

The Motor Train in Iowa

Richard S. Prosser

BY THE VERY NATURE OF ITS Rural and Urban development, Iowa was probably preordained to become a state with a wide variety of modes for light-traffic transportation. One of the most important of these was the motor train on steam railroads. Another was the interurban; west of the Mississippi River, the only states with more electric interurban railway trackage were the much larger California and Texas.¹ However, in steam railroad mileage patrolled by non-electric motor trains, Iowa led all the rest. With an abundance of routes which served primarily rural centers, and criss-crossed by several railroads which had large rosters of motor trains, Iowa became a focal point for this kind of service. Iowa had 3,972 motor train route-miles in a sample period (May, 1932), which was nearly thirty-five per cent of total route-miles.²

A Motor train was a non-electric train basically passenger-carrying, not over three cars (an arbitrary limit), which was not pulled by a locomotive, but had a self-contained power plant. The typical branchline motor train was a large coach containing the power plant, sections for mail and/or baggage, and seating for twenty to eighty passengers, depending on space allotment. If additional capacity was desired, smaller trailers for passengers or merchandise, or regular coaches or box cars were attached. The motor train has been affectionately dubbed "doodlebug,"

¹John F. Due and George W. Hilton, *The Electric Interurban Railways of America* (Stanford University Press, 1960), 359.

²Interstate Commerce Commission, *Annual Report*, 1932, 147. (Since motor trains were used variably on routes, it is not possible to select a single figure for maximum total simultaneous mileage.)

"coffeegrinder" (for the noise), "skunk" (for the smell), and even "potato bug" (in Nebraska).

The term "Motor Train" on one hand means a form of propulsion for self-contained vehicles, indicating the study of engines, fuels, and transmissions; and on the other hand refers to a vehicle, indicating considerations of capacity, durability, comfort, and safety (for example), which are independent of the form of propulsion. "Motor Train" also refers to a type of passenger service: traditionally a stop-and-go (interurban-like) operation for light traffic with day-coach or trolley-type seating, running at a universal average speed of twenty-five miles per hour. In fact the term "Motor Train" encompasses almost the entire sphere of power technology for railroads.

The earliest use of motor trains was on street railways in cities. While horse power was the order of the day for urban transit at first, mechanically powered methods of propulsion were constantly being sought. Before electric traction via overhead wire was agreed upon in the 1890s, several sources of power were tried. Steam was the first; small boilers, in some cases mounted vertically, were placed in or on passenger cars. One report identifies a steam car devised by William T. James, in service on the New York & Harlem Railroad as early as 1832-34. This is the earliest steam car on record. The Eastern Colonies lines first used steam cars in Great Britain in 1847-48. By 1860, the firm of Latta, Grice & Long had applied for patents to build steam cars in America, which soon appeared in Philadelphia and on the Utica & Clinton in New York. Steam cars were tried in New York, Boston, Philadelphia, and Chicago. The Baldwin Locomotive Company, one of the stalwart builders of steam power, was producing steam cars by the 1870s, and Baldwin cars appeared in Dubuque, Iowa in 1877, which was the same year a steam powered sled was invented in neighboring Minnesota. By 1880 steam cars were reported in service to Cedar Rapids-Marion.³

³*Street Railway Journal* (New York: American Railway Publications, 1887), III, 955; *Electric Railway Journal* (New York: American Railway Publications, October, 1912), XL, 846; *Railway Age* (Philadelphia: Simmons-Boardman, February 13, 1926), 80, 443; *American Railroad Journal* (New York: John H. Schultz, January 28, 1965), 38, 99-100; *Railway News* (New York) February 25, 1865; *American Railroad Journal*, (June 15, 1877) 50, 131; *Railroad Gazette* (New York: Dunning & Forney, April 20, 1877), 9, 66; *American Railroad Journal* (June 11, 1880), 53, 241.

Fuel for steam cars, besides coal, was oil, ammonia, or even caustic soda. There were also fuel-less, or "stored steam" types (also called "fireless"), which were charged directly from steam reservoirs; these included the Lamm & Francq, the Angomar, and the Dodge Kinetic.⁴ Small locomotives were boxed in with noise and dirt shields, acquiring the moniker 'dummy.'

Compressed air was tried as an alternative source of power, its main virtues being quiet and cleanliness. Compressed air cars appeared first in Paris in 1876.⁵ Two years later a system patented by Robert Hardie was tested in New York City. In 1900 that metropolis ordered 100 cars. There were two primary compressed air systems, the Hardie of Great Britain and the Mekarski from France. The domestic manufacturers of each were united in 1898 under the impressive title of *American Air Power Company*.⁶ The main problem with air power seems to have been the inability to generate enough force to attain express speeds or strong traction, and hence it was consigned to 8 m.p.h. averages in cities, where it eventually was replaced by the overhead system.

The Storage Battery, or Accumulator, car was another form of independent vehicle. Like the Compressed Air Car, it appeared first in France, in 1880, and was first tested in the U.S.A. in New York City (1887).⁷ Within three years Storage Battery cars began regular runs in Chicago, Philadelphia, and Washington, as well as New York. One domestic variety was utilized on the Hill Line of Dubuque in 1891.

Storage battery power, like compressed air, was quiet and clean, though the latter virtue was marred somewhat by acid odors and leakage from batteries. Storage Battery also had the same drawbacks: the need for frequent chargings, and the limited power capacity for high speeds and heavy traction. It did develop further and over a longer period than Compressed Air, however,

⁴Herman Haupt, *Street Railway Motors* (Philadelphia: Henry Carey Baird, 1893), 67.

⁵*Railroad Gazette* (April 6, 1900) 32, 212.

⁶*Electric Railway Journal* (October 12, 1912), XL, 846; Haupt, 83; *American Engineer, Car Builder & Railroad Journal* (New York, November, 1900), 74, 360; *Railroad Gazette* (December 27, 1889) 21, 859, *Railroad Gazette* (August 19, 1892), 24, 584; *Street Railway Journal*, (February and June, 1899), XV-1, 109, 372.

⁷International Railway Congress Association *Bulletin* (Bruxelles, Belgium: February, 1897) 150-158.

very possibly because the battery makers were more effective promoters.

Gasoline power for rail vehicles dates well before Henry Ford's heyday. In Germany, the Wurtemberg State Railways tested gasoline cars as early as 1885.⁸ By 1888, the firm of W. H. Patton was reported experimenting with a car which had electrical transmission at Pullman, Illinois. The first commercial Patton cars did not emerge until nine years later. One of the Patton cars made its way on the Chicago Great Western tracks from Chicago to Cedar Falls, Iowa in 1898, negotiating the hill from Dubuque to Farley with no trouble.⁹ F. W. Hild, Chief Engineer of the Southwestern Wisconsin Railway, in a speech to a convention of the Iowa Street and Interurban Railway Association at Clinton in 1906, rated gasoline cars below electric and steam cars in acceleration, overload capacity, and power/weight ratio. He felt, however, that gasoline cars had an advantage over electric in independence and a smaller initial investment. Independent cars operated to best advantage, he said, at service frequencies of less than 2½ hours.¹⁰

Both the automobile and the airplane came "running out of the blocks" shortly after 1900 and helped to spur the use of internal combustion engines in rail equipment. A 4-wheeled bus-type vehicle was assembled by The Chicago Motor Vehicle Company and placed in service on the Tabor & Northern, an 11-mile track linking Malvern and Tabor in southwestern Iowa. The car weighed less than four tons, was rated at 20-25 h.p., and had a seating capacity of twenty riders. The mechanical transmission was by Worth Traction Drive, and was similar to autos except for omission of differential gears. It could run up to 25 m.p.h.¹¹

A more powerful gasoline-mechanical car, 60 h.p., was erected by the Stover Motor Car Company of Freeport, Illinois, for the Waterloo Cedar Falls & Northern in 1908. Seating eighteen riders, it was put to work on the Sumner-Waverly branch. Cars by P. H. Batten of Chicago were employed on the

⁸*Street Railway Journal* (July, 1887), III, 603; *Electric Railway Journal* (October 12, 1912), XL, 846.

⁹*Street Railway Journal* (October, 1891), VII, p. 513; (June, 1892), VIII, 338; (April, 1898), XIV, 226.

¹⁰*Street Railway Journal* (May 5, 1906), XXVII, 717-722.

¹¹*Railway Review* (October 2, 1903), XLIII, 379; (June 18, 1904), XLIV, 439.

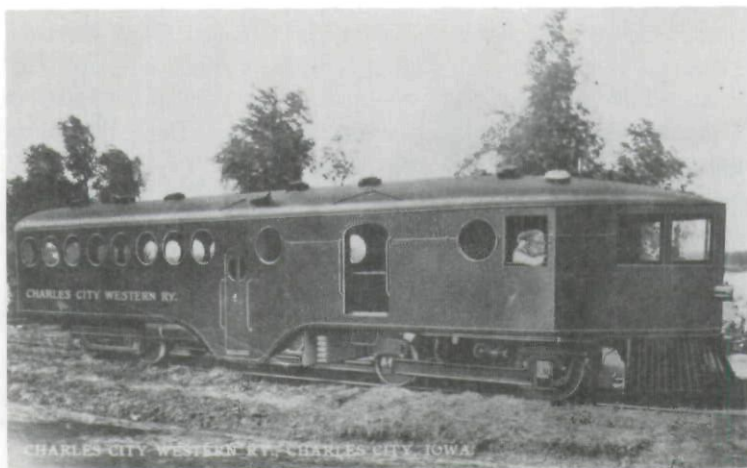
Sioux City, Crystal Lake & Homer line between Sioux City and Dakota City, Nebraska. The cars were twenty feet long, had single wheel trucks, and seated thirty riders. Fairbanks, Morse & Company built both passenger and track inspection cars during this era which served Oelwein-Clarion, Oelwein-Austin, Minnesota, and Austin-Fort Dodge-Council Bluffs.¹²

The McKeen car was the first major gasoline car—it was manufactured in the shops of the Union Pacific at Omaha under direction of W. R. McKeen, superintendent of motive power and machinery, in the early spring of 1905. The McKeen Motor Car Company spun off as a separate entity in 1908, and remained as such until 1920 when the Union Pacific bought back the assets and rights. Orders for cars continued as late as 1922, though the preponderance of manufacturing terminated in 1916 with the United States entry into World War I. Estimates of the total number of cars made run as high as 150. McKeen cars had a celebrated existence, and probably more has been recorded about them than any other type of motor train in America.¹³ The design of McKeen cars was very distinctive. Taking a cue from the racing yacht *Reliance*, they had angled noses and rounded rears, to enable them to slice through headwinds. (Later aerodynamic studies suggested that a rounded front and angled rear would have been more suitable.) Other innovations were porthole windows, sidedoor entrances, single I-beam, and unity of side and cross members, all for the purpose of great body strength. Gasoline engines of 200 and later 300 h.p. were employed. Power transmission was via chain drive, a feature which caused problems relating to reliability and ease of operation.

McKeens were distributed widely throughout the country. They also went abroad to Australia, Queensland, and Victoria, and inquiries were received from Japan and Russia about them.

¹²*Street Railway Journal* (July 25, 1908), XXXII, 353; (February 15, 1908), XXXII, 249; *Railway Age Gazette*, (New York, April 1, 1910), XLVIII, 856; All of these were minor builders. The era was dominated heavily by two companies which fabricated gasoline cars, one with mechanical and the other with electrical drive. Together they divided the lion's share of the market almost equally between them. This division of the market by two major fabricators made the era unique in motor train history.

¹³See William W. Kratville, "Knife Noses and Portholes." *Trains*, July, 1960, 30-39; also William M. Schopp, "Born Thirty Years Too Soon," *Railroad*, (January, 1951, 14-27).



photograph courtesy of Al Shade

McKeen Car for the Charles City Western, 1910

In Iowa, the Charles City Western obtained a McKean car for use before the line was electrified. Other railroad companies serving Iowa which had McKean cars were the North Western, Great Western, Rock Island, Illinois Central, and Milwaukee Road. The Great Western showed remarkable ingenuity in converting a McKean unit to steam power, and in 1930 rebuilding three cars to make a luxury (coach, dining, lounge accommodations) motor train, the *Blue Bird*, which ran between Minneapolis and Rochester, Minnesota.¹⁴ McKean cars were used in Council Bluffs-Omaha shuttle service up to World War II, and in service on the Great Western through the 1940s.

The chief competitor of McKeens were cars by General Electric, which utilized a different transmission. The first of the General Electrics appeared on the Delaware & Hudson early in 1906, less than a year after the first McKean. It used a 160 h.p. engine of an English firm (Wolseley Tool & Motor Car Company), an electric generator, and railway motors. Later General Electric developed its own engines of 175-200 h.p. The body contour resembled the McKean, with side doors and open

¹⁴*McKeen Motor Car Company: 128 Cars in Service, 1912* (Milwaukee: Old Line Publishers, 1970); E. J. Brennan, "Trends in Motor Equipment Design," *Railway Age* (April 4, 1925), 78, 889; *Railway Mechanical Engineer* (New York, May, 1929), 103, 251.

rear platforms on some models, although porthole windows were not adopted and the front end was of parabolic line rather than angled. It was not until 1910 that the first commercial cars entered the market, by which time McKeen had already sold some seventy-five cars. Between then and 1916, when they left the market, General Electric made ninety-four cars according to one source; estimates run as high as 120.¹⁵ Car bodies generally were provided by the Wason Company of Springfield, Massachusetts.

Companies serving Iowa which used General Electric cars included the Illinois Central, Milwaukee Road, Rock Island, and Great Northern. One of the Milwaukee cars was outfitted with a Foos Diesel engine in 1927, and this was one of the earliest conversions of cars to Diesel power.

General Electric and McKeen were not the only types of rail vehicles in use during this period. Steam cars continued to grow bigger and better. An import crossed the ocean from Ganz to Budapest, Hungary. Ganz cars came to the Florida East Coast, to the Erie and to the Rock Island line in 1906-07. The Rock Island also got a car from American Locomotive (Alco) in 1908. A very large and powerful version, the Kobusch-Wagenhals, measuring eighty-three feet long and weighing ninety tons, joined the parade in 1906. It went on a nationwide exhibition tour, then to the Missouri Pacific.

Other gas-electric cars were the F. M. Hicks, for the St. Joseph Valley Traction (1905), and the Strang, a luxuriously appointed car for the Missouri & Kansas Interurban. Four Strang cars, all named after lovely ladies, were built between 1906 and 1908. Storage battery cars continued to enjoy demand. Again two makers pre-empted the field, the Federal Storage Battery Car Company (Beach-Edison cars) and the Railway Storage Battery Car Company. A Beach-Edison car of fifty feet and thirty tons, said to be capable of 85-100 miles on one charge, was obtained in 1912 by the Chicago Great Western.¹⁶

¹⁵*Railway & Engineering Review* (February 10, 1906), XLVI, 94; David H. Hamley and Raymond F. Corley, "About the Railcars Which Forecast Dieselism," *Trains*, November, 1973, 36-49.

¹⁶*Railway & Engineering Review*, (March 17 & 24, 1906), XLVI, 173,213; (April 6, 1907), XLVII, 292; (July 11, 1908), XLVIII, 457; *Railroad Gazette*, (October 5, 1906), XLI, 289-90; *Street Railway Journal* (April 8, 1905), XXV, 671; (March 3 & August 18, 1906), XXVII, 272, 359; (March 14, 1908) XXI, 435.

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