EMC products line up for the 25th anniversary celebration at La Grange, illustrating progression of product line. EMD

EARLY ELEC

The formative years of mid-century's No. 1 locomotive builder // BY PRESTON COOK

On the afternoon of Nov. 22, 1946, Harold L. Hamilton was completing work on a long letter summarizing the history of the Electro-Motive Division of General Motors. EMD was approaching its 25th anniversary in the railroad equipment building business, and part of the celebration of that event was the publication of a book on the history of the company prepared by Franklin M. Reck of Manchester, Mich. The letter in progress was an enormous document, almost 30 pages of detailed inside perspective on the early days of Electro-Motive, and the man writing it was the absolute authority on the subject, because he was the founder of the company. Unfortunately, much of what he wrote that afternoon would not be used in Reck's book "On Time." There would not be room in the book, which covered a much wider scope than the short period from the founding of the company in 1922 to its acquisition by GM in 1930, the focus of Hal Hamilton's afternoon of writing.

TRO-MOTIVE

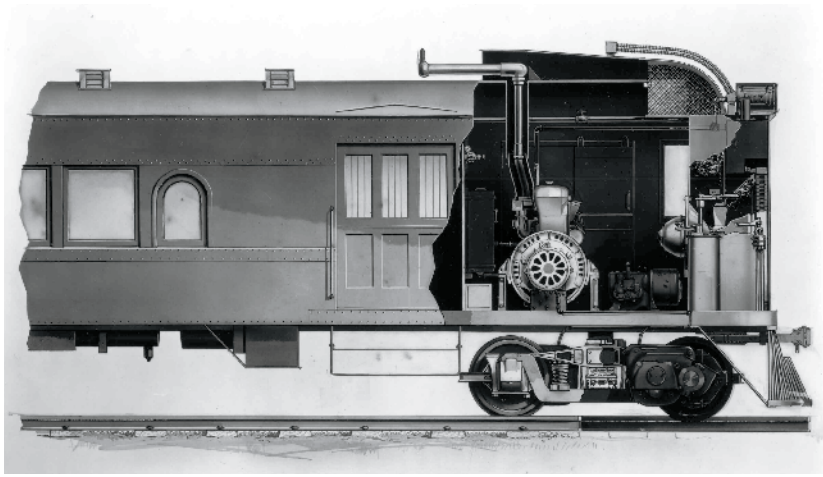
While he might not have had Reck's polished writing skills, Hamilton could be quite eloquent: "It is not often that a group of people associated together as pioneers in an enterprise, have the good fortune to see it reach complete maturity and revolutionary success within their active span of time. That however is the experience of the group that laid the foundation for this business, and most of them are still on the scene."

THE DREAM

Hamilton's early experience as a salesman had made him aware of the challenges posed by rural transportation in the 1920s. While automobiles were improving in usefulness and affordability to a wider segment of the public, the road network outside large cities was still lacking.

The nation's vast network of railroads serviced many communities, but passenger transportation on branch lines was usually the province of the oldest and least reliable steam engines left on each railroad, along with passenger coaches in similar condition. The latter were often, as Hamilton described, "pungent with the accumulated odors of decades of tobacco juices."

Due to the relatively high operating expense for operating this outdated equipment, schedules on many branch lines provided infrequent service and station stops were lengthy. Hal Hamilton had become aware of the economics of railroad operations in his years as a locomotive fireman and engineer on the Southern Pacific Railroad and had then seen a contrasting perspective as a regional executive of a trucking company beginning in 1914. This odd range of background experience had positioned him well for the business ventures he was about to undertake.



Machinery of the cars was as kept simple. The Winton gasoline engine was mounted sideways with the radiator section above. There were no traction motor blowers; instead the motors were equipped with armature fans. Preston Cook collection

Co-founder Hal Hamilton became general manager of EMC under GM ownership, and later vice president of the parent. He is seen in his office in the late 1940s. EMD

One other experience influenced Hamilton's railroad equipment design thoughts. During World War I, branch lines were torn up for metal to make munitions. To facilitate the removal of light rail from deteriorated lines, Hamilton had supervised a project using flanged-wheel trucks to push flatcars to the end of a line to collect loads of salvaged iron. This application influenced several manufacturers to adapt buses and trucks for relatively light-duty rail transportation and maintenance.

Hamilton found these automotive adaptations were generally short-lived and required high maintenance. Frames and running gear designed around highway applications simply did could not stand up to the daily battering on a major railroad. The engines, transmissions, and drivelines were also subject to frequent failures due to the mechanical shock loadings of operating on railroad track.

He left this experience with a respect for the developing capabilities of the internal combustion engine, but firmly convinced mechanical transmissions and clutches were not suitable for use in railroad vehicles.

Instead, Hamilton became a strong advocate for the use of internal combustion engines with electric transmission systems, essentially setting the stage for his next remarkable excursion into railroad vehicle product development.

THE CONCEPT

In 1922, based on his knowledge of rail operations and the growing trucking and bus industries, Hamilton envisioned the concept of a relatively lightweight and high-speed railroad motor car. It would provide enhanced service at lower operating cost to communities along remote branch lines where establishment of competing bus routes was not likely to be feasible for several years. In order to ensure success, the motor cars needed to be modern and clean, and the railroads needed to be convinced to take advantage of their reduced operating expense to run them more frequently than the branch-line steam trains they would replace.

The window for this market was likely to be brief because of improvements being made to rural highways. Once a network of good roads was more widely available, bus lines and motor-freight companies would compete with the railroads. Hamilton thought his concept would provide more reliable service in all weather conditions and might be viable for a decade or more.

He studied the economics and technical problems of his planned business carefully for about six months. His study included a review of the previous efforts at the design of similar equipment. He also contacted many railroad officials for their opinions regarding motor cars. Hamilton subsequently stated their opinions were of little value because "there was no agreement among them at all."

After considering all the anticipated issues he concluded the rail motor car concept was worth a shot. He and his busi-

1922 ENTER ELECTRO-MOTIVE: **The Electro-Motive Engineering Corp. in Cleveland, Ohio, begins to market gas-electric railcars. With GE electricals, Winton engines, and carbodies from various builders, more than 700 EMC doodlebugs are sold by 1930.** Classic Trains collection

1929 MOTOR CARS TO LOCOMOTIVES: **Following a 1927 installation of Winton gas engines in two former mail cars, Rock Island converts three more to locomotive-baggage cars and orders seven all-new units from EMC with bodies by St. Louis Car Co.** Classic Trains collection

ness partner, salesman Paul Turner, established the new company in Cleveland, Ohio, in 1922. In deference to their preference for electric transmission systems they called it the Electro-Motive Engineering Co. It's possible that they got the idea for the company name from reading the recently issued volume titled "Generation of Electromotive Force," a widely distributed reference on the design and application of motors and generators.

One challenge faced by the designers was the problem of making the motor car suitably strong while avoiding excessive weight. Hamilton was convinced, to succeed in the railroad environment, his motor cars needed to be able to handle some of the same operational requirements as traditional equipment. They would also need to be significantly lighter in order to realize the best possible fuel economy, and durable enough to withstand years of daily service.

These seemingly conflicting requirements were addressed using a very unconventional method of construction. The car used a side truss frame hidden by the lower panels of the carbody to provide stiffness and load-carrying capability. This allowed the underframe to be a pair of Z-shaped channels as opposed to a heavy underframe as was common in passenger cars of the period.

A second challenge was finding a suitable internal combustion engine. The power requirements for railroad service ruled out virtually all the builders of highway motor vehicle engines at that time. The rail application needed 250-400 hp and there was nothing then in highway use that could provide it.

This left Hamilton to choose from various builders of construction and industrial machinery, or from the marine-engine field. He selected the neighboring Winton Engine Co., owned by automotive magnate Alexander Winton, as the best available option.

Winton was, at the time, one of the largest builders of marine engines in the world, widely known to produce smooth-running, high-speed gasoline-powered products. It was also working on the development of diesel prime movers for marine and stationary service, but in 1922 these engines were still much too heavy for use in Hal Hamilton's rail motor car design.

Hamilton worked with the Winton engineers to develop a suitable prime mover for railroad application. Their efforts resulted in the Model 106 gasoline engine, which was also built in marine and industrial versions.

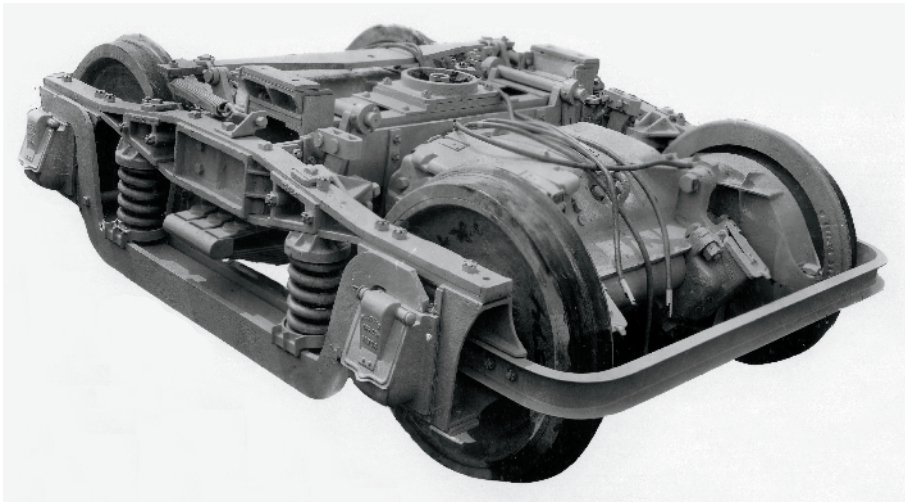
Traction motors weren't a problem as axle-hung models already existed in trolley and interurban transit and electric locomotive applications. However, Hamilton needed a source of suitable electrical transmission equipment.

Finding a suitable generator for use with the Winton engine was a challenge. Control technology for engine-powered generating applications requiring continuously variable speed and load was still in its infancy. Hamilton approached Westinghouse Electric and found that it was willing to pursue the design of the equipment — but entirely at his expense.

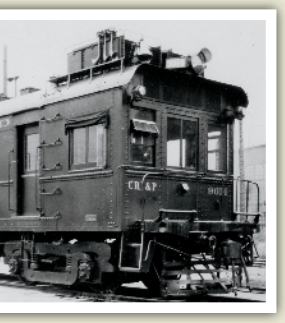
He then contacted General Electric, which had built railroad motor cars prior to World War I. It was receptive to pursuing the design of a suitable transmission system based on Hamilton's analysis of the potential market.

GE also was willing to work on the problems involved in providing electrical load control for the vehicle that would integrate the generator loading with the engine throttle control. Hamilton wanted the controls to be as similar as possible to those of steam locomotives. He didn't want the engineer to have to deal with a half-dozen knobs, dials, and levers to make continual adjustments to the power plant as speed increased. Everything needed to be done with a single throttle lever.

Part of the successful solution was development of a generator suited to the requirements: a "variable voltage, differential field, separately excited" Direct Current machine. The design formed the basis of the transmission systems in

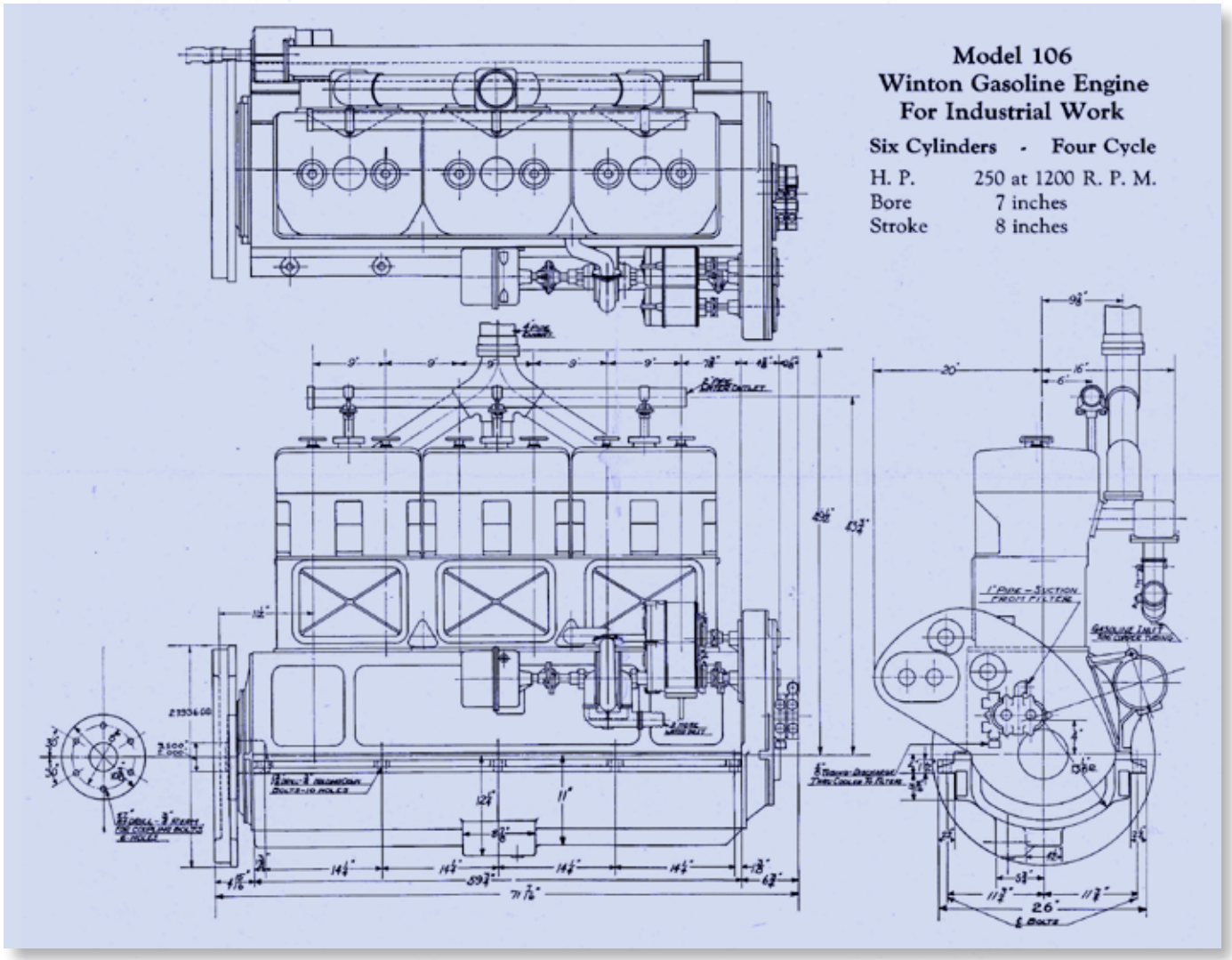


The powered truck of a gas-electric car shows the two axle-hung traction motors. The lightweight construction of the car and the lack of traction motor blowers illustrate its intended use as a self-propelled passenger vehicle rather than as a locomotive. Preston Cook collection



1930 DETROIT GOES RAILROADING: General Motors purchases Electro-Motive Co. and its gas-engine supplier, Winton Engine Co. GM backing fuels the development of a Winton diesel and the growth of EMC. Classic Trains collection

1934 THE DIESEL GOES MAIN LINE: In April, two months after UP's M-10000 streamliner debuts with a Winton distillate engine, GM unveils its first diesel-locomotive power plant, the Winton 201A, in Burlington Route's *Zephyr*. On May 26, America's first high-speed diesel-powered train makes a record run from Denver to Chicago in 13 hours 5 minutes, pulling the diesel out of the shadows of yard duty and into the spotlight. CB&Q



Model 106 gasoline engine provided power for many of the early cars. These engines were installed crosswise just behind the operator's seat. Preston Cook collection

Electro-Motive's subsequent products through 1938. Improvements after that led to the adoption of systems with separate external load regulators.

THE PRODUCT

Hamilton and his small team of employees then set out to combine these elements into a workable design for a gas-electric railway motor car. He later observed they "had to be substantially correct in everything they did as there was no reserve capital to finance mistakes." The result of their efforts was a carefully engineered vehicle incorporating contingency features to provide adequate margins for future growth of the design.

The basic powered unit was sufficiently adaptable that it could be constructed in several combinations of seating, baggage, and express space. A design was also developed for a compatible non-powered trailer car for use on routes that required additional passenger-carrying capacity.

Hamilton correctly guessed railroads would overload and abuse his creation,

1935 ELECTRO-MOTIVE'S LOCOMOTIVES: EMC's first true diesel locomotives are outshopped from General Electric's Erie plant: two 600-hp switchers for the Lackawanna (Nos. 425-426) and three twin-engined, 1,800-hp passenger boxcabs: EMC demonstrators 511 and 512 and Baltimore & Ohio 50. All are powered by GM's new Winton 201A diesel engine and equipped with GE electrical gear. EMC

1935 DIESELS FOR THE SUPER: Santa Fe takes delivery in August of St. Louis Car-EMC boxcabs 1 and 1A for use on the all-Pullman *Super Chief*, which enters service behind 1 and 1A at Chicago on May 12, 1936.

and he over-specified the generator and traction motors for this possibility. He also allowed adequate room in the carbody and left a suitable margin for added weight on the front power truck so a second prime mover and generator unit could be installed to boost horsepower. This proved to be an excellent decision as a number of railroads eventually wanted more powerful versions.

With the requirements defined, Hamilton sought the services of a company willing to build the new and unusual railcar that would maintain confidentiality and not turn into a direct competitor. He settled on the St. Louis Car Co. to build his first gas-electric cars.

At that point, Electro-Motive did not have the capital, staff, or resources to set up for the construction of the carbodies and the trucks, which represented better than 50% of the cost of the vehicle. Hamilton and his staff would provide design services, market and advertise the gas-electric cars to the railroads, coordinate the construction, deliver the product to the customer, and provide technical support in the field. Curiously, this arrangement did not prohibit his suppliers from advertising their skills in the construction of his products in the trade press, which they did even though they did not have the final product to sell.

Selling the cars proved to be another challenge. Hamilton's initial contacts with railroad mechanical department managers were frustrating. Motive-power design had traditionally been an area where each railroad's mechanical department exercised great influence; chief mechanical officers were used to having the equipment builders design things the way they wanted them.

Hamilton's concept for the gas-electric car called for a high degree of standardization. The mechanical department people often balked at this intrusion into their area of influence, nitpicked the product, and became obstructive to the sales effort.

As a result of these early experiences, Hamilton changed his target audience, directing his sales efforts at railroad executives and operating management and bypassing the mechanical departments completely. His presentations to the railroads were based on the potential economic advantages provided by the gas-electric cars compared to their existing fleet of steam locomotives. He took an enormous gamble by offering the railroads the performance guarantee that if the car did not operate for its first 30 days of service with no more than two reportable road failures (causing more than five minutes of delay), they could hand it back to the builder and the deal was off.

Two railroads, the Chicago Great Western and the Northern Pacific, took him up on his offer, and ordered one car each, conditional on the cars meeting the performance curves and the reliability guarantee. The orders were placed with St. Louis Car, and production began.

THE BREAKTHROUGH

The first car to be delivered went to the CGW in August 1924. Right from the first run, Hamilton's expectation that railroads would overload the equipment was confirmed.

The gas-electric car and its transmission system had been rated and advertised as being capable of handling a 35-ton trailing coach, adequate for the unpowered trailer Electro-Motive offered. But the general manager of the CGW elected to accompany the new gas-electric on its first trip and coupled his 85-ton business car to it. Fortunately, there were no problems on the run to Oelwein, Iowa, but Hamilton was kept busy checking the main generator's temperature as the car handled the ruling grades on the line.

The NP car went into service in the last days of August 1924.

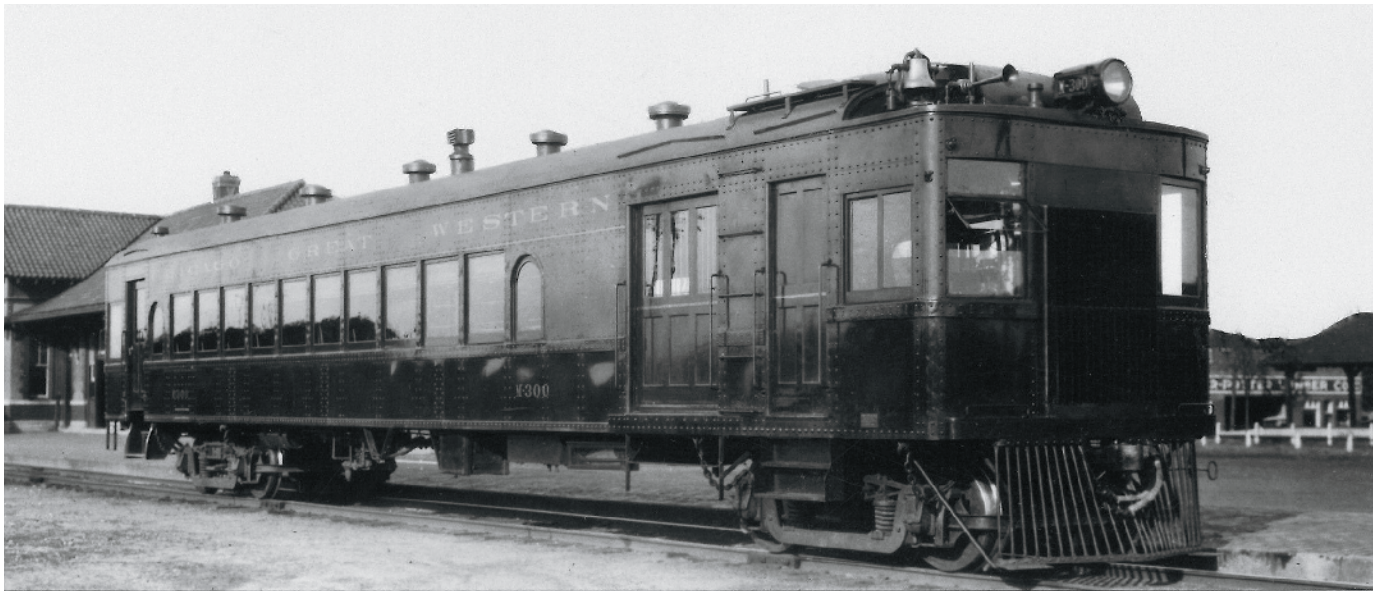
Both cars passed their performance and braking tests on the respective railroads, confirming the accuracy of the design calculations made by the Electro-Motive staff. The field-service people were kept very busy riding and supporting the needs of the new cars for the tense 30-day performance guarantee period. Hamilton said, "It does not require much imagination to bring out how thin the ice was under us. A plugged gasoline line, broken spark plug, dirt in the air

Gas-electric motor cars were the first successful applications of internal combustion on railroads. Chicago, Burlington & Quincy No. 9838, an Electro-Motive product built by St. Louis Car Co. in 1927, stops a Virden, Ill. It was powered by a 275-hp gasoline engine. Gordon Lloyd Sr.

1937 SWITCHERS AND STREAMLINERS FOR THE ROCK: Chicago, Rock Island & Pacific, an early user of internal-combustion power, embraces the diesel with orders for two types of Winton-engined Electro-Motive B-B units: 600-hp switchers and six 1,200-hp model TA cab units that look like pocket-sized EAs for its new Budd-built *Rocket* streamliners (see page 27).

1937 A STAR IS BORN: EMC completes B&O model EA No. 51, launching a long line of streamlined, twin-engined units that will dominate the passenger-locomotive market for decades and evolve over 1,314 units from the slant-nosed, 1,800-hp, Winton-engined EA to the bulldog-nosed 2,400-hp, 567-powered E9. EMC

1938 MORE MUSCLE FOR ELECTRO-MOTIVE: EMC introduces its 567 engine, the prime mover that, in 6-, 12-, and 16-cylinder versions, will quickly propel the builder to the top position in North America and be EMD's standard for a quarter-century. EMD also begins production of its own electrical equipment, based on designs previously supplied by GE.



The beginning of it all: 150-hp Chicago Great Western gas-electric M-300, built in 1924, was the first railcar sold by Electro-Motive and founder H. L. Hamilton. The pioneering car was destroyed by fire. Classic Trains collection

Gulf, Mobile & Ohio 2506 pauses at Delavan, Ill., in October 1958. The GM&O's Bloomington to Kansas City run was the longest for a motorcar in the U.S. Monty Powell, Brian M. Schmidt collection

brake system, a brake shoe falling off, or any simple thing could result in failure."

Hamilton's next move was to deal with the hostility and reluctance on the part of the railroad mechanical departments to accept the new technology. Thus was the beginning of the resident District Engineer concept: Electro-Motive field-service employees stationed at the customer's shops to provide direct technical support. It has remained a standard practice by Electro-Motive and the other locomotive builders ever since.

Experience with the cars demonstrated that a gas-electric with a trailer coach could handle branchline operations at a cost of $0.30-$0.40 a mile, compared with typical operating expense of $0.75 to $1.25 for a steam locomotive with coaches. Orders for the new cars began to come in and Electro-Motive was on the way to becoming a successful business. To keep up with the pace of purchases, builders Pullman, Standard Steel Car, and Osgood Bradley were enlisted for manufacturing help.

THE PROBLEMS

Hamilton was secure in the knowledge a high degree of standardization in the gas-electric cars would result in the minimum possible requirements for supporting inventory. Electro-Motive could stockpile essential parts at its home warehouse or at field locations. One spare each of the critical items could provide local protection against random failures because the equipment was the same on

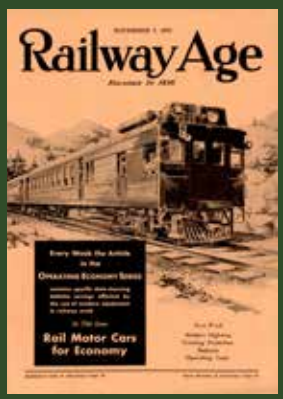
1939 NO LOOKING BACK: Electro-Motive FT No. 103, a 5,400-hp, A-B-B-A demo set seen here at Denver on April 28, 1940, departs La Grange in November on an 83,764-mile, 35-state tour that will change railroading forever by showing that diesels can handle heavy-haul freight service. Richard H. Kindig

1941 SUITED FOR THE DESERT: Santa Fe FT A-B-B-A set No. 100, first FT in revenue service, hits the road Feb. 4.

1941 PERFECT RECORD: B&O EA 56 and EB 56X complete their 365th consecutive trip on the Washington-Chicago *Capitol Limited* on Feb. 25, achieving 100 percent availability and logging more than 280,000 miles.

each of the cars.

What he had not anticipated was the possibility of a fleetwide field-service problem involving critical propulsion system components on all the cars. This happened with the traction motors relatively early in production, requiring factory repair of many motors. It kept the field service staff busy for months. Further problems were identified and dealt with, but proved to be passing irritants and had little influence on the new product's success.



A Railway Age cover from 1931 featuring a gas-electric car. Preston Cook collection

Hamilton's expectation that the railroad would misuse the cars had been reinforced by the experience of the initial trip on the Chicago Great Western. However, he had underestimated how completely some of the railroads might misapply them.

"In the design of the equipment we had accomplished our part of the job, but we were defeated in our efforts to sell the railroad on using the cars as we had planned (i.e. to provide an economical service that would generate new business)," Hamilton said. "Instead, they insisted on substituting them for the locomotive and head-end car of the little steam trains they had been operating. This meant that the motor car became a power plant, mail compartment, and baggage space with an occasional small passenger compartment for smoking use.

"Behind this they hauled the same coach or coaches which in endless instances had been on that particular local run when all the current travelers were children. The railroads simply treated the motor cars as a loss-reducer…"

Hamilton added, "The net result of this trend of events was that the motor car would become more and more of a locomotive with less revenue space and more and more standard cars being hauled behind it. Therefore, we were under pressure for more and more horsepower until we hit 900 in a single unit."

Electro-Motive management took note and in 1930 developed a small gas-electric switching locomotive, the Model 60, powered by a Winton Model 148 gasoline engine rated at 400 hp. The electrical transmission system was provided by General Electric, with a single main generator powering four traction motors.

In essence, Hamilton admitted that his concept had been a failure, even though the product had been a success.

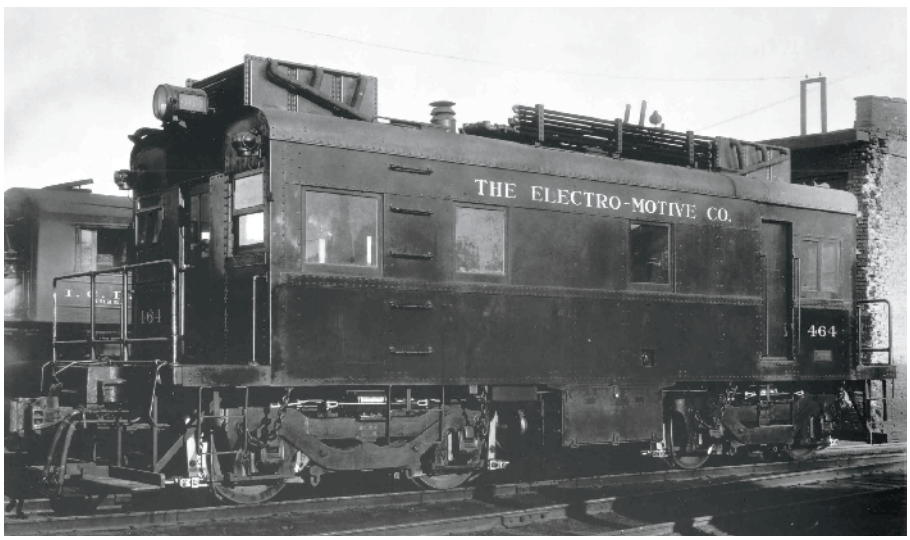
By the early 1930s the railroads had purchased 500 of the motor cars, virtually all of them being misused. EMC had, however, achieved a much greater goal than simply making a successful product: It had propelled itself into recognition as a respected motive-power supplier.

GENERAL MOTORS TAKES OVER

In the late 1920s several GM executives had been visiting diesel engine manufacturers, exploring power units for their motor yachts and sparking talk of corporate expansion into the market. One of these top-level managers was Charles F. Kettering, noted designer of a wide range of automotive systems and accessories, who later became the head of the GM Research Laboratories.

He became actively involved in the design process for the Winton engines in his yacht and was also intensely interested in its engine development programs. Kettering subsequently influenced GM's distinguished president Alfred P. Sloan Jr. to consider acquiring Winton.

Meanwhile at Electro-Motive, the market for gas-electric cars was approaching saturation and sales were slowing down.



EMC demonstrator 464 is a Model 60 based on gas-electric car machinery. As the market for conventional motorcars slowed down in the late 1920s, Hal Hamilton finally conceded to the railroads interested in switchers, and produced a few of these locomotives. Preston Cook collection

1945 BIRTH OF A BEST-SELLER: As the war winds down, EMD introduces the E7 and F3. Best-selling of all Es, the E7 will total 510 units, while sales of 1,807 F3s will pave the way for the even better-selling F7.

1947 RARE MISSTEP AT LA GRANGE: EMD stumbles in responding to Alco's new road-switcher design with BL1 demonstrator 499, a semi-streamlined 1,500-hp B-B, aptly described by Trains magazine editor David P. Morgan as looking "like a cross between a cab unit and a Borden milk car." Only 58 more (designated BL2) will be built, for nine customers. EMD

CB&Q motorcar 258 works as train 56 in Peoria, Ill., in June 1958. It has compartments for baggage, mail, and passengers and is towing a combine. Monty Powell, Denny Hamilton collection

Union Pacific E2 No. LA-1, co-owned with Chicago & North Western, helped bring EMC out of the motorcar era. It sports the bulbous nose unique to that 1937 model. Classic Trains collection

Hamilton needed a new marketing method to carry the business forward while harvesting the rest of the opportunities to sell gas-electric cars. He found it in the form of the "lease to buy" program.

Instead of trying to sell the cars in a purchase transaction where the railroad needed to come up with the cash immediately, EMC bought the car from their builder and then leased it to the railroad at an attractive rate that was comfortably less than the railroad's cost to operate a steam locomotive in the same service. This afforded the railroad an immediate savings in operating expense which showed up as cash in their till, while it made monthly payments on the gas-electric car. When the accumulated payments reached the price of the car, Electro-Motive would then sell it to the railroad for $1.

The stock market crash in 1929 was followed by the start of the Great Depression and the business outlook in 1930 was particularly bleak. To GM president Sloan, it was an ideal time for expansion into new product areas. The sour business environment would not last forever, he reasoned, but in the short term it would inhibit the commercial activities of diesel builders that had fewer resources. It seemed like the ideal time to acquire Winton Engine Co. as had been advocated by Kettering. Negotiations with Alexander Winton were successful, and the company became part of GM on June 20, 1930.

Electro-Motive was one of Winton's largest customers and provided an opportunity for a further expansion. EMC by this time also had a well-developed replacement parts manufacturing and distribution network set up to support its products in the field. Sloan and Kettering subsequently pursued the acquisition of Electro-Motive. It became a wholly owned subsidiary of GM on Dec. 31, 1930.

Hal Hamilton was retained as General Manager of Electro-Motive and admitted in later years that the GM purchase had saved the company. The combined effects of the economic depression, the saturation of the railcar market, and the increasing cost of gasoline as larger numbers of automobiles were produced had all combined to put Electro-Motive in a corner.

To move forward, EMC needed a new prime mover, preferably a diesel, that would allow it to build a more powerful railcar operable on cheaper and safer diesel fuel. It also had to be consistent with the railroads' desire to misapply the product and use it as a locomotive. Given the prevailing business environment in 1930, neither Electro-Motive nor Winton had

the financial resources to pursue that goal.

As a new employee of GM in 1930, Hamilton had brought with him an impressive resume. Those achievements by themselves would have constituted a successful career for most business executives, but they were only the prelude to Hamilton's greatest accomplishments.

TURMOIL, THEN SUCCESS

On Dec. 31, 1932, the road to history took another abrupt and unexpected turn when Electro-Motive was merged into Winton, an event conveniently overlooked in GM-sponsored corporate histories prepared from the 1940s onwards. For more than two years after, Electro-Motive and its employees survived as the Railroad Products Division of Winton.

While this rapid development was transpiring, frustration was building within GM management. Kettering was becoming increasingly disillusioned with the cooperation he was getting from Winton's engineering department despite his son, Eugene, having joined the organization in 1930. Sloan was also in doubt about whether the lightweight two-stroke cycle 201A diesel would be successful. Kettering complained to him that if he could just get what he wanted out of Winton's engineering department, the new engine would do the intended job.

Partially because of these problems, the decision to re-establish Electro-Motive as an independent subsidiary to handle the manufacture of diesel locomotives was announced in February 1935.

Two more years of experience with the Winton 201A, which encountered several serious problems in its development and early railroad service, further convinced GM executives to take development and manufacture of railroad prime movers out of Winton altogether.

GM Research Laboratories supported the development of the Model 567 diesel engine that was the replacement for the 201A. Its manufacture was moved to the plant in La Grange, Ill. so it would be where the locomotives were being assembled. The company also established a new line of electrical equipment to work with the 567 and additions were built on site to manufacture the engine, main generator, and traction motors.

Working with Alfred P. Sloan Jr, and Charles F, Kettering, and with the enormous contributions of Richard M. "Dick" Dilworth and his talented staff of design engineers at Electro-Motive, Hamilton and his associates would subsequently develop and market an array of diesel locomotives that would dominate the motive-power market for decades. It would mean the end of more than 50,000 steam locomotives on the American railroads, replaced by about half that number of diesel locomotives.

In short, it changed the way railroads looked and operated.

That process was well underway when Hamilton concluded his writing to Franklin Reck and put on his coat on to head for home. He could be rightfully proud of what he and his associates had accomplished. The days of operating on a shoestring were gone; Electro-Motive was the largest builder of diesel locomotives in the entire world. As Alfred P. Sloan Jr. had commented on the opening of the Electro-Motive plant in the Chicago suburb, "This is the majesty of manufacturing. This is proof that nothing can stop the progress of diesel locomotives."

The result would be the replacement of more than 50,000 steam locomotives on the American railroads with about half that number of diesel locomotives, and it would change the way that the railroads looked and operated forever.

On Oct. 25, 1947, Electro-Motive celebrated its 25th anniversary with an open house at the La Grange plant, the event for which Franklin Reck's book "On Time" was being prepared. Railroad and GM officials gathered to hear a series of speakers, and Hal Hamilton gave a talk about the early years of Electro-Motive and its accomplishments since 1922.

A bronze plaque commemorating Hamilton's role in developing the diesel locomotive was unveiled. It would be displayed for many years after at the Plant One Administration Building, along with the shovel that was used to turn the first earth for the facility in 1935.

PRESTON COOK is a mechanical engineer with 45 years experience in the railroad equipment construction industry. He is the author of four books and more that 100 articles on railroad, marine, industrial, and military subjects.

After the motorcar market subsided, Electro-Motive transitioned to conventional locomotives. In 1937 it built six early streamlined TA diesels for the Rock Island, Nos. 600-605. Here, 604 is mated to an F7B at Omaha in July 1953. Brian M. Schmidt collection