the design was never duplicated.

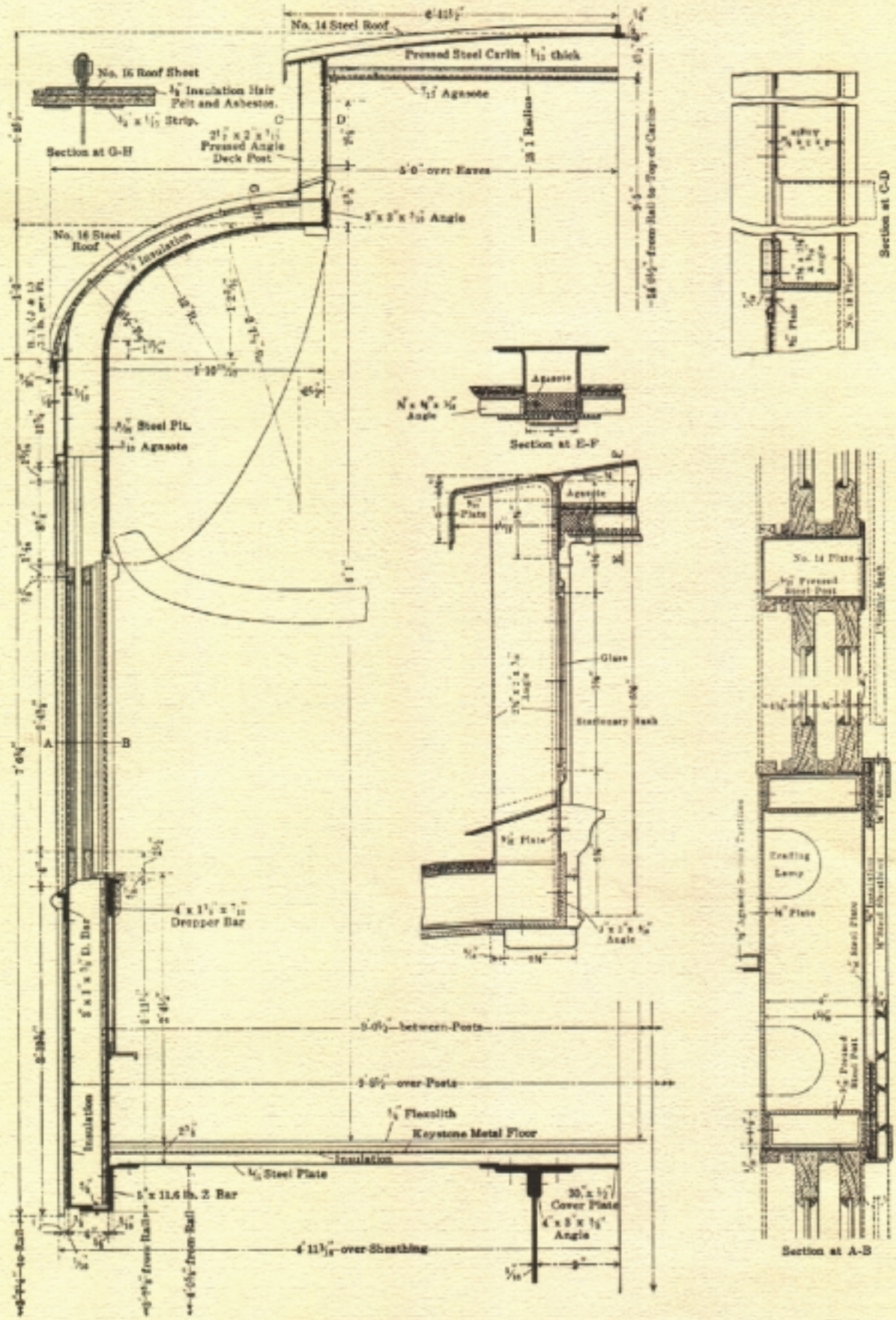
Pullman had little in the way of metalworking facilities or equipment in 1907, but *Jamestown* made it clear that such machinery would be necessary so that more sophisticated special shapes could be formed and used to produce lighter cars without sacrificing strength or comfort. The company was also receiving orders for various types of railroad-designed steel cars by that time, making efficient manufacturing facilities a must, so in 1909, Pullman opened a new facility at its Calumet Works exclusively for building steel cars. In addition to achieving the badly needed production capability, Pullman's engineers now had greater freedom in car and component design.

Glengyle's *interior finish was originally the same simulated mahogany shown here in one of* Tantallon's *drawing rooms. (Pullman Neg. 13172)*

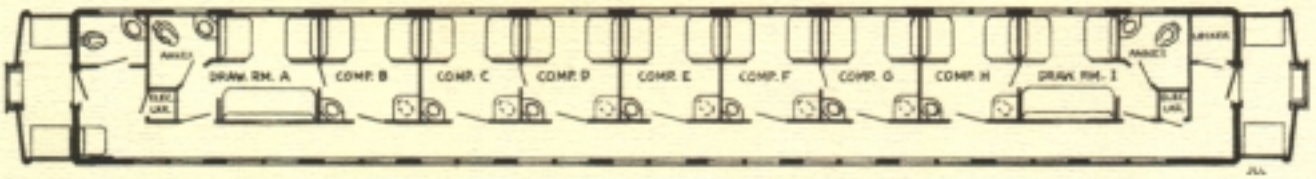
The car structure combined steel castings with rolled steel shapes and plate. The heavy center sill is the primary structural member. (Pullman Neg. 12484)

During 1909, Pullman built five steel baggage-club cars for service on Pennsylvania trains, but little is known concerning their construction details. Presumably they were significantly lighter than *Jamestown,* since they remained in service until as late as 1942. By the end of the year, Pullman engineers felt they were ready to build a sleeping car that would incorporate all they had learned about steel car construction in the last three years.

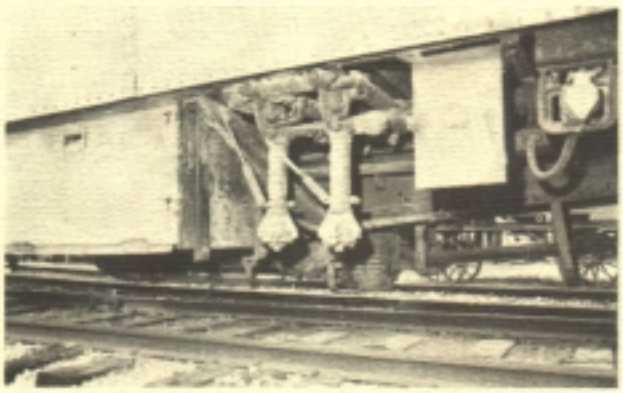
Carnegie, a 12-section, 1-drawing room car, outshopped by Pullman's Calumet Works in January 1910, was the first production model all-steel sleeper. It was 82 feet long, including vestibules, 9 feet-10 3/8 inches wide, 14 feet-½ inch tall, and weighed 137,000 pounds, almost 12 tons less than *Jamestown.* It was built on a fishbelly underframe composed of rolled steel shapes and steel castings furnished by Commonwealth Steel Company of St. Louis, who also cast the major truck components and end frames. Carbody framing was formed from 1/16-to 3/16-inch plate, with sheathing out of 14- to 18-gage plate. Riveted construction was generally used, but some of the side sheathing was attached with large sheet metal screws. Lining the sides and roof were 3/8-inch thick blankets of horse hair and



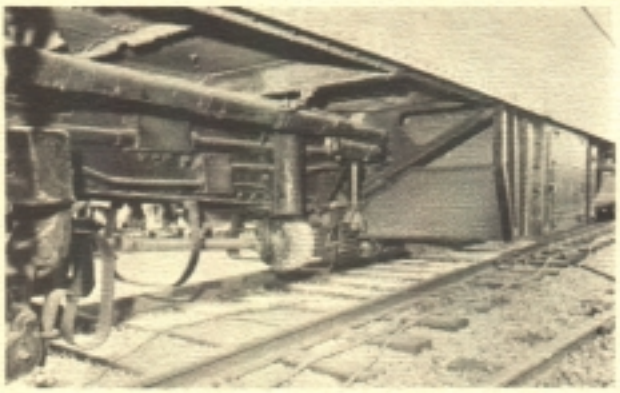
Construction details of early steel Pullman cars, including Glengyle. *(American Railroad Journal, October 1910)*



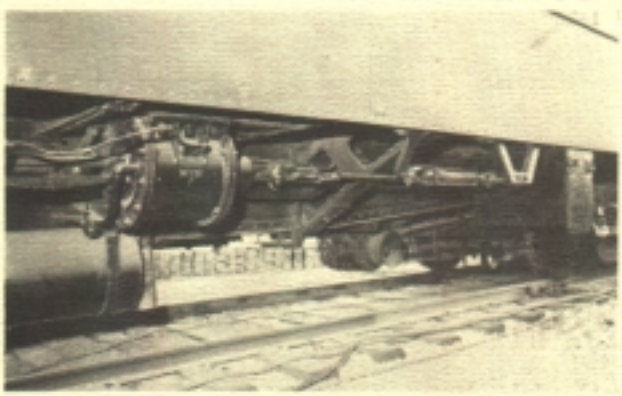
Floor plan of Glengyle. *(Drawing by J. L. Lee)*



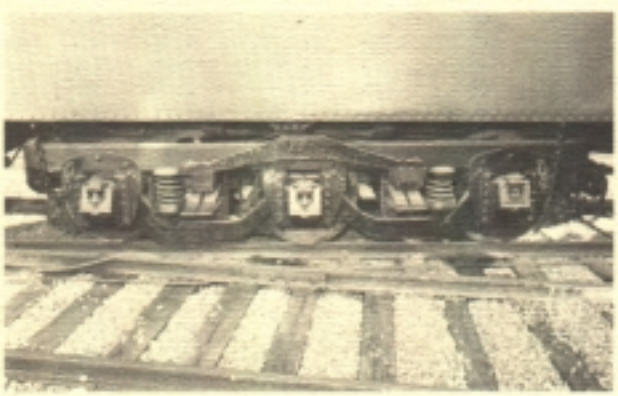
Battery box, Vapor steam-heat regulators, air conditioner control box, and stand-by power receptacle. (Photo by J. W. Schroeter)



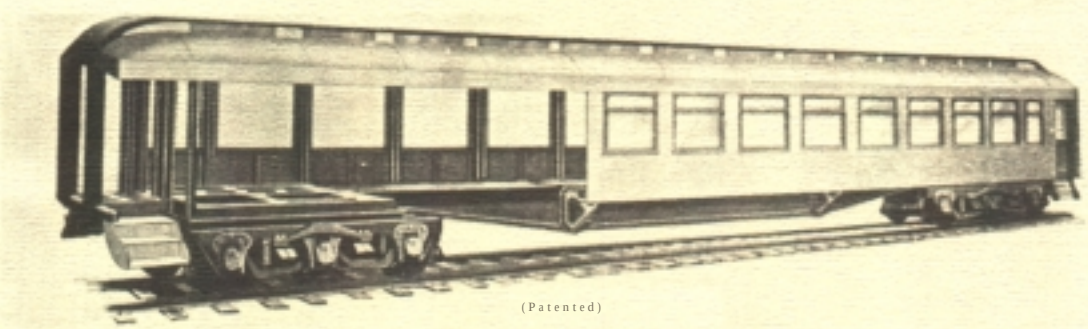
Pullman air conditioning unit, including speed control and drive shaft. (Photo by J. W. Schroeter)



Westinghouse type UC brake cylinder and U. S. Light & Heat belt-driven, 32-volt DC generator. (Photo by J. W. Schroeter)



Pullman type 1910-A six-wheel truck. (Photo by J. W. Schroeter)



Cut-away of steel car showing application of Commonwealth Steel Co. bolster, end sill, cross bearer, and truck castings. (Car Builders' Cyclopedia, 1922)

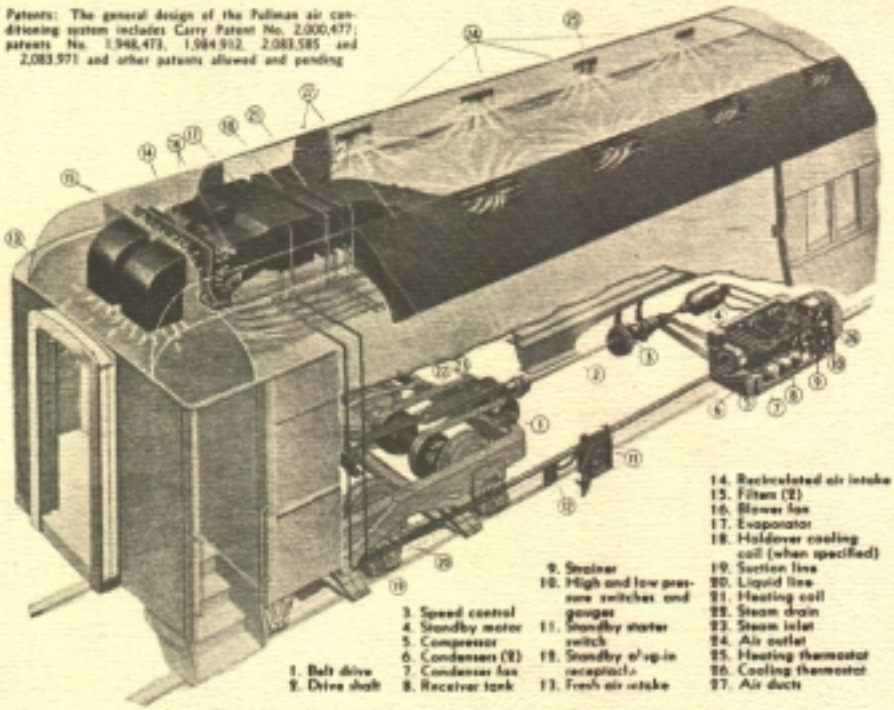


Diagram of the Pullman mechanical air conditioning system used on heavyweight cars. (Pullman Co.)

Air conditioning system control panel, located near porter's seat on Glengyle. *(Photo by J. W. Schroeter)*

asbestos insulation. The interior, though steel, was painted and grained to resemble mahogany paneling.

In *Carnegie,* Pullman had the practical steel sleeping car design it was looking for, and one that would serve as the model for the rest of the cars it would build until the advent of lightweight, streamlined cars in the 1930s. The company quickly realized that fact, and began building steel sleepers in earnest. Over 500 more were completed in 1910 alone, most for service on the Pennsylvania's top trains that were operating through the Hudson River Tunnel. After 1910, Pullman built no new wooden sleeping cars, and by 1926 three-quarters of the Pullman fleet consisted of all-steel cars.

Pullman's basic design had a major influence on the course of steel car construction throughout the heavyweight era. There were other successful designs, such as the "Harriman" cars operated by the Union Pacific, Southern Pacific, Illinois Central, and others, the "Stillwell" cars used on the Erie Railroad, and the Santa Fe cars with their distinctive channel sidesills, but the preponderance of steel cars built by all American car builders exhibited design and construction features very similar to those found on the steel Pullman cars, such as the fishbelly center sill, cast-steel end structures, monitor roof, and belt rail below the windows.

The advent of the steel car allowed Pullman to standardize its design of all major car components including underframe, trucks, sides, windows, doors, ends, and roof. Interior accomodation layouts and components such as seats, berths, toilets, light fixtures, and other appliances were similarly standardized. The electrical and mechanical components, including generators, battery boxes, water pressurization system, heating system, and later, air conditioning system, were all used with few variations on all of its heavyweight steel cars. Thus, it was possible for Pullman to construct a wide variety of car types using these "building blocks" while still retaining the construction and maintenance advantages inherent with standardization.

Pullman chose to retain the section as its basic accommodation in the new steel cars, and changed it very little from its wooden car configuration. A section consisted of two facing seats by day that converted into a lower berth at night. An upper berth opened from above the window, and provided storage space for linens and the lower berth mattress during the day. Heavy curtains provided some measure of privacy in the berths, but toilet and washroom facilities for men and women were at opposite ends of the car as in a coach. Pullman received growing criticism because it did not convert to fully enclosed private rooms, but the company maintained that more people could be carried on each car and fares would stay lower with sections than with individual rooms. It did, however, continue to provide a limited number of private rooms with private facilities for those who wished to pay a premium fare. A compartment slept two people and a drawing room, Pullman's most luxurious accommodation, had seating and berths for three. The most common heavyweight steel Pullman, comprising almost half the fleet, was the

"12 and 1" with 12 sections and 1 drawing room. Also common were 14- and 16-section cars, and 10-section, 2-compartment, 1-drawing room cars. The most common Pullman lounge car contained 10 sections in one half of the car and an observation lounge area in the remaining half. Only about 300 all-room heavyweight sleepers were built new, although a considerable number of section cars were rebuilt into a variety of all-room configurations in the 1930s, after the traveling public had expressed considerable enthusiasm for some new enclosed single and double room arrangements introduced in the late 1920s.

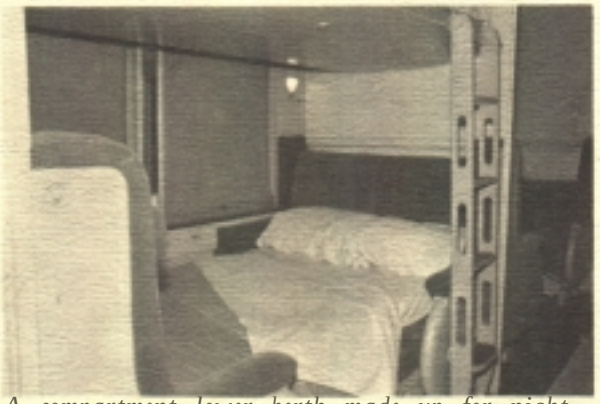
The first group of all-room steel sleeping cars rolled out of the Calumet Works during December 1910 and January 1911. Lot Number 3867 consisted of ten cars built to Pullman Plan Number 2522, containing 7 compartments and 2 drawing rooms. *Glengyle* was one of these cars, the other nine being named *Glenarkin, Glenartney, Glenfinlas, Lanrick, Lochard, Tantallon, Teviot, Tineman,* and *Trosach.* Their overall dimensions were the same as shown above for *Carnegie,* but they were about 3000 pounds heavier due to the interior differences. These were the most luxurious steel cars yet constructed, and their first service assignments were the prestigious New York-Florida trains, such as the *Florida Special,* where affluent patrons were in abundance. Since the patronage on the Florida trains was highly seasonal, *Glengyle* no doubt saw service on other name trains across the country in the summer months, but other service assignments are unknown. It is known that *Glengyle* continued in service until 1957, and that its last years of service were in Southern Railway trains.

Pullman built only seventy 7-compartment, 2-drawing room cars like *Glengyle,* all between 1911 and 1923, and all to Plan Numbers 2522, 2522A, 2522B and 2522C. (The letters indicate only minor variations on basic Plan Number 2522.) This was less than one percent of the total production, but of over 100 different floor plans operated, only the 6-compartment, 3-drawing room cars and the 7-drawing room cars surpassed them in luxury of accommodations.

Unlike many Pullman cars that were completely rebuilt into other interior configurations, or into tourist sleepers and even baggage cars, *Glengyle* stayed very much like it was when new. The only major modifications were the addition of air conditioning, replacement of exterior body panels, an upgrade of the air brakes from PC to UC type, and installation of the newer type D couplers. To accommodate the additional 7000 pounds of air conditioner, the original type 1910 trucks had heavier coil springs and equalizers applied, becoming type 1910-A. The re-sheathing replaced the original transom windows and narrow letterboard with the later-type wide letterboard, and the roof panels were changed to accomodate the air conditioning duct. These modifications were done in the mid-

One of Glengyle's *compartments by day. Note the Vapor heat pipes along the baseboard and the individual heat control above the seat. (Photo by J. W. Schroeter)*

A compartment upper berth made up for night occupancy. (Photo by J. W. Schroeter)



A compartment lower berth made up for night occupancy. Note the ladder for upper berth access. (Photo by J. W. Schroeter)

Glengyle *today at the Age of Steam Railroad Museum in Dallas. (Photo by J. W. Schroeter)*

1930s as part of Pullman's massive program to air condition and modernize its cars.

In 1957, over 46 years after it had entered service, the combination of declining passenger traffic and an abundance of lightweight, streamlined cars brought an end to *Glengyle's* career. Normally this meant the scrapper's torch, but it so happened that the Lone Star Steel Company in Texas was in desperate need of some dormitory space, so *Glengyle* and a 12-1 car named *McQuaig* were sold to the Texas & Northern Railroad, a Lone Star Steel subsidiary. The two cars served in this capacity for several years at Lone Star, Texas, and were surprisingly well maintained. Significantly, neither was altered during that time.

When the Southwest Railroad Historical Society was organized in Dallas, Texas, in 1961, one of its prime goals was the establishment of a major railroad museum, including a complete heavyweight-era passenger train. Once again, fate was on *Glengyle's* side. The need for dormitory space at Lone Star had passed, so the Texas & Northern donated both *Glengyle* and *McQuaig* to the new Age of Steam Railroad Museum in 1964. Since that time *Glengyle* has been restored to its in-service appearance by SRHS member volunteers and can be seen during regular museum hours. It is most interesting to first examine *Glengyle* closely, and then compare its construction details with those of the other steel cars on display, including two other Pullman sleeping cars, *McQuaig* and *Goliad,* built as much as 26 years later. There are differences to be sure, but the influence of Pullman's landmark steel car design is unmistakable.

J. L. Lee, P. E.
Region XI History
& Heritage Chairman

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THE HISTORY AND HERITAGE PROGRAM OF ASME

The ASME History and Heritage Program began in September 1971. To implement and achieve its goals, ASME formed a History and Heritage Committee, composed of mechanical engineers, historians of technology, and the Curator of Mechanical and Civil Engineering at the Smithsonian Institution. The Committee provides a public service by examining, noting, recording, and acknowledging mechanical engineering achievements of particular significance.

Glengyle is the 87th National Historic Mechanical Engineering Landmark to be designated. Since the ASME History and Heritage Program began, 119 Historic Mechanical Engineering Landmarks, 3 Mechanical Engineering Heritage Sites, and a Mechanical Engineering Heritage Collection have been recognized. Each reflects its influence on society, either in its immediate locale, nationwide, or throughout the world. A landmark represents a progressive step in the evolution of mechanical engineering. Site designations note an event or development of clear historical importance to mechanical engineers. Collections mark the contributions of a number of objects with special significance to the historical development of mechanical engineering.

The ASME History and Heritage Program illuminates our technological heritage and serves to encourage the preservation of the physical remains of historically important works. It provides an annotated roster for engineers, students, educators, historians, and travelers, and helps establish persistent reminders of where we have been and where we are going along the divergent paths of discovery. For further information, please contact the Public Information Department, The American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017, 212-705-7740.

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