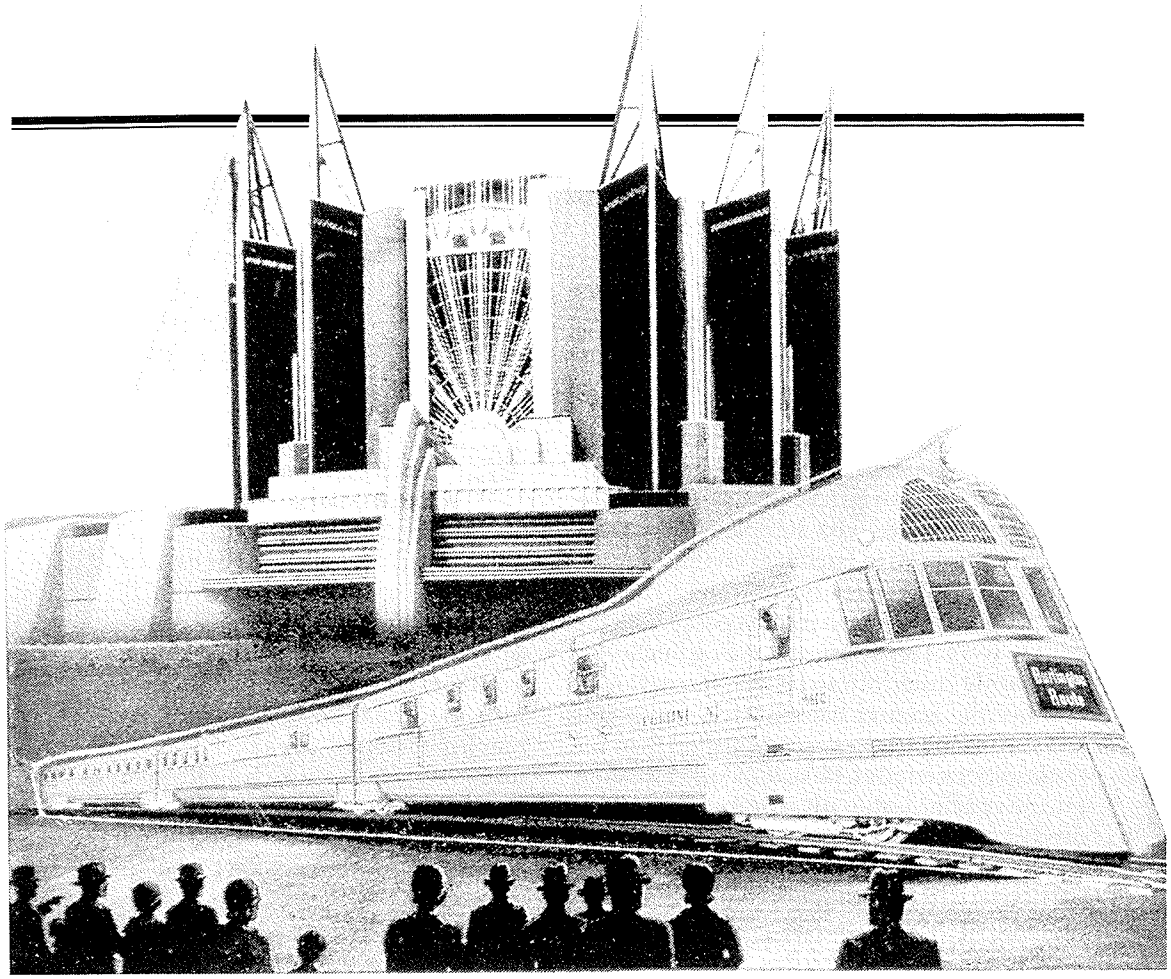

The Lost Promise of the American Railroad

BY MARK REUTTER

A whole new breed of train took to the American rails during the 1930s, emblazoning names like Flying Yankee *in American mythology. Fashioned from sleekly proportioned metal and powered by high-tech diesel engines, the new streamliners slashed city-to-city running times and made American rail passenger service the envy of the world. Here Mark Reutter recalls these days of promise—as well as the blunders that put America far behind in the worldwide race of high-speed rail.*

Nearly 60 years ago, on May 26, 1934, a train unlike anything ever seen on rails pulled out of Denver's Union Station and raced east across the Colorado plains. Boasting a stylish curved prow and fluted silver sides, it had been dispatched on a mission to prove the value of radically redesigned railroad passenger equipment. Its goal was to make the longest and swiftest land run in history. To reach Chicago by nightfall, the train would have to cover 1,015 miles—one-third of the continent—in under 15 hours. No locomotive in railroad history had ever traveled more than 401 miles nonstop, and the fastest passenger train on the Denver-Chicago route, a deluxe steam-powered "flyer," took 25 and three-quarters hours to make the run.

A main-line passenger train in the 1930s was supposed to be big and blunt, powered by a steam locomotive with churning driving rods and massive wheels. The *Zephyr*, though, was low-slung and sleek, with an unconventional "cab forward" design that put the engineer's compartment right at the front of the train. It was not just the *Zephyr*'s appearance that was different. The train was the product of several advanced technologies of the day. Its shimmering silver skin was the result of a breakthrough in metalworking. Its cars were not coupled like those of a conventional train but joined in a light-weight, semicontinuous, "articulated" tube. Most important, the train was powered not by steam but by a revolutionary compact diesel engine. Not a few railroad executives scoffed at the *Zephyr* that bright May morning, and newsmen on board the train labeled its attempt at the world record "chancy" at best.

On the first leg of the journey, the train was held to an unremarkable 50 MPH in order to break in a new armature bearing in the diesel motor. Diesel technician Ernie Kuehn lay face down on the floor of the engine room, alert for the telltale scent of burning metal. No damage was detected, and the train covered the 34 miles between Fort Morgan and Akron, Colorado, at 70 MPH. On a monotonous stretch of highland plains past Akron, engineer Ernest Webber pushed the brass throttle to the top notch. The 600-horsepower diesel engine responded by knocking off the next 129 miles in 86 minutes, covering the 12 miles between Otis and Yuma, Colorado, at 104 MPH, and the four miles from Yuma to West Schramm at 109 MPH. Then the *Zephyr* raced across three miles in 96 seconds flat—a pace of 112 and one-half MPH.

"You almost forget you're moving until you look out at those fence posts going by and realize they're telegraph poles instead," wrote a *Chicago Herald* reporter who was on board. "It's a trip to defy imagination," agreed the *Rocky Mountain News* correspondent. There was much laughter when a motorist tried to race the *Zephyr* on a parallel road and fell behind in a cloud of dust. Twice the train out-paced a biplane. By the time it reached Lincoln, Ne-

braska, 483 miles from Denver, the clock showed an elapsed time of only six hours and seven minutes. A railroad official announced that the train had broken the nonstop distance record set by Britain's premier train, the *Royal Scot*, in 1928.

As word of the *Zephyr*'s progress spread—news bulletins were dropped off at prearranged intervals, then telegraphed to radio stations and newsrooms—the train attracted bigger and bigger crowds. In town after town across rural Iowa and Illinois, fire sirens shrieked and church bells pealed to signal its approach. Outside of Galesburg, Illinois, farm trucks and Model Ts packed the right of way for eight miles solid. As the train dashed toward Chicago—"a cynosure of national interest rivaling airplane flights for new records," said the *Chicago Daily News*—its progress was monitored by President Franklin D. Roosevelt's staff in Washington on an NBC radio hookup.

When it finally touched down, snapping the Western Union timing tape stretched across the tracks in Chicago, the *Zephyr* had traveled 1,015 miles in two seconds under 13 hours and five minutes, beating its own target by two hours. It had averaged an unheard-of 77.6 MPH and established world records in nearly every category of long-distance speed and performance. Of particular satisfaction to many Americans was the fact that it had beat the record of Germany's *der Fliegende Hamburger*, previously considered the fastest rail vehicle on Earth.

From Halsted Street Station, the train proceeded slowly to the Century of Progress world's fair on the shores of Lake Michigan, just opening for its second year. When the *Zephyr* was rolled out on a stage that evening as the grand finale to a pageant on the history of American transportation, the crowd surged forward to touch the "silver streak." After order was restored, Ralph Budd, president of the Chicago, Burlington & Quincy Railroad, led the train's mascot, a Rocky Mountain burro named Zeph, out of the baggage compartment, and presented him to officials of the fair. "It was a sweet ride," Budd exclaimed.

The *Zephyr* was born out of the imaginations of four men who brought to creative focus a variety of economic, technological, and political developments. In addition to Ralph Budd, they were Edward G. Budd (no relation), inventor of the all-steel automobile body; Harold L. Hamilton, founder of a company that built self-propelled gas-electric "doodlebug" railcars; and Charles F. Kettering, head of General Motors Research Laboratories. With the Depression hanging over the country, these industrialists gambled that an ultramodern train of unprecedented speed would recapture lost passenger traffic, create a market for new railway products, and invigorate a far-flung industry threatened with slowly advancing paralysis.

The passenger train always had been more to America than a means of transportation. It was a historical force that opened up and then bound together a nation of scattered territories and states. The first trains of the 1830s were primitive affairs, little more than enclosed wagons that bounced roughly along on iron rails, but they sped up travel enormously. Three days of hard travel across the Appalachians by stagecoach were reduced to 24 hours when the Baltimore & Ohio Railroad lived up to its name by reaching the Ohio River at Wheeling, in what is now West Virginia, in 1853. As track was laid deeper into the continent, stagecoaches and canals were eclipsed. After the Civil War the railroads began another great surge, paced by the industry's embrace of many technological advances of the time: George Westinghouse's air brakes, Samuel Morse's telegraph, Henry Bessemer's steel, and the first really powerful steam locomotive, the American-made Mogul. By the

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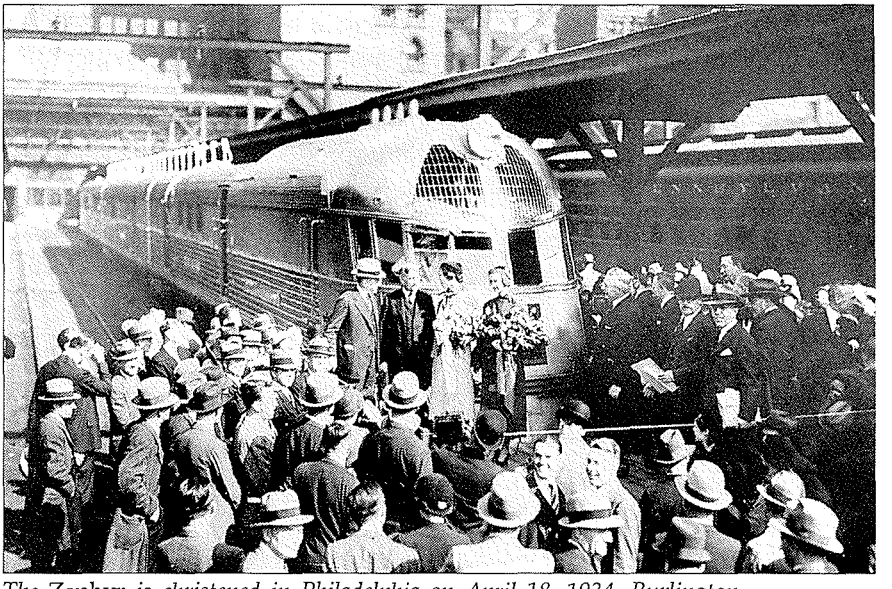
turn of the century, passenger trains connected every major community in the United States and names such as the *Phoebe Snow, Wabash Cannon Ball, Black Diamond, Fast Flying Virginian, Sunset Limited, Royal Blue,* and *Empire State Express* were celebrated in songs and stories.

At first, the "horseless carriage," invented in the 1890s, posed little threat to railroads. Between 1896 and 1916, railway passenger traffic tripled, while journeys on added-fare Pullman sleepers increased fivefold. The high-water mark was reached in 1920, when 1.2 billion passengers boarded 9,000 daily intercity trains and rode a total of 47 billion passenger-miles.

But soon the automobile began to take its toll. Henry Ford, who had introduced the Model T in 1908, began slashing prices after he opened his Highland Park, Michigan, assembly line in 1913. Between 1920 and 1930, the number of registered cars on American roads increased from eight million to 23 million. While intercity express trains more than held their own (the New York Central routinely dispatched five sections of the crack *20th Century Limited* in 1928), the auto began to make significant inroads into the short-haul passenger business. The biggest impact was felt on railroad branch lines. Automobiles and buses were slowly destroying the feeder system that brought passengers and profits to main-line trains.



The Zephyr *is christened in Philadelphia on April 18, 1934. Burlington president Ralph Budd is at left; carmaker Edward G. Budd stands beside him.*

Ralph Budd watched this trend with growing alarm. Tall, lean, and clean-shaven, wearing wire-rimmed glasses, he was the antithesis of the cigar-chomping, million-buck railroad mogul immortalized by writers Frank Norris and Matthew Josephson. Budd loved nothing better than to put in a 16-hour day at a remote outpost of the railroad quizzing employees and poring over maps. Like many farm and small-town boys of the 19th century, he had gone into railroading because it was the nation's premier industry. Starting as a $1-a-day surveyor for the Chicago Great Western after graduating from a Des Moines, Iowa, trade school, he was only 27 when he was picked in 1906 to build the railroad needed for the Panama Canal project, and he was 40 when he was named president of the Great Northern Railway. The appointment made him the youngest chief executive of a major railroad. When he took command of the Burlington in 1931, the 11,000-mile railroad was staggering under the impact of the Depression and the weight of heavy passenger obligations. The fact that the Burlington had lost a fifth of its passengers between 1926 and 1929—and then lost half of what was left between 1929 and 1931—was sufficiently shocking to call for radical treatment.

Budd knew that he had some things working in his favor. Railroads benefited from the natural efficiency of steel wheel on steel

rail: minimal rolling friction. (It takes only a fourth as much power to propel a passenger railway car as to propel a highway vehicle moving on rubber tires.) He was also aware of the importance of passenger revenues in railroad economics. Freight brought in the lion's share of revenues, but as long as passenger trains earned more than their out-of-pocket costs, they could help defray the enormous expense of track and other fixed capital. Many secondary passenger trains were not even meeting their costs, however, the chief reason being the high cost of operating steam locomotives. Having grown to 60–70 feet in length and weighing 200 tons apiece, steam locomotives inflicted a severe pounding on track and on themselves. The wear and tear showed up in costly roadbed repairs and unproductive time spent in roundhouses. The solution: lighter and less expensive trains that would attract more passengers.

Budd later said that he was encouraged to experiment by the political environment of the time. Revival of the rail industry had been one of Franklin Roosevelt's campaign planks in 1932. Roosevelt's emissary to the industry, Joseph B. Eastman, said Washington might be willing to relax antitrust regulations so that railroaders and suppliers could experiment with new materials, new methods, and especially new kinds of locomotives. "It is in technical improvement that the salvation of the railroad passenger business lies," Eastman declared.

In September 1932, Ralph Budd paid a visit to the Philadelphia factory of another man named Budd. Edward Gowen Budd had got

Diesel engines are installed in Rock Island Rocket *locomotives at General Motors's Electro-Motive plant in La Grange, Illinois, circa 1938. The famous "E" locomotives were capable of an impressive 117* MPH.

his start as a machinist apprentice in 1887, when Philadelphia was still America's forge. He had helped build the first steel passenger car for the Pennsylvania Railroad before starting the Budd Company in 1912 to make pressed-steel frames for the auto industry. Possessing a showman's flair, he once perched an elephant on top of one of his steel auto bodies—and dared wooden-body makers to do the same. The crash of 1929 badly hurt his auto-body business, but it gave the entrepreneur a chance to explore new markets for steel. "A Depression is a period in which you have time to think," he declared. In 1931 he came out of a spell of thinking with the idea for a lightweight alloy to use in the building of trains. The alloy was one in the stainless steel group that metallurgists called 18 and 8. It consisted of low-carbon steel with 18 percent chrome and 8 percent nickel. First produced in Germany by Krupp, it outclassed ordinary carbon steel on several counts. Strong and light, it was also so malleable that it could be drawn into fine wire or easily formed into deep-drawn, graceful shapes. The term stainless described another of its virtues: It did not rust. The metal kept its silver sheen even when exposed to organic acids, and wind and rain only brightened its natural glasslike finish.

Despite its attractive properties, stainless steel had found few uses—mostly for hypodermic needles, false teeth, and decorative novelties—because no satisfactory way had been devised to fabricate it. After much research, Budd's company came up with its patented "shotweld" method. The inspiration for the invention came from lightning, Budd said, in particular lightning's ability to melt a piece of metal so quickly that the adjacent woodwork is not discolored. Where two pieces of stainless were to be joined, a machine passed a strong electric current through the metal, forming a rigid bond that was hidden because it cooled before it extended to the surface. Budd called it "stitching steel with threads of lightning." With shotwelding and a related innovation, Budd inaugurated the modern age of metal fabrication and snatched the lead in developing what would become one of the most prized "miracle metals" from under the nose of the Germans.

Ralph Budd wasted no time commissioning the Philadelphia metalmaker to build the *Zephyr*, giving him carte blanche to design it "without any restrictions except those which are inherent to railway equipment, namely the gauge of the track and the clearances within which the outside dimensions must be kept." The *Zephyr* began to take shape on the Budd company's drafting boards in 1933. Its unconventional prow was designed not solely with beauty in mind, but to reduce air resistance. Windtunnel tests at the Massachusetts Institute of Technology had established that the train's resistance to motion at speeds of 95 MPH and above would be less than half that of a train of regular coaches. The three-car train had a tubular shape in which both the roof and side frames carried loads formerly assumed by the subfloor structure. This allowed Budd to do away with the heavy center sills and concrete-laid subfloors of conventional equipment without sacrificing safety or stability. Because the train had a lower center of gravity, it would be able to negotiate curves at high speeds.

In Philadelphia, Edward Budd stuffed the latest technology into the train, using the products of 104 U.S. manufacturers, including Freon air conditioning from DuPont, radio reception by Stromberg-Carlson, and new battery-retardation brakes by Westinghouse. The interior design of the *Zephyr* was also daring. Gone were the arch roofs, wooden-paddle fans, heavy curtains, and other Victorian holdovers of standard railcar design. Gone, too, were the violently (and justifiably) damned red-plush coach chairs that "on a hot summer day made you break out with prickly heat even before you sat down upon them," as one Midwest traveler recalled. Paul Cret, head of the architecture school at the University of Pennsylvania, installed soft-cushioned seats upholstered in pastel shades, recessed fluorescent lighting,

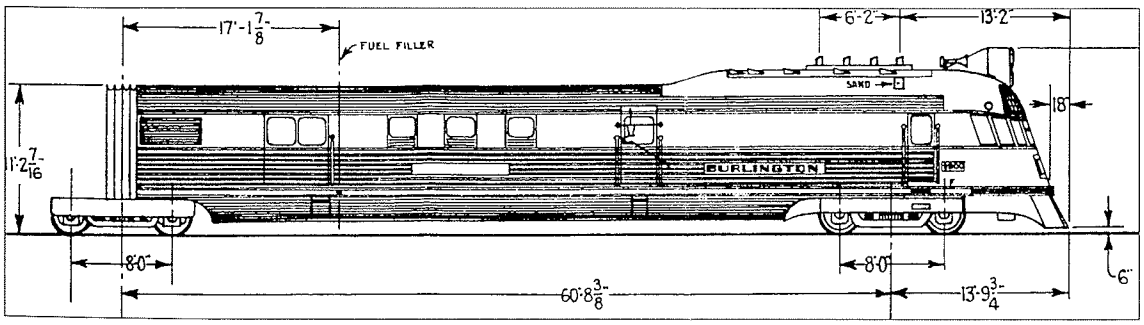
wide double-paned windows, and other comforts and conveniences—all wrapped in a train that was 196 feet long but weighed only 97 tons, or little more than a single conventional railway car.

The only thing needed to bring the *Zephyr* to life was a suitably modern engine. That came in the form of General Motors' brand-new model 201A diesel engine. While not strictly the first diesel to appear in railroad service, the streamliner's power plant was the first diesel to be used for high-speed passenger service. Ever since Rudolf Diesel built a crude 20-horsepower prototype in 1897, engineers had dreamed of adapting the diesel to railroads. Using as much as 37 percent of the potential thermal energy in each gallon of fuel oil, the diesel was four times more efficient than a steam engine and had double the thermal efficiency of a gas engine (which relied on a spark plug rather than compressed air for combustion). The catch was that a diesel was highly efficient only when operating at a slow and steady speed. That explained why the engine found its first widespread application in World War I submarines and ships that traveled at constant speeds for days on end. Moreover, a diesel took up a lot of space, not only for the engine, but for the maze of pipes needed for the intake, compression, and exhaustion of air.

The GM diesel grew out of the vision and tenacity of two engineers, Harold Lee Hamilton and Charles Kettering. Hamilton, a former professional baseball player and railroader, figured out how to build a reliable self-propelled gas railcar, or "doodlebug," to be used on lightly traveled railroad lines. In 1930, Hamilton's Electro-Motive Company and an allied concern, Winton Engines, were purchased by General Motors at the urging of Charles Kettering, GM's chief of research. Kettering had been working for several years on a diesel engine design and he needed Hamilton's organization for its knowledge of electric drives, fuel-injection systems, and other engineering esoterica.

After 1931, there was something of an international race to "sweat down" the diesel, or increase horsepower per pound of motor weight, in order to build a high-speed engine. "Some topside men in General Motors kept advocating that the corporation get into the diesel engine business not by the development route that Kettering was pursuing but by purchasing rights and know-how from one of the old-established European companies making diesel engines," notes T. A. Boyd in his biography, *Professional Amateur* (1957), but Kettering refused to budge. He found an important ally in the U.S. Navy. Interested in developing an improved diesel for submarines, the navy agreed to cosponsor the research and, in effect, insulated Kettering from GM's bean-counting "topside."

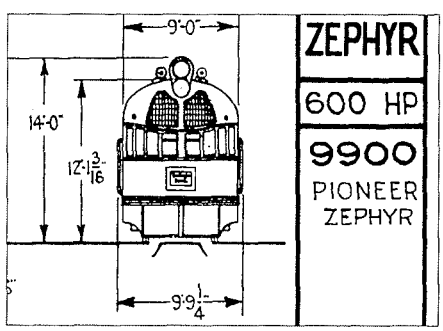
By early 1933, the Kettering-Hamilton team had tapped the potential of lightweight diesel with their breakthrough 201A model. Hamilton took the news to Ralph Budd. "Immediately I was set afire because I knew that that was something completely revolutionary and better—so much better—than



anything we had ever had," Budd later recalled. He paid a visit to the GM research labs in Detroit, where he talked to Kettering about putting the diesel in his forthcoming *Zephyr*. "We wouldn't dare sell you this thing," Kettering told him. "We don't even know if it will run." But Budd placed his order in June 1933, giving the GM engineers 10 months to deliver. As Budd explained, "I knew that if General Motors was willing to put the engine in a train, the national spotlight would be on the corporation. They'd simply have to stay with it until it was satisfactory. I knew they'd make good."

After barnstorming the West on a 12-state exhibition tour, the *Zephyr* went into regular service between Kansas City, Missouri, and Lincoln, Nebraska, at the end of 1934. Despite double-digit unemployment in the farm belt, the train attracted so many riders that customers had to be turned away. To meet the demand a fourth car was added, and the company made plans to buy five more *Zephyrs* from the Budd Company for other Midwest routes. By the end of 1935, revenues were twice what they had been when steam trains ran on the line, while operating costs had been reduced from 65 to 35 cents per mile. Although the initial $250,000 cost of the *Zephyr* was approximately double that of a steam train, the lower operating costs more than compensated. The bottom line showed $95,000 in profits in the *Zephyr*'s first year of service.

The Union Pacific Railroad was also in an experimental mood in 1934. From the drawing boards of the Pullman Company and the test labs of the University of Michigan came "Tomorrow's Train Today," a three-car aluminum-clad train featuring such novel touches as a bubble-top cab for the engineer and a waterfall grille splashed across its prow. While not technically as advanced as the *Zephyr*, the train proved so popular that the UP's young Wall Street banker-chairman, W. Averell Harriman, sent it around the country on an exhibition trip. The first stop was Washington, D.C., where President Roosevelt was given a personal tour of the train by Harriman and his wife, Marie. Huge crowds were on hand as the train embarked on its first coast-to-coast tour, heading west on the Pennsylvania Railroad. The train's high-speed exploits filled the pages of metropolitan papers and the screens of movie houses. "They really don't run this Union Pacific train," people joked, "they just aim and fire it."



In Washington, Joe Eastman was taking steps to ensure that the fledgling revolution did not die from a lack of money or from bureaucratic timidity. A crusty, charismatic New Englander long known as the "most liberal mind" in the public utility field, Eastman had been named coordinator of transportation by FDR in 1933. After the Burlington and UP streamliners were built with private capital, Eastman approached Harold L. Ickes about the possibility of advancing Public Works Administration (PWA) funds to railroads seeking to build the next round of streamliners. Ickes agreed, and $3 million was lent to three railroads for diesel streamliners and switch engines.

Eastman then faced the task of encouraging General Motors to build the world's first diesel-locomotive plant. GM officialdom was still divided over the wisdom of investing in railroad motive power. Hamilton and another executive went to Washington to ask Eastman for his advice. If GM was convinced that its locomotive could effect major operating economies for the railroads, Eastman told them, it could surely win a lucrative share of the locomotive business and smooth the cyclical ups and downs of auto-making. Eastman sug-

gested that the corporation finance diesel sales on an installment plan similar to the one offered to auto buyers. Electro-Motive company historian Franklin Reck says that this novel idea helped sway GM headquarters.

The first PWA-funded streamliner rolled out of the factory in April 1935. Built for the New Haven Railroad by Goodyear-Zeppelin Corporation, the blue-and-silver *Comet* bolted back and forth between Boston and Providence, Rhode Island, achieving speeds of 109 MPH. It was closely followed by the Baltimore

With its spirit of elegant modernity, the streamline style spread far beyond trains. A greeting card captured the spirit, as did the sophisticated ladies who posed for a publicity still in a Union Pacific lounge.

& Ohio's *Royal Blue* and *Abraham Lincoln*, both built by American Car & Foundry of St. Charles, Missouri. The *Abraham Lincoln* was pulled by the world's first standard-sized, 1,800-horsepower diesel locomotive. Built by GM, the locomotive was tested repeatedly over the next two years against the best steam power on the railroad. Its impressive performance—"she's the pullingest animal on rails," exclaimed George Emerson, the B & O's chief of motive power—resulted in a raft of orders for GM locomotives and heralded the eventual dieselization of American railroads.

Across the country railroads found the new streamliners had only one flaw: They did not have enough cars to accommodate all the people who wanted to ride them. By 1938, nearly every important railroad had bought—or if it could not afford to buy, had rebuilt from standard equipment—a streamliner of its own. In all, about 90 trains were placed in service. Streamliners now blasted west out of Altoona, Pennsylvania, around famous Horseshoe Curve on the Pennsylvania Railroad's *Broadway Limited*. They skimmed along the desert sands of New Mexico on the Santa Fe's *El Capitan* and *Super Chief*. They cut through the piney woods of Mississippi on the Gulf, Mobile & Northern's *Rebel*. They wound up and over the Sierra Nevada at Donner Pass on the Union Pacific's *City of San Francisco*, sped through the wheatland oceans of Kansas on the Rock Island's *Rocky Mountain Rocket*, and threw their horsepower against the head winds of coastal Maine on the Boston & Maine's *Flying Yankee*.

In breathless magazine accounts such as "The NEW ERA of Railroading," the public was informed that railroad presidents were consorting with "artists and designers" to give expression to new creations. In 1937, the New York Central hired artist Henry Dreyfuss to completely overhaul the *20th Century Limited*, at a cost of $800,000 per trainset, and the new *Limited* became one the era's leading symbols of everything that was fast and modern. The *Zephyr* itself "starred" in a Hollywood action-romance hit, *Silver Streak* (1934), rushing a polio-stricken child to the safety of an iron lung. Movies of the era often showed characters boarding the glistening new trains, and many a Tinsel Town starlet served as mistress of ceremonies at streamliner christenings.

"We are trying to revive the interest and the romance that people used to see in the iron horse," Frederick Williamson, president of the New York Central, said. The streamliner did that and more: It promoted advances in construction that swept across the fields of transportation, architecture, and consumer goods. Automobiles, for example, became less angular and boxy. The Ford Motor Company's new sedan, the Lincoln Zephyr, had more than a name in common with the glamorous Burlington train. As one car historian wrote, it "represented an entirely new idea in automotive design." Railroad streamline art influenced advertising, architecture (notably, Radio City Music Hall in New York), and the design of ordinary consumer products, Robert Reed writes in *The Streamline Era* (1975). Housewives were pictured in ads scrubbing their "convenient, up-to-date" aluminum pots as a miniature streamliner rushed around the kitchen sink. Streamlined furniture, streamlined corsets, even streamlined coffins were sold to a receptive public.

What quickened the public pulse as much as the glamor of the streamliner was its tremendous speed. The *Zephyr*'s dawn-to-dusk dash to Chicago was a preamble to the "greatest speed-up of rail service the world had yet seen," in the words of industry journalist Donald Steffee. On routes where trains had loped along at an average of 35–40 MPH since World War I, the new streamliners quickened the overall pace to 55 MPH or higher, shrinking the running times between most terminals by about one-third. The quantum leap in train speed is made vividly evident by industry reports. In 1928 there were only two trains scheduled at 60 MPH or more;

by 1936 there were 644. The new trains covered a distance of 40,205 miles, of which 29,301 were scheduled daily. By 1939, total mile-a-minute mileage jumped to more than 65,000—and the 10 fastest trains in the world were all U.S. streamliners.

The acceleration was accomplished by eliminating dead time and by reducing stops and slowdowns. The diesel locomotive was crucial in making these increased efficiencies possible. The diesel gained top speed much more rapidly and smoothly than a steam locomotive, owing to the steady rotating power delivered to the driving wheels. A diesel could round curves at elevated speeds and did not have to stop for coal and water. The success of the diesel gave rise to an improved generation of steam locomotives, which posted some remarkable speed records on individual runs in the late 1930s. Ultimately, though, the speed game was ruled by the diesel.

The increase in speed occurred in all parts of the country. In the East, where schedules were already tight, 40 minutes were cut from the running time of the *Congressional* between New York and Washington after the Pennsylvania Railroad completed electrification of the line in 1935. (At three hours, 35 minutes, the *Congressional* was about 50 minutes slower than today's express *Metroliner*.) The leisurely eight-hour schedule between Chicago and St. Louis of 1925 was reduced to four hours, 55 minutes by the *Green Diamond*. Houston was brought two hours closer to Dallas by the Southern Pacific's *Sunbeam*. Service between Kansas City and Oklahoma City was chopped from 12 hours to seven by the Frisco's *Firefly*. Streamliners commonly ran 100 MPH to meet their schedules; one Midwest train was *scheduled* at 108 MPH between stops in Kansas.

The testing ground for the economics of high-speed service was the corridor between Chicago and Minneapolis-St. Paul. Between these cities "there was probably more transportation competition than anywhere in the world," noted *Fortune* magazine. In 1935, Ralph Budd first took on the competition—Greyhound, Northwest Airlines, and the family car—by announcing a six-and-one-half–hour run between Chicago and the Twin Cities. Diesels would make the trip in three and one-half hours less than steam-driven trains (and 115 minutes faster than Amtrak does today). Thus were born the Twin City *Zephyrs*, with Budd-built cars and GM-powered engines. Believing their corporate honor was at stake, both the Chicago & North Western and the Milwaukee Road responded by introducing their own streamliners, matching the Burlington's scorching pace and its comfortable seats, air-conditioning, elegant dining cars, and reduced round-trip fares. "If transportation competition ever justified itself, it did here," *Fortune* said. The new service resulted not in the waste of facilities but in their highly profitable use. The Milwaukee's *Hiawatha* immediately started to gross well over $3.50 a mile, or three times its operating expenses. The Twin *Zephyrs* carried an average of 316 people a day (up from 26 through passengers on average under the old steam regime), and the C & NW's *400's* performed equally well. Greyhound offered discount fares and even attached trim to the sides of its buses in an effort to imitate the streamliners, but to no avail. Additional fast trains were scheduled. Overall, the railroads carried more than four million passengers between Chicago and the Twin Cities between 1935 and 1939.

Another travel market that was expanded by the mating of speed and comfort was the New York to Florida trade. The *Silver Meteor*, put into service by the Seaboard Railway in 1939, trimmed eight hours off what had been a 33-hour run between New York and Miami. By 1941, six more fast and luxurious trains were in operation between New York and Florida. Coach travel had increased 1,200 percent, and Florida had become "a playground for people who never had been farther south than Asbury Park, New Jersey," one observer said. In short, reawakened passenger

departments discovered what John B. Jervis, an officer of the Mohawk & Hudson, had noticed a century before. "The expectations of the public have been so much excited in reference to rapid traveling," Jervis wrote to his board of directors in 1831, "that they will not be satisfied with moderate speed, say 10 or 12 miles per hour; they must have 15 as a regular business."

When Ralph Budd met with President Roosevelt and Joe Eastman at the White House in September 1939, he could report that the rail-passenger business had turned a corner. Railroad patronage, measured in passenger-miles, had increased 23 percent over 1935 levels nationwide and 38 percent over those of 1933. A pattern of decline that had begun in 1920 had been reversed. Budd pointed out that the industry had taken tremendous strides in improving the business of moving people. Under private ownership and mostly with private capital (the PWA loans for streamlined trains had ceased in 1936), railroads were offering better transportation to the public than ever before. And this improvement had not been achieved at the expense of safety. Statistics collected by the Interstate Commerce Commission (ICC), which was now chaired by Eastman, showed only three fatalities resulting from accidents in five years of running speedy streamliners, a tribute both to safe railroad practices and to the engineering excellence of the railway equipment and locomotives. Nor did the improved service add to the price of rail transportation; in fact, coach fares had dropped from 3.6 cents a mile to 2 cents a mile after 1936.

Roosevelt and Eastman listened intently. Hitler's invasion of Poland earlier that month had forced an immediate rethinking of the government's plans for military readiness. Transportation loomed as one of the more pressing concerns. A number of experts were urging Washington to nationalize the railroads, citing the precedent of World War I. Budd argued against federal seizure. Why not, he suggested, work through existing organizations, notably the ICC, the Association of American Railroads, and the Shippers' Advisory Boards, to make the necessary arrangements? Budd's idea won over the White House, and on May 28, 1940, President Roosevelt named him federal transportation commissioner, a post he held until America entered the war 18 months later.

Just as Budd had predicted, railroads proved to be one of America's more important wartime assets. At the height of the war, they carried four times the passengers and twice the freight they had handled in 1939, without the kind of congestion that had brought rail traffic to a near standstill during World War I. "It was inconceivable that we could have waged a two-front war without railroads which hauled 90 percent of all Army and Navy equipment and supplies and more than 97 percent of all troops," one authority noted.

The secret to this achievement lay primarily in the technological innovation that had occurred between the two world wars. The advent of the diesel locomotive was a breakthrough, along with the introduction of centralized traffic control, improvements in rights of way, and the use of heavyweight rails. On many roads, diesel locomotives provided the extra horsepower to muscle war-swollen freight and passenger trains over the line. Diesels hauled troop trains mile after mile, week in and week out. Although the low operating cost of the diesel was important, the feature that made it nearly indispensable was its around-the-clock dependability. On that score alone, it took only half as many diesel units as steam units to handle a given tonnage over the same distance in the same time. This in turn represented an enormous saving in fuel and labor.

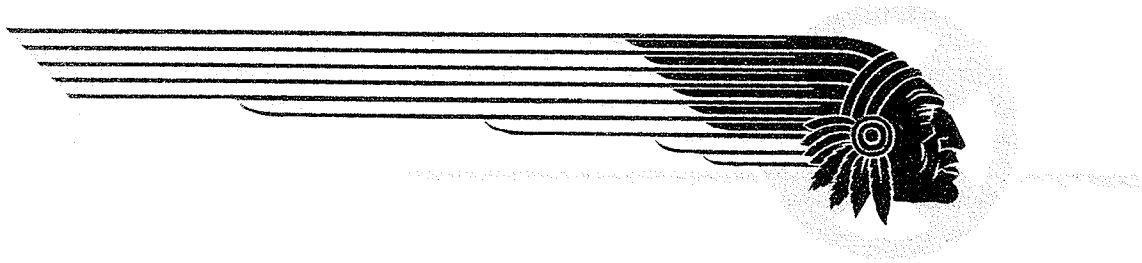
Another spillover of diesel-streamliner technology was the development of dynamic brakes in freight locomotives. Without the prior development of high-speed passenger service, this revolutionary application would probably have been delayed for another decade. By simply operating a lever, a freight train

engineer could change the electric traction motors into generators, thereby reversing their function from drivers to retarders. When dynamic brakes went into use on mountain grades, the problem of smoking wheels diminished and time-consuming stops for wheel cooling were largely eliminated.

After Pearl Harbor, the pioneers of the diesel streamliner were deeply involved in the war effort. Hal Hamilton's organization kept producing locomotives and was also pressed into service to develop diesel engines for the navy's LSTs (landing ship, tank). The "567" diesel gained worldwide renown for its reliability. During the week after D-Day, more than 300 LSTs shuttled tanks and heavy artillery between the allied fleet and the Normandy beaches. The Budd Company converted its railcar factory to the emergency manufacture of war goods, turning out the famous bazooka projectile and earning the army-navy "E" award for outstanding war production. In 1944, an ailing Edward Budd received the American Society of Mechanical Engineers' highest award, a medal for "outstanding engineering achievements." The father of the stainless-steel streamliner died two years later at his Philadelphia home at age 76.

The surge in wartime traffic was not an unmitigated blessing. Not only did the railroads' physical plant, equipment, and roadbed suffer heavy wear, but in the crush of people and matériel, trains were delayed, connections were missed, and many a benighted traveler spent at least one trip sitting on his suitcase in an "old rattler." Moreover, for millions of young soldiers who rode the troop trains to Oakland Pier or Norfolk, the railroads took them away from loved ones and toward a hazardous future. No doubt unpleasant associations with railroads were seared into the minds of many Americans. But under Joe Eastman before his untimely death in 1944, the Office of Transportation cooperated with railroad personnel to ensure that hundreds of thousands of cars and locomotives moved night and day. The trains got through.

Had Hitler shown like judgment and not sacrificed Germany's fine rail network to his autobahns, *Railway Age* magazine pointed out in November 1943, the state of the world might have been different: "Germany is suffering now from the plan of her 'master-minds' to subordinate railway to highway development and her ultimate defeat may be attributed to the failure of her railways—assisted in such failure by our own Flying Fortresses—to stand up under the job of supplying transportation during a long war."



II

A spirit of optimism prevailed in the railroad industry at the end of World War II. "Railroad men never have been so full of ideas for developing passenger business," *Fortune* reported. "There is, for example, talk of streamliners, complete with bars and lounges, that will leave New York and Chicago in the morning and arrive in Chicago or New York after dinner, and charge as little as $10 or $12 for the trip." Carriers were making surveys of passenger preferences, and railcar builders were preparing

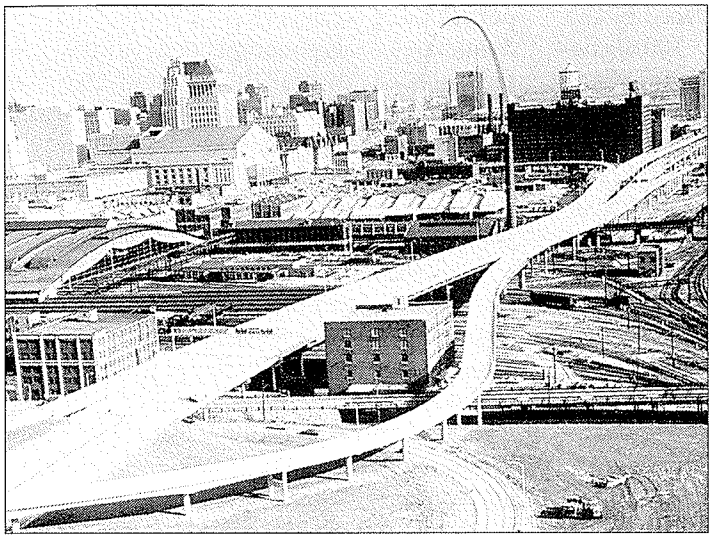
for the biggest boom in history. Paced by the New York Central's order for 300 lightweight coaches, the Budd Company announced plans to quadruple its car-building capacity. Budd and other builders believed that at least 13,000 of the industry's 28,000 passenger railcars would be replaced over the next five years. They expected to build more than 3,000 cars a year.

While it was widely believed that airlines would eventually dominate long-distance trips of 600 miles or more and that cars and buses would eat into the short-haul business, nobody gazing into a crystal ball in 1946 could have predicted what happened next. Railroads then handled two-thirds of the nation's commercial passenger traffic, and the New York Central alone carried more people than the entire U.S. airline industry. Who could have imagined that railroad passenger volume would plunge from 790 million riders in 1946 to 298 million by 1965; that such legendary streamliners as the *Liberty Limited*, *Royal Blue*, *400's*, and *Orange Blossom Special* would be discontinued or turned into locals, shorn of dining and sleeping cars; or that the U.S. government itself, in the form of a 1958 report by the ICC, would complacently assert that the passenger train was rolling down the track to oblivion and would in all probability "take its place in the transportation museum along with the stagecoach, the sidewheeler, and the steam locomotive"?

There were several standard explanations for the collapse of the world's best rail-passenger service. Many observers, watching the diversion of traffic from railroads to cars and planes, declared that the day of the train was past, its work done. GI Joe had voted with his feet, it was said, preferring the go-anywhere, go-anytime convenience of his car and the speed of the plane. "We are a nation on wheels," declared Lucius D. Clay, the retired army general who headed the 1954 government committee that would help launch the interstate highway system, "and we cannot permit these wheels to slow down." In academic circles this phenomenon was known as the "railroad downfall theory," and it worked by analogy: Just as horse-drawn stagecoaches were overtaken by railroads during the 19th century, so railroads in the second half of the 20th century would be buried by automobiles and airlines.

Another body of opinion was built around the view that railroaders, preoccupied with hauling freight, had willfully abandoned their human cargo, practically slapping passengers in the face with high fares and chronic bad service. "I am the Unwanted Passenger," E. B. White lamented in the *New Yorker*. "I am all that stands between the Maine railroads and a bright future of hauling fast freight at a profit." Freight, in fact, did appear to remain a solid revenue base until the 1957–58 recession, when the curtain parted to reveal the extent to which truckers had skimmed off the lucrative end of the business. Battered further after 1959 by the opening of the St. Lawrence Seaway, which shifted vast amounts of bulk freight from rails to barges and cargo ships, even railroads that carried few passengers—the Lehigh Valley, Ann Arbor, and Western Maryland, to name three—began a tortuous descent into wholesale route abandonments or receivership.

In retrospect, the passenger train did not succumb because the jet turbine was more efficient than the diesel engine, or because Americans owned 60 million cars, or because railroad managers implemented fewer and fewer new ideas after 1950. Behind these effects lay a more profound cause: a change in the very ground rules of transportation. After World War II, government became the railroads' biggest competitor, as first Congress and then the White House jumped into the transportation business. Released from the stringencies of the Depression and the discipline of war, federal expenditures for airports and highways rocketed to dizzying heights, driven by the politics of the Cold War and the pork barrel.



Making a more apt symbol of the age than the Gateway Arch looming behind it, an interstate cuts across the "throat" of St. Louis Union Station.

The public promotion of roads and runways, with government construction, government maintenance, government policing, and government signaling, made it easy for truckers and airlines and bus companies—not to speak of motorists—to compete with railroads that built and maintained their own rights of way. At the same time, the passenger train was hobbled by an unusual array of shortsighted government regulations, tax policies, and labor laws that drained vital capital and squashed the enterprising spirit of the 1930s. In the words of an exasperated Ralph Budd, who retired from the Burlington in 1949, the industry was denied "the equality of opportunity" to compete for postwar passengers.

As the world of tires and wings overtook the railroads, the great Gothic city terminals that once echoed with the bustle of travelers and the clatter of baggage carts began to resemble the relics of a fallen empire. "Year by year the railroads have simply been drifting out of the public consciousness," David P. Morgan, editor of *Trains* magazine, wrote in 1958. "Nobody hangs around the depot to see the 5:15, assuming it's still there, and a generation of Americans has never been inside a train." Without anyone realizing that it would be the start of a postwar pattern in other industries, America let the technological advantage built by the two Budds, Hal Hamilton, and Charles Kettering slowly slip away.

Speed, cost, and efficiency were the three elements that had made the streamliner such a luminous success in the 1930s. Remarkably, all three were undercut or penalized by government policies in the postwar period. For example, *Railway Age* reported in 1944 that the industry was thinking of fielding daytime expresses that would run between New York and Chicago in 14 hours, a two-hour improvement over the fastest overnight schedules. Cars on these trains would connect with the fleet of West Coast trains at Chicago, making the coast run in about 36 hours, so that a passenger leaving New York on a Saturday morning would arrive at Los Angeles Monday morning. But the ICC effectively killed this idea before a single train left the station. In 1947, the agency imposed a 79-MPH limit on all passenger trains not equipped with special signaling devices in their locomotive cabs. The rule, which went into effect in 1950, further restricted trains running on lines without other trackside signals to 60 MPH.

The problem with the regulation was not just the estimated $80 million it would cost the carriers (the equivalent of roughly $400 million today), but the minimal improvement it would make in passenger safety. Because some of the fastest stretches of track were used by so few passenger trains a day and under such safe conditions, several railroads argued that special signaling was not warranted. The railroads' line of reasoning irked ICC commissioner William Patterson, who complained in a hearing, "When you get to the final analysis here, it is

a question of whether you [the railroads] should determine how these funds should be used or whether the government should. . . . And hasn't Congress given the commission that responsibility?"

Another obstacle placed in the path of the streamliner was the 15 percent federal excise tax on common-carrier tickets. Originally established as a wartime measure to discourage civilian travel, the tax was continued after the end of the war, and unhappily it succeeded all too well in its original purpose. "The additional 15 percent added to the cost of rail transportation has often been the deciding factor in the choice of the private automobile over the rail service," regulatory commissioners said in a 1954 report. Between 1945 and 1953, the tax added $1.4 billion to the federal treasury, while boosting the price of a one-way first-class ticket between New York and Chicago from $35 to $40.25. (The tax was lowered to 10 percent by Congress in 1954 and rescinded at the request of the Kennedy administration in 1962.)

Local property taxes also hurt the passenger train. Unlike cars, trucks, and buses, which travel on public roads, passenger trains used stations and rights of way that were taxed as private property. As the cost of local government rose after 1945, municipal tax collectors found passenger-railway properties too tempting to overlook. By 1955, the railroads in Chicago were paying more than $12 million in Cook County taxes. The New York Central became the single biggest taxpayer in New York City. In 1956, it paid $6.6 million in taxes on Grand Central Terminal alone.

Taking their cue from the cities, a number of small towns and counties placed special taxes on property owners for the support of airports. This put the railroads in the maddening position of being able to calculate exactly how much they were being required to contribute to the welfare of their competitors. A 1958 government report found this example in Montana:

> Cut Bank, population 3,721 in 1950, had an airport covering 1,703 acres which cost $4.3 million, mostly provided by the federal government, perhaps for military reasons. Through the city and county airport levies, the Great Northern in 1956 contributed $2,241 for the support of the airport, and the ad valorem tax of Western Airlines, which serves the airport, was $22.92. There were 587 air passenger loadings at the Cut Bank airport in 1957, so that the cost to the Great Northern was $3.82 for each of those passengers, compared with a tax cost to Western Airlines of 4 cents per passenger.

Passenger trains were further burdened by full-crew laws passed by many state legislatures at the behest of organized labor. These laws required a fireman aboard every diesel passenger train, even though there was nothing for the fireman to fire. Both the fireman and the engineer were paid under "basic-day" rates unchanged since 1919. One hundred miles constituted a basic day for the crew. As a consequence, crews were changed a total of eight times on a passenger train running the 1,000 miles between Chicago and Denver in 16 and one-half hours, and the crews shared a total of 10 days' pay. Restrictive union work rules had been a matter of controversy in railroading for years. But the issue of "featherbedding" took on added urgency in a period of inflationary wages. During the 1930s, when the streamliner movement got under way, the average pay of a railroader was 70 cents an hour. With railroad wages climbing to $1.94 an hour in 1954, the costs of the old practices soared. "This type of labor agreement has loaded wage costs so heavily on the passenger train that these costs alone have often been the decisive factor necessitating the discontinuance of the operation of trains," an expert declared to Congress in 1954.

High operating costs were a greater problem than loss of patronage: Through 1955, the number of passengers carried on an average intercity train was only slightly less than the average carried in 1939. But the inflationary

spiral had a deadly outcome. Capital that should have gone for improved equipment and faster service was dissipated in wages and taxes.

The effect on American railcar-builders was profound. Orders for passenger-train cars sank to 109 units in 1949 from a 1945 peak of 2,993. "We carbuilders have literally knocked ourselves out designing and building new types of equipment," Edward Budd, Jr., son of the founder, told the Association of Passenger Traffic Officers in 1957. The carbuilder found that it was selling more rail equipment abroad than at home: The title of a company advertisement announcing delivery of a new streamliner in 1955 made the bittersweet boast, "None But the Best for Canada."

To be sure, rail executives deserved part of the blame for the declining state of the passenger train. Many companies were too prone to compete foolishly among themselves rather than against buses and planes, dispatching trains out of the same cities at the same times instead of spacing departures throughout the day on a cooperative basis. As often as not, passenger trains stopped only in the downtown stations of cities and rolled past the expanding suburbs that were home to many potential riders. And it is fair to say that some companies became defeatist and used train losses to try to convince state railroad commissions that passenger service was no longer necessary or desirable. On the Southern Pacific and New York Central, management combined trains and downgraded food and sleeping car service. The emphasis was on retrenchment—on keeping people *off* trains.

Frequently, the government's own regulatory apparatus served to accelerate the slide. There were a number of reasons for this. Railroads, America's first big industry, were also its most highly regulated. Federal oversight began with the Interstate Commerce Act in 1887. The industry was also bound by state laws, city ordinances, and 48 state public-service commissions whose cumulative decrees, sociologist W. Fred Cottrell quipped, "exceeded the French Code in size." Established at a time when railroads ruled the transportation world, the overlapping laws and agencies compelled carriers to provide passenger service on money-losing branches and otherwise denied management the right to make crucial economic decisions. Obtrusive regulations, such as the signaling requirement, deprived railroads of their flexibility to respond to changing conditions or to experiment with new technology, and bred a negative, antagonistic approach to passenger-train problems.

Congress also suffered its own failure to modernize. Its thinking on railroads remained stuck in the 19th century, when railroad robber barons seemed poised to take over the entire American economy. In 1943, for example, the New Haven and Pennsylvania railroads sought permission to invest in commercial airlines. Presented with a golden opportunity to encourage the integration of air and rail service in the New York area, Congress instead let the authorizing legislation die in the belief that railroads were seeking to monopolize aviation.

A different regulatory environment was established for air carriers. In 1938, aviation enthusiasts pushed through Congress the Civil Aeronautics Act, which *promoted* as well as regulated air transport. The Civil Aeronautics Board (CAB) provided direct operating subsidies to most airline companies and indirect subsidies to all carriers by fixing high rates for air mail. But such public underwriting of private enterprise paled next to the 1946 Airport Development Act. The law called for construction of more than 2,000 new airports and authorized $500 million to help cities and states build them. The aid was justified on the grounds of national defense and the argument that Washington had always offered financial help to promising new forms of transportation, including railroads in the 19th century. But amid all the rhetoric there was plenty of old-fashioned logrolling. "Every town had its congressman, ready to proclaim the . . . absolute necessity for airline service," wrote former

CAB official Charles Kelly, Jr., in his book, *The Sky's the Limit* (1963). Subsidies would be needed "just to get the feeder lines on their feet. . . . At least that was the theory." Washington also began to spend huge sums on control towers, approach-light lanes, weather-reporting systems, and a cadre of federal air traffic controllers. By 1960 the federal government had spent more than $2 billion on such "airway aids."

With Washington's help, the airlines experienced a tremendous boom. "Civilian aviation is now a giant grown fat by government subsidies," a 1959 congressional report noted. Between 1946 and 1959, the airlines' share of commercial intercity travel leaped from a negligible six percent to a commanding 39 percent. The increase came almost entirely at the expense of the passenger train. Airlines drew comparatively few patrons away from highways, but gained an overwhelming share of the "business class" travelers who had previously traveled in overnight Pullman sleepers or daytime parlor cars.

By 1959, the railroads' market share (excluding commuters) was down to 29 percent—only two percentage points above intercity bus volume. Even the most progressive railroads had trouble stabilizing passenger service. Despite vigorous sales campaigns to spur travel on its flagship *Afternoon Hiawatha* linking Chicago and the Twin Cities, the Milwaukee Road saw yearly revenues from the line drop to $1.7 million in 1960 from a peak of $2.2 million in 1948.

A fundamental shift in federal spending priorities helped pave the way for America's postwar car culture. Highways, historian Bruce Seely points out in *Building the American Highway System* (1987), once were considered the responsibility of local and state government. During the Depression, Congress agreed to underwrite new programs to build roads and bridges in order to create jobs for the unemployed, but rejected an $8-billion plan for a national system of highways after critics labeled such roads "extravagant speedways, designed to serve the luxurious few." Washington's involvement grew with the passage of the Federal-Aid Highway Act in 1944, which authorized $500 million a year for postwar highway building. Yet it was not enough. With cars pouring out of Detroit in record numbers, highway supporters argued that congested and obsolete roads would throttle the economy.

On July 12, 1954, Vice President Richard M. Nixon waved the promise of a $50-billion road-building project before state governors assembled at Lake George in upstate New York. At a time when the federal budget totaled $71 billion, this was very big money—roughly equivalent to $1 trillion worth of construction work today, transportation historian Tom Heppenheimer notes. "America is in an era when defensive and productive strength require the absolute best that we can have," Nixon declared. Using notes prepared by President Dwight D. Eisenhower, who could not attend the conference, Nixon spoke of "a grand plan" of expressways that would solve "the problems of speedy, safe transcontinental travel" and help "metropolitan area congestion, bottlenecks, and parking."

In his diary, James C. Hagerty, Eisenhower's press secretary, reported that Nixon told a cabinet meeting that highway building "would be a good thing for the Republican Party to get behind," and pointed out that "in California [Governor] Earl Warren got the reputation of being a great liberal because he built schools and roads. We are now ready to build roads and it is very popular." Eisenhower, who had been greatly impressed by the German autobahns when he was supreme allied commander in Europe, agreed.

Eisenhower picked as his key adviser on highways a man who was accustomed to thinking in sweeping terms—retired general Lucius Clay, the hero of the Berlin airlift. From the outset, the Clay Committee couched the road-building project in Cold War terms. The

threat of atomic attack demanded a national superhighway system to speed the mass evacuation of cities, General Clay said. In one survey it was estimated that expressways could save 225,000 additional lives in Milwaukee alone (though it was estimated that 210,000 would still perish). Dubbing superhighways "roads for survival," Clay and his colleagues wrote in their report to President Eisenhower, "It was determined as a matter of federal policy that at least 70 million people would have to be evacuated from target areas in case of threatened or actual enemy attack. No urban area in the country today has highway facilities equal to this task. The rapid improvement of the complete 40,000-mile interstate system, including the necessary urban connections thereto, is therefore vital as a civil-defense measure."

Out of a series of financial schemes that satisfied Eisenhower and the Democrats in Congress came the National System of Interstate and Defense Highways Act of 1956, described by Secretary of Commerce Sinclair Weeks as "the greatest public-works program in the history of the world." A principal feature of the act was the establishment of a Highway Trust Fund that would collect money for highway construction from increased taxes on gasoline, tires, and commercial road vehicles. In effect, urban drivers would subsidize rural drivers and the crowded Northeast would support road-building in the sparsely populated West. South Dakota and Utah could not underwrite interstates on their own, but with a national fund that pooled money from all car and truck travel, superhighways could be built across the country.

The unprecedented legislative and financial support marshaled on behalf of interstate highways completed the transformation of the railroads from a proven national resource to a rusty relic. Ralph Budd and other executives had seen the industry make more significant changes in a decade than in the whole half-century before, but in the public's eyes, railroads were run by whiners or plunderers. Eleven years after V-J Day, the train was no longer considered essential to the nation's transportation needs or even to its defense.

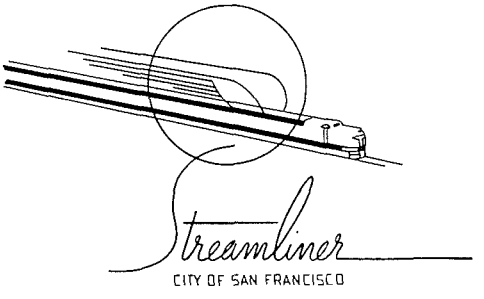
The fact that Washington's encroachment on the transportation business not only violated the principles of free enterprise preached by the Republican Party but contributed to the downfall of an important taxpaying industry only added to the sense of frustration and betrayal among railroad officials. "When the president signed the bill, I told him he had just signed the death warrant of American passenger service," Howard E. Simpson, president of the B & O Railroad, recalled in an interview. An apparently indifferent Eisenhower replied, "We'll see."

Simpson was right. The impact of interstates would be little short of shattering. Between 1956 and 1969, a total of 28,800 miles of interstate highways were opened to traffic. In the same period, 59,400 miles of railroad were taken out of passenger service. General Motors, like many other manufacturers, bailed out of the passenger-train business in the 1950s, although it continued to make diesel freight locomotives at its plant in La Grange, Illinois.* America's rail-passenger service dwindled from 2,500 intercity (noncommuter) trains operated in 1954 to fewer than 500 in 1969. By that time it was impossible to ride a train between Houston and Dallas or Pittsburgh and Cleveland. Gone was the South's first streamliner, the *Rebel*. Other trains that figured prominently in the great speed-up of the 1930s—the Chicago & North Western's *400's*, the B & O's *Royal Blue*, the Milwaukee Road's *Hiawathas*, the Union Pacific's *City of Portland*, the New Haven's *Comet*—were excised from the timetable or combined with

*Before his retirement in 1956, Hal Hamilton, president of the Electro-Motive Division, wanted to experiment with new forms of railroad motive power, including electric and turbine generation, according to his son, Kent Hamilton. But his ideas were turned aside by GM chairman Harlow Curtice. "Curtice pulled my father into his office and said: 'Hamilton, you're not selling enough parts. You're building your engines so they last too long. Now you've got to cheapen up those engines so that they won't last as long so we sell more parts.' "

other trains. Cars built for the world-famous *20th Century Limited* were sold to the Mexican National Railways, which ran them out of Guadalajara and Mexico City.

On lines where passenger trains still ran, service was often threadbare. Only a masochist would want to ride the Erie-Lackawanna from Buffalo, New York, to Hoboken, New Jersey, just across the Hudson from Manhattan. The railroad offered one train a day, a local with nothing but coaches, that left Buffalo at 5:15 P.M. and arrived at Hoboken at 3:35 A.M. Save for the popular Metroliner trains that began operating in the New York-Washington corridor in 1969, the once-blazing torch of American intercity passenger service had dimmed to a faint dot on the horizon when the National Railroad Passenger Corporation (Amtrak) took over virtually all intercity service in 1971.



III

During the same years that American railroads fell into decrepitude, officials in Japan and Western Europe took the bright ideas of Edward Budd, Hal Hamilton, and other American inventors and figured out how to use them to propel passenger trains to a new threshold of speed, safety, and energy efficiency. Their achievements have revived worldwide interest in steel-wheel transportation. Trains in France currently top 175 MPH. Trains in Japan and Germany use between one-sixth and one-eighth as much energy as a jet plane carrying an equal passenger load. The safety record of such trains is nearly flawless. And like U.S. streamliners of yore, high-speed trains in Japan and Europe have been a commercial success, earning revenues substantially over costs.

It is difficult today to appreciate how primitive Japan's railways were in the years following World War II: Those were the days when Japan's industrial reputation rested on the manufacture of little trinkets found in American cereal boxes. Built in narrow gauge and served by archaic steam locomotives, Japan's rail system was an antique assemblage of short lines whose construction had been financed by British traders in the 19th century. The first step in the rejuvenation of the Japanese National Railways (JNR) was political rather than technological. In 1949, the railroad was reorganized by the U.S. military government into a quasi-public operation, its management separated from the Ministry of Transport. The second step was the selection of Shinhi Sogo as JNR president in 1954. Appointed after the capsizing of a JNR ferry resulted in Japan's worst-ever peacetime sea disaster, Sogo recognized that his first task was to improve safety. Once he got the railway functioning as a national system, he introduced the first intercity streamliners to Japan.

But Sogo knew that his organization had to address the technological gap that existed between his country and America. Following a tour of the United States, he expanded the Railway Technical Research Institute in Tokyo and launched programs in applied research and systems engineering. In 1956, the same year that President Eisenhower signed the interstate highway bill, Japan's minister of transport, at Sogo's urging, formed a commission to study the costs and traffic demands of the Tokyo-Osaka corridor. The group called on the government to consider new railways an integral part of national transportation, parallel with highway construction and new airports. Three years later, the ceremonial first spade of dirt for construction of a new high-speed super-railroad was turned. The Shinkansen, or Bullet Line, debuted in October 1964, and soon the railway was dispatching blue-and-ivory trains that ran between Osaka

Has Amtrak Missed the Train?

Amtrak started operations inauspiciously on May 1, 1971, a year after the bankruptcy of the Penn Central railroad forced a reluctant federal government to enter the passenger rail business. After only two months of operations, Amtrak's modest federal start-up grant of $40 million was nearly exhausted. And when its first president, Roger Lewis, asked for authority to buy new passenger equipment, President Richard M. Nixon's White House turned him down, forcing Amtrak to rely on a ragtag fleet of old cars and locomotives.

Since those chaotic early days, the National Railroad Passenger Corporation, or Amtrak, has compiled a mixed record. On the positive side, it has replaced much of its antiquated rolling stock with Superliner and Amfleet cars. Its operating deficit has been sliced from 44 percent of total costs in 1984 to 21 percent last year. (Amtrak received $351 million in federal operating subsidies last year.) A number of dilapidated depots, notably Washington, D.C.'s Union Station, have been restored, and ticketing and reservation services have improved greatly.

Yet against these accomplishments must be weighed the poor performance of many Amtrak trains, whose slow schedules and infrequent service conspire to make trains a marginal presence outside the Northeast Corridor. Today, Amtrak accounts for less than four percent of common carrier travel nationwide, while buses claim 10 percent and planes 86 percent.

Amtrak's problems partly stem from the politics surrounding its birth. It was overseen during its early years by Nixon administration officials whose commitment to passenger trains was less than wholehearted. Secretary of Transportation John Volpe slashed 49,500 miles of railroad passenger service to 23,000 miles and cut the number of intercity trains from 450 to fewer than 250. A private railroad that wanted to be relieved of its intercity passenger routes was required only to pay Amtrak an amount equal to its 1969 passenger-service losses. Before long, Amtrak was the underfinanced master of all the nation's intercity passenger trains.

For a time, the railroads that had dumped their passenger service continued to operate the trains under contract to Amtrak. Even though Amtrak now operates its own trains, the freight railroads still own most of the track. This divided responsibility leads to buck-passing between the two. One result is that long-distance train service is slower today than it was when Amtrak took over in 1971—and measurably slower than it was during the streamliner era of five decades ago. The schedule of the New York–Chicago *Broadway Limited* has gone up from 16 hours in 1940 to 20 and one-half hours today; the *Southwest Limited* requires 50 hours between Chicago and Los Angeles on the same route that took 39 and three-quarters hours under the Santa Fe Railway.

In recent years, Amtrak supporters have blamed the railroad's plight on President Ronald Reagan, who took an extreme laissez-faire position on Amtrak's subsidies and repeatedly rejected plans that would have improved service. But some of Amtrak's "friends" share the blame for its current state. They include nostalgia buffs who seem satisfied to have Amtrak operate trains like those they knew as children and local political interests that want to use the railroad for a variety of purposes, such as serving out-of-the-way towns or providing jobs for the homeless. These friends seem unable to conceive of passenger rail as a business and a technology, not as a social agency or a trip down memory lane.

Another perennial problem is high labor costs. When it passed the legislation creating Amtrak in 1970, Congress did not demand any relaxation of restrictive work rules from railroad labor. Despite some improvement in union work rules, about 60 percent of revenues today are consumed by wages.

The Northeast Corridor is the happy exception to Amtrak's woes. In 1976, Paul Reistrup, Amtrak's second president, purchased the Washington-Boston mainline of the bankrupt Penn Central, giving Amtrak total control of passenger operations. Reistrup's bold move, together with fresh capital committed by

Washington ($1.6 billion for track rehabilitation and $150 million for station improvements), resulted in a New York-to-Washington speedway that allows travel at up to 130 M.P.H., which begins to approach the kind of rail system in place in Japan and under rapid development in Europe.

The public has responded to fast, frequent trains by making Amtrak the largest single common carrier in the New York-Washington market. Its share of the air-rail passenger business is 43 percent and growing. Amtrak is trying to duplicate this success by rebuilding its line from New York to Boston. But it has displayed little enthusiasm for starting other high-speed corridors. The reason may be traced to its history: To protect its annual subsidy in Congress, Amtrak must curry favor with organized labor and other constituencies, and they are quite content with the status quo.

Amtrak's structural inadequacies have convinced many transportation specialists that if high-speed rail is ever to take hold in the United States it will have to be developed outside the Amtrak system. Several groups have come forward with plans for the construction of high-speed intercity rail. A consortium led by Morrison-Knudsen Corporation and GEC Alsthom, a French-British venture, is seeking permission to build a 620-mile route that would link Dallas-Fort Worth, Houston, Austin, and San Antonio using 200-M.P.H. French-built trains. The project has created a Texas-size political dust-up. An earlier attempt by other businessmen to build a Shinkansen-like railroad between San Diego and Los Angeles was defeated after citizen groups objected loudly to high-speed trains near their homes.

Despite such opposition, the basic concept of high-speed rail is sound and could be applied on a number of routes where travel is heavy, such as Miami–Fort Lauderdale–Jacksonville, Milwaukee–Chicago–Detroit, Philadelphia-Harrisburg–Pittsburgh, Kansas City–St. Louis, and perhaps San Francisco–Los Angeles. Marketing studies indicate that if rail travel between two cities is reduced to three hours or less, many businesspeople will choose rail over air.

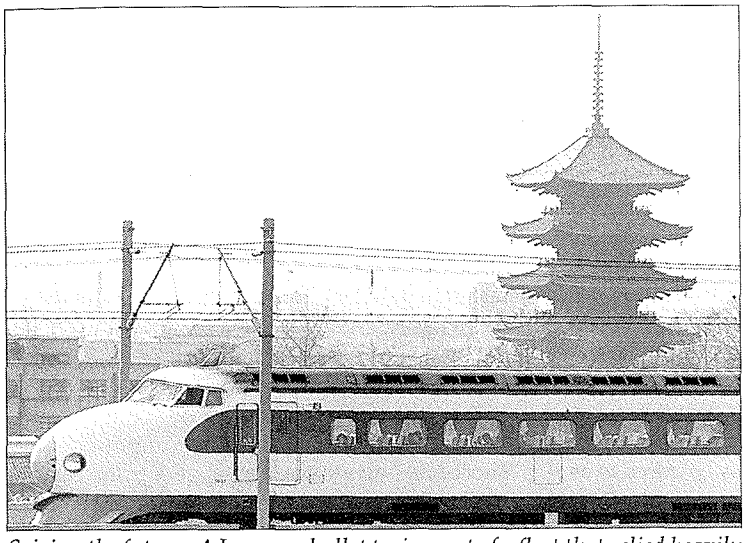
The best option for introducing trains that attract the public would be to use the proven technology of steel wheel on steel rail. "Maglev" trains that float above a magnetic guideway may prove workable in the future but are not practical today. The trains would need to use tracks barred to freight trains and free of grade crossings so that total safety and high speed could be achieved. A similar sort of "dedicated" passenger service was suggested by federal Transportation Coordinator Joseph Eastman back in 1936.

One way to overcome the financial obstacles to high-speed rail would be to tie the service to hub airports, then encourage airlines to invest in rail as an alternative to unprofitable "short-hop" air routes. Passengers from, say, eastern Pennsylvania and Maryland could check their baggage at rail stations and ride directly to Virginia's Dulles Airport for long-distance and international flights. Integrated rail-air ticketing could be provided, and airlines could be awarded coveted airport gates as an incentive to invest in modern ground transportation.

Another idea would be to split high-speed corridors into two discrete parts. A private company would buy the equipment, run the trains, and price tickets without public subsidies, while the federal government would maintain the rights of way, much as it supports highways and airport terminals. Such a venture would parallel developments in Japan and Europe, where government railroads have been broken up into smaller, quasi-private companies in order to lower costs and to encourage private investment.

High-speed rail advocates face a formidable opponent in the highway lobby, which has dominated American thinking about transportation since World War II. Yet there are signs of change. Some market-oriented conservatives now propose to put highways in the hands of private investors, who would charge tolls reflecting the true cost of the facilities. This idea has aroused interest in the Clinton administration. Secretary of Transportation Frederico Peña has argued that such pricing of car travel, coupled with the introduction of fast intercity trains, could save the country huge sums that otherwise would be spent on highways.

—Mark Reutter



Seizing the future: A Japanese bullet train, part of a fleet that relied heavily on borrowed American technology, speeds through Kyoto in 1966.

and Tokyo at 115 to 125 MPH, setting world speed records.

The bullet trains represented the coming of age of Japanese industry in many respects. To build the railroad, Sogo tapped into virtually every field of Japanese civil engineering and manufacturing. In all, 4,000 experts were mobilized from the ranks of the nation's automakers, steel companies, electric-machinery makers, and other industries. In many areas, the Shinkansen applied technology found in America. It incorporated the lightweight cars and two-axle trucks of the Budd Company and included dynamic brakes pioneered by Electro-Motive. Propulsion for the Japanese trains was provided by overhead wires using alternating current (AC) developed by George Westinghouse and first installed successfully by the Pennsylvania Railroad on its New York–Washington main line. (Under Sogo, the JNR also dieselized many of its rail lines, thus gaining efficiencies from yet another American innovation.)

Imported or not, the Shinkansen was that rarest of phenomena, a large-scale construction project that earned a profit from the start. Ridership on the Tokyo–Osaka line climbed 300 percent in the first five years of operation. By 1976, the line had grossed $7.5 billion, equal to six times its $1.2-billion cost. Expanded to connect nine of Japan's 10 largest cities, the Shinkansen continues to be profitable following JNR's breakup into six regional passenger carriers in 1987.

High-speed rail has played an impressive part in reducing transportation costs in Japan and limiting the nation's oil imports. The International Institute for Applied Systems Analysis found the Shinkansen to be nearly three times more productive than aircraft serving the same route in terms of labor efficiency, five times more productive in terms of capital charges on equipment, and eight times more productive in terms of energy consumed. And Japan's bullet trains have carried nearly four billion passengers since 1964 without a single reported fatality.

Europe, too, appreciated the value of the American passenger train, as well as the diesel engine used by U.S. forces during World War II. The first "American-style" lightweight cars made their debut on the Continent in 1949 on France's Paris–Strasbourg line. In Germany, a pair of lightweight diesel trains that borrowed heavily from the original *Zephyr* design began running between Hamburg and Frankfurt in 1953. American Car Foundry reported a similar pattern of overseas enthusiasm for its railroad equipment. In 1950, the railcar builder introduced the low-slung Talgo train, only to find it unsalable among hard-pressed American railroads. The Talgos, however, became a great success for the Spanish National Railways. By virtue of a tilting mechanism that enabled the trains to round curves at high speed, the Talgos reduced the travel time between

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DALGE (JA)

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Madrid and the French border by one-third.*

With improved equipment, several railways started to experiment with the kind of high-speed running that had enthralled the American public before the war. On March 29, 1955, the French startled the world by running a test train at 207 MPH. The tests convinced government and business officials (the state owned a 51 percent stake in the French railways) that existing railroads could reach speeds of at least 140 MPH without sacrificing safety or comfort. A team of engineers got to work on developing such a railroad, using AC propulsion and lightweight car bodies built under Budd Company patents. Steadily, the French increased passenger speeds until *Le Capitole*, the first train scheduled to run at 125 MPH in Europe, entered service in 1967 between Paris and Toulouse.

In 1973, the first oil-price shock struck Europe, turning the spotlight on fuel-efficient forms of transportation, especially railroads. Exactly eight years later, the French completed their new electrified line from Paris to Lyons, employing the TGV (*train à grande vitesse*, or train of great speed). A technological marvel, the train covered the 270-mile route in two hours. Critics of the venture fell silent when the service became a commercial success as well. The $2.3 billion invested in the project was repaid by 1991. Over the same years, the number of railroad passengers carried in the Paris–Lyons corridor increased by 75 percent, while travel by plane between the cities dropped by 48 percent.

Inspired by the success of the TGV, most other European nations have taken on the construction or rehabilitation of railroads as national projects. Germany is rebuilding 2,500 miles of track to allow trains to run at 186 MPH in its InterCity Express (ICE) system. Its new line between Hamburg and Munich has been carrying full trains since 1991. Italy's streamliners have sharply reduced travel time between Naples and Milan. Spain became the latest member of the high-speed elite when trains began operating between Madrid and Seville in 1992. In Sweden, Denmark, Greece, the Netherlands, and Switzerland, new rail links are being promoted aggressively as part of the economic unification of Europe. By the year 2015, the Community of European Railways projects a 18,000-mile high-speed network stretching from Athens to Glasgow and from Seville to Stockholm.

The success of high-speed trains abroad raises serious questions about the direction and wisdom of America's transportation choices. Despite the hundreds of billions of dollars poured into highways and airports, America has less mobility today than it did 40 years ago. The average speed of traffic in an urban area is 7 MPH, "the same speed that a camel caravan traveled 2,000 years ago," according to James Costantino, director of the Intelligent Vehicle-Highway Society. With both urban and suburban highways clogged with traffic and many airports reaching the saturation point, much transportation is getting worse instead of better. The U.S. Department of Transportation estimates that $100 billion is needed to end airport congestion and flight delays that cost billions of dollars in extra fuel and wages. Up to $600 billion is the price tag for rebuilding America's interstate highways, with their cracked pavements and worn-out bridges.

Rail service *within* metropolitan areas has enjoyed a comeback in recent years. Even Los Angeles, the mecca of cars and freeways, has jumped on the bandwagon. But with Washington largely indifferent to intercity rail service outside the Northeast Corridor, the most efficient means of travel between cities a few hundred miles apart languishes. If the passenger train does undergo a renaissance, as the Clinton administration advocates, the technical know-how of high-speed railroading now belongs to France, Germany, Japan, Spain, and Sweden. This

*Some 40 years later, Talgo-inspired engineering would re-cross the Atlantic in the form of Sweden's X-2000 passenger train. When Amtrak tested it last spring between New York and Washington, its tilt system for curves was hailed in the news media as "revolutionary."

places America in the ironic position of having to repurchase the fruits of its own engineering from foreign manufacturers.

I'll take the right side and you sit in the fireman's seat, and we'll see if we can get the old girl started." The date was May 26, 1960, when a group of railroad officials and suppliers gathered on the grounds of the Museum of Science and Industry in Chicago to pay their last respects to the train that had opened a new era in land transportation. Exactly 26 years after it had hurtled across the prairies on its history-making run, the world's first dieselized, stainless steel train had reached the end of the line.

Harry Murphy, president of the Burlington Route, made informal remarks to the audience. He recalled how his predecessor, the visionary Ralph Budd, had decided upon the train's name. He had been rereading Chaucer's *Canterbury Tales,* in which the god of the west wind, Zephyrus, promised renewal. Budd thought the name perfect for a fast train that would run across the Midwest. And for over a quarter of a century the *Zephyr* had breezed past farms and small towns on various Burlington routes, destined to run off 3.2 million miles in its daily duty of hauling passengers and mail with speed, comfort, and reliability.

"Now after carrying more than one million passengers, the train has earned an honorable retirement," Murphy said. "At this great museum, those who knew the *Zephyr* in the past, rode on it, or just watched it go by, can renew their acquaintance and relive their memories of it, while children who are too young to have known the train during its period of service can go through its cars and learn from the pictorial displays inside about the important role it played in revolutionizing transportation."

It was a bittersweet moment, for the *Zephyr* renewed but ultimately failed to save America's private-sector passenger train. By the time of the streamliner's retirement, the industry had declined so precipitously that no technology, no matter how efficient, could rescue it. The business was beyond the therapy of traction power. After Murphy spoke, he handed the brass throttle to Lenox Lohr, president of the museum. The diesel engine was started one last time and the wail of its horn flooded the museum grounds as Lohr yanked on the whistle cord four times. Then the diesel was turned off and a small group of admirers climbed a platform that flanked the cars and filed slowly past the still-gleaming silver streak.

The Lost Promise of the American Railroad

Much has been written about the first 100 or so years of railroading in America, when the industry roared forward in tandem with the U.S. economy. Seldom discussed, like some embarrassing relative who went to pot, are the years since 1940.

For the most part, railroad literature consists of individual histories of the dozens of railways that sprouted during the industry's heyday. Many of these books—and there are literally hundreds of them—are more anecdotal than historical, and, as often as not, emphasize pictures at the expense of text. In recent years, however, a number of company histories that transcend the genre have been published. Among the best are James D. Dilts's **Great Road: The Building of the Baltimore & Ohio, the Nation's First Railroad, 1828–1853** (Stanford, 1993); Maury Klein's **Union Pacific**, 2 vols. (Doubleday, 1987, 1989); and Allen W. Trelease's **North Carolina Railroad, 1849–1971, and the Modernization of North Carolina** (Univ. of N.C., 1991). These books serve as antidotes to the "railroads as robber barons" school of history, epitomized by Matthew Josephson's **Robber Barons** (1934), which continues to poison public attitudes toward the industry.

Dilts, a Baltimore-based independent scholar, notes that America's first railroad, the Baltimore & Ohio, cast the mold for many others. Launched in 1827 by a group of Baltimore worthies concerned about their city's future prosperity, the B & O was partially underwritten by the city government and the state of Maryland. The pattern of collective municipal effort and public subsidy was repeated in many parts of the country. The first great railroad boom pushed rail mileage past that of canals and plank roads in the early 1850s. Route mileage reached 30,626 by 1860 and shot past 250,000 in 1916.

What was the impact? Robert W. Fogel, an economist at the University of Chicago, won a Nobel Prize in economics last year partly on the strength of his **Railroads and American Economic Growth: Essays in Econometric History** (1964), which argues that railroads were not nearly as essential to the growth of the 19th-century U.S. economy as is generally believed. His view remains highly controversial. The more conventional interpretation is advanced in George Rogers Taylor's **Transportation Revolution, 1815–1860** (1951); **The American Railroad Network, 1861–1890** (1956), by Taylor and Irene D. Neu; and Edward Chase Kirkland's **Men, Cities and Transportation: A Study in New England History, 1820–1900**, 2 vols. (1948). Alfred D. Chandler, Jr., the dean of American business historians and editor of **The Railroads: The Nation's First Big Business** (1965; Arno, 1981), emphasizes that the railroads did much more than build up steel and other industries. "The swift and widespread adoption of the railroad, together with the telegraph and ocean-going steamship. . . . helped to lay the foundations of the modern American economy and to transform the nation into the world's greatest industrial power. The large corporation, the craft union, the investment banking house, and the regulatory commission all moved toward their modern form in meeting the financial and operational needs of the new instruments of transportation."

The nuts and bolts of railroading are the subject of many specialized books. John H. White, Jr., senior historian emeritus at the Smithsonian Institution, artfully conveys a vast amount of information on the evolution of rolling stock in two beautifully illustrated books, **The American Railroad Passenger Car** (Johns Hopkins, 1978) and **The American Railroad Freight Car** (Johns Hopkins, 1993). Carl W. Condit's **Port of New York**, 2 vols. (Univ. of Chicago, 1980, 1981), deals with the building of Grand Central Terminal and Pennsylvania Station in New York, the two greatest private civil-works projects of their day. On a more intimate scale, the central role of the railroad depot in rural America is explored in H. Roger Grant and Charles W. Bohi's **Country Railroad Station in America** (1978; Center for Western Studies, 1988).

The colorful lingo and folklore of trainmen were the subject of several studies in the 1940s, on the eve of the shift from steam to diesel power

that was to sweep away many of the old railroad ways. Notable examples include **The Railroader** (1940), by W. Fred Cottrell, **Railroad Avenue** (1945), by Freeman Hubbard, and **A Treasury of Railroad Folklore** (1948; Bonanza, 1989), edited by B. A. Botkin and Alvin F. Harlow. Even in 1940, Cottrell, a Miami University sociologist, had to remind readers of the railroads' "glorious past." He recalled that in small-town America every "air jammer," "baby lifter" and "club winder"—occupations defined in Cottrell's 21-page glossary—earned enough to be considered a man of substance, and was entitled as well to a certain amount of swagger by dint of his role in such a daring enterprise.

The neglect of the years after railways stopped expanding extends to the field of technology. Studies of the effects of post-1930s diesel propulsion, central traffic control, and other innovations are scant and superficial. Two exceptions are **Railroads in the Age of Regulation, 1900–1980** (1988), edited by University of Akron business historian Keith L. Bryant, Jr., which contains profiles of railroad executives and companies through the 1970s, and **The Life and Decline of the American Railroad** (Oxford, 1970), by John F. Stover, a Purdue University historian.

As the sickest part of the business, the passenger train has suffered from similar neglect. No one has bothered to write a comprehensive history of railroad passenger travel. By far the best documentation of the private-sector passenger train's problems comes from government reports and from the pages of railway and business magazines. Highly useful are the **Reports of the Special Committee on the Railroad Passenger Deficit Problem**, issued by the National Association of Railroad and Utilities Commissioners (1952, 1953, 1955, 1957). They document how federal airline subsidies undermined the economic viability of intercity rail service, and how ill-designed labor contracts exacerbated the problem. James C. Nelson's **Railroad Transportation and Public Policy** (1959) is a helpful, if dry, supplement on the shifting nature of federal transportation policies. Other sources include the special issue of *Trains* magazine (April 1959), "Who Shot the Passenger Train?," and John Walker Barriger's **Super-Railroads** (1956), a forward-looking work suggesting ways in which rail service could be improved through public and private investment.

The development of Amtrak has revived interest in passenger trains, though most observers pay more attention to transportation politics than to improvements in service and technology. **Amtrak** (American Enterprise Inst., 1980) is a strongly argued critique of existing passenger service by economist George W. Hilton, cited by the Reagan administration in its attempt to cut off Amtrak's public subsidies. In **Off the Track** (Greenwood, 1985), Donald M. Itzkoff, a congressional staff member, also criticizes Amtrak's performance, but places much of the blame on Republicans in the White House. Amtrak also comes under unflattering scrutiny in **Supertrains** (St. Martin's, 1991), by Joseph Vranich, president of the High Speed Rail/Maglev Association.

One of the more valuable books of recent years on American railroads is Albro Martin's **Railroads Triumphant** (Oxford, 1992). The professor emeritus of history at Bradley University begins by asking why "an innovation as clearly revolutionary" as railroads came to be "despised and rejected" by the public. In no uncertain terms, he blames government overregulation for the plight of the railroads, and breathes a sigh of relief that the "stinking corpse" of this sort of regulation was buried with the Staggers Rail Act of 1980. The law reduced federal regulation of freight rates and otherwise freed the industry to compete with truckers and other rivals. The revival of the rail-freight business in recent years owes much to this measure. Martin thinks that even passenger rail will stage a comeback, and he writes serenely that we are at the dawn of "a new railroad age."

—Mark Reutter