On the Wings of the *Zephyr*

The Rise and Fall of America's High-Speed Streamliners

1934–1960

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Let's go back to a Saturday evening seventy years ago. On 26 May 1934, at precisely 8:26 p.m., a remarkably designed train rolled onto the stage of the Century of Progress Fair in Chicago. An exuberant crowd bolted to the stage to pay homage to the train, which had just made the longest and swiftest railroad run in history, sprinting nonstop 1,015 miles between Denver and Chicago at an average speed of 77 miles per hour, with bursts of up to 112 mph. Named the *Zephyr*, the train was the result of a unique collaboration of railroad executives and automotive engineers. The men had taken the orthodoxies of standard railroading and tossed them into a cocked hat. The train's glistening silver skin, for example, was made of lightweight stainless steel, a breakthrough in metalworking design. Its cars were not coupled together but configured in a sleek "articulated" tube. Most unusual of all, the train was propelled by a revolutionary compact diesel engine.

Smooth, light, quick on the pickup, faster than an automobile, and almost as economical as a bus, the *Zephyr* caused quite a sensation. During its 26 May race, the "silver streak" was bathed in adulation and generated excitement as it sped to its destination. In town after town, fire sirens shrieked and church bells pealed at its approach. Roads became parking lots as spectators gathered at highway crossings, along embankments, in farm fields, on the top of grain silos, and wherever else the view was good to watch it speed past. Women threw kisses at the train, and men tossed their hats in the air. The race was front-page news around the country.[1]

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In 1934 columnists, politicians, and street-corner philosophers alike had been demanding that American industry "do something" to get the economy rolling again, to create jobs, and to pull the country out of the gloom of the Great Depression. The *Zephyr* seemed to be the answer in the field of transportation. In the wake of its journey, the railroad industry was revolutionized. From the equipment and designs incorporated in the *Zephyr,* a new kind of passenger train took to the rails. Over the next seven years (until car building was suspended because of World War II), 143 trains were put in service on twenty-nine railroads. The trains featured major innovations in fixed-wheel technology and enabled America to claim title to the fastest scheduled passenger trains in the world.[2]

The word "streamliner" became indelibly etched in the public's mind with these fleets of high-speed, high-tech trains. The word originated from the jargon of aircraft engineers. A shape that cut down on wind resistance was said to be "a streamline." In truth, very little was known then about wind resistance. But it was generally believed that smooth, round, continuous objects moved through air and water with a minimum of effort. The porpoise and the teardrop were cited as examples of "gliding forms of nature" that approached aerodynamic perfection.[3]

A change in passenger-train construction was long overdue. Ever since wooden passenger cars were replaced with all-steel cars around 1910, engineers continuously found new ways of using alloy metals to lower the weight of a moving structure. Automobiles had shed many pounds, while commercial flight had risen on the wings of aluminum. Railroaders, however, had been trained to believe in weight, which was equated with safe and smooth riding. Ralph Budd, president of the Chicago, Burlington & Quincy Railroad, was among the first railroaders to think seriously about reengineering the passenger train. In June 1933 Budd, convinced that lightweight trains would reduce operating costs, ordered a streamline passenger train from Edward G. Budd, owner of the E. G. Budd Manufacturing Company of Philadelphia.

Edward Budd (the two men, it turned out, were distantly related) was a builder of steel automobile bodies who was intrigued by a new type of alloy steel called 18-8 (18 percent chromium and 8 percent nickel). Cold-rolled, the alloy was three times stronger than regular carbon steel, yet was so ductile that it could be pressed into deep-drawn, graceful shapes. "The term 'stainless' reflected another of its virtues: It did not rust. The alloy kept its silver sheen even when exposed to organic acids, and wind and rain only brightened its natural glasslike finish."[4]

In fabricating the *Zephyr*, the Budd company incorporated a lightweight body design and low-slung suspension. The roof, for example, acted as a major load-bearing member rather than just "a lid for the box" and allowed the heavy center sills and concrete subfloors of orthodox railway equipment to be eliminated without sacrificing safety or stability. Better distribution of stresses permitted use of light, hollow beams of metal reinforced by welded crosspieces. Wrapped in its stainless steel wrapper, the 196-foot-long train weighed only 97 tons, or slightly more than a standard Pullman car.[5]

A key element of the new train was the engine. For years the chief bar to the adoption of diesel power on railroads was the tremendous weight of diesels with enough horsepower to move a train. Based on thousands of tests, Harold Lee (Hal) Hamilton and Charles Kettering of General Motors Corporation came to believe that the four-cycle diesel could be "sweated down" to a two-cycle version. The two-cycle engine they designed was one-fifth the weight of a conventional diesel of similar horsepower. Coupled to direct-current generators to furnish electricity for the traction motors, the GM diesel proved to be a rugged prime mover. As Ralph Budd later recalled, "Immediately I was set afire because I knew that [the diesel] was something completely revolutionary and better—so much better—than anything we had ever had."[6]

A few months after its dramatic debut, the *Zephyr* went into passenger service between Kansas City and Lincoln, Nebraska. Despite double-digit unemployment in the farm belt, the train attracted so many riders that customers had to be turned away. By the end of 1935

revenues were twice what they had been when steam trains ran on the line, while operating costs had been slashed from sixty-four cents to thirty-four cents per train mile. In other words, by spending money, railroads were making money. Although the initial $200,000 price tag of the *Zephyr* was high, the reduction in operating costs more than compensated, and the train earned $97,000 in its first year of service and recouped its cost in twenty months. The larger *Twin Cities Zephyrs*, which started running between Chicago and St. Paul-Minneapolis in 1935, were cash machines, ringing up $823,422 in operating profits in their first nineteen months of service.[7]

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By 1939 just about every major U.S. railroad had bought streamliners, some powered by diesel locomotives and others by revamped steam locomotives.[8] Streamliners now blasted through the Mohawk Valley on the *20th Century Limited* and *Pacemaker*, wound up Raton Pass on the Santa Fe's *Super Chief* and *El Capitan,* and skimmed across the high Nevada desert on the *City of San Francisco*. They also ducked between the smokestacks of New Jersey on the Reading's *Crusader*, sprinted through corn-and-hog country on the Rock Island's *Des Moines Rocket*, cut through the piney woods of Mississippi on the Gulf, Mobile & Northern's *Rebel,* and matched horsepower against the headwinds of coastal Maine on the Boston & Maine/Maine Central's *Flying Yankee*.[9]

What quickened the public pulse about the streamliner was its speed. The *Zephyr*'s race 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.[10] In 1928 there were only two passenger trains, running a total of 135 miles a day, scheduled at 60 mph or more between stops. Both ran over the Reading's South Jersey lines between Philadelphia and Atlantic Ocean resorts. By 1936 there were 644 station-to-station runs scheduled at 60 mph. The trains covered a distance of 40,000 miles. By 1939 the over-60 mileage had jumped to 56,300 miles, and the 10 fastest passenger trains in the world were U.S. streamliners.[11]

Individual running times showed remarkable improvements. The traditional sixty-hour schedule between Chicago and California was reduced by a full day when the Union Pacific's *City of Portland* raced between Chicago and Portland in thirty-nine hours and forty-five minutes. Kansas City and Oklahoma City were pulled five hours closer with the expedited *Firefly*. Two hours were shaved between Houston and Dallas by the Southern Pacific's *Sunbeam*. In the East, where schedules were already tight, New York-to-Washington running times were cut forty minutes on the Pennsylvania Railroad's *Congressional*.[12]

The acceleration was accomplished by reducing dead time at stations—crew changes became marvels of fast work—and by maintaining the highest cruising speed possible between stops. With every minute counting, diesel power became an indispensable tool. Frequent stops for coal and water en route were eliminated. Diesel engines could decelerate faster than steam locomotives because of their higher braking ratios, and they could quickly accelerate to top running speeds after a station stop. The net result was that the *Denver Zephyr* ran at up to 90 to 95 mph and averaged 66 mph between Denver and Chicago eastbound, including eleven stops. But the *Super Chief* and *El Capitan* claimed the world's fastest scheduled runs of more than a hundred miles. The diesel streamliners covered the 202 miles from La Junta, Colorado, to Dodge City, Kansas, in 155 minutes flat. On one 10-mile stretch, the trains were actually *scheduled* at 108 mph.[13]

Streamliners made the public "train conscious again," summed up Ralph Budd. Measured in passenger miles, it was determined that rail patronage increased by over 40 percent between 1933 and 1940. This improvement, Budd liked to point out, had not been achieved at the expense of safety. Data gathered by the railroad indicated that the *Zephyrs* had about the same number of grade-crossing accidents per million train miles as steam passenger trains, but recorded fewer injuries and property damage. In fact, none of the grade-crossing accidents had resulted in passenger injuries, and the streamlined trains had continued under their own power to the terminal after the collisions.[14]

The implications of the American speed-up were not lost on overseas railroads. Faster trains were soon in operation in countries as far apart as Argentina and Japan. In continental Europe, where rigid speed limits had been the norm, changes were made to mimic the American streamliner. The previous maximum of 75 mph was lifted in France to 81 mph for conventional trains and 93 mph for diesel-powered rail cars. The 75-mph limit was increased to 87 mph in Holland and Belgium, and 100-mph running was permitted over certain sections in Germany and Italy. Most of these changes came as a result of the study of U.S. rail operations.[15]

Racing into World War II, streamliners were a crucial factor in handling the 300 percent surge in wartime traffic. Spliced with heavyweight cars, streamliners rolled up billions of passenger miles and kept traffic moving in the same years that intercity buses and commercial aircraft struggled to stay afloat.[16]

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A spirit of optimism prevailed at the end of World War II. The Santa Fe Railway made plans for roadbed and track strengthening to permit passenger-train speeds of up to 125 mph, and railcar builders were preparing for the biggest boom in history. The Budd company and other builders, such as Pullman-Standard and American Car Foundry, expected to build more than three thousand cars a year. "A new era has come to the railroads," Edward Budd said in 1944. "The automobile has its advantages and will always carry many people. But the railroad has the [common-carrier] field."[17] While it was widely believed that airlines eventually would dominate long-distance trips of five hundred miles or more and cars and buses would eat into the short-haul business, railroads dominated passenger service, handling two-thirds of the nation's common-carrier traffic. In fact, the New York Central Railroad alone carried more people than the entire U.S. airline industry. Nobody gazing into a crystal ball in 1945 would have imagined that railroad passenger volume would plunge from 790 million riders in 1946 to 298 million by 1965; that such legendary streamliners such as the *Royal Blue, Liberty*

Limited, 400's, and *Orange Blossom Special* would be discontinued or turned into locals; and that the Interstate Commerce Commission (ICC), in a 1958 report, would declare that the passenger train was headed for oblivion and would soon "take its place in the transportation museum along with the stagecoach, the sidewheeler, and the steam locomotive"?[18]

There were several standard explanations for the collapse of the world's fastest 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. "We are a nation on wheels," declared Lucius D. Clay, the retired army general who headed the 1954 presidential advisory committee that launched the interstate highway system, "and we cannot permit these wheels to slow down."[19]

Another body of opinion was built around the view that railroaders, preoccupied with hauling freight, had willfully abandoned human cargo. "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."[20] Freight, in fact, did appear to be a solid revenue base until the 1957–58 recession that revealed the extent to which truckers had skimmed off the lucrative end of the business. Battered still further by the opening of the St. Lawrence Seaway that shifted vast amounts of bulk freight from rails to barges and cargo ships, even the railroads that carried few passengers—the Lehigh Valley, Ann Arbor, and Western Maryland, to name three—began a descent into wholesale route abandonment or receivership.

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In retrospect, the passenger train did not succumb because the jet turbine was more efficient than the diesel engine, or because Americans owned seventy million cars, or because railroad managers implemented fewer new ideas after 1950. Behind these effects lay a more profound cause: a change in the very ground rules of transportation. After

1945 the federal government became the railroad's biggest competitor, as first Congress and then the White House jumped into the transportation business. Released from the stringency 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.

The public promotion of roads and runways, with government construction, government maintenance, government policing, and government signaling, made it easy for truck, airline, 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 array of shortsighted government regulations, tax policies, and labor laws that drained vital capital and squashed the enterprising spirit of the 1930s.

As the world of tires and wings overtook the railroads, America let the technological achievements of the two Budds, Hamilton, and Kettering slip away. Speed, efficiency, and low operating costs were three hallmarks of the *Zephyr* era. Remarkably, all three were undercut or penalized by government policies in the postwar period. For example, *Fortune* reported in 1944 that the industry was thinking of fielding fourteen-hour daylight trains between New York and Chicago, a two-hour improvement of the fastest overnight schedules. Cars on these trains would connect at Chicago with trains to the West Coast, so that a passenger leaving New York on a Saturday morning could arrive at Los Angeles or Portland, Oregon, on Monday morning.[21]

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 the 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 only the estimated $80 million it would cost the carriers (equivalent of roughly $500 million today), but also the minimal improvement it

would make in passenger safety. Because some of the fastest stretches of track, especially in the West, were used by relatively few passenger trains, several railroads argued that special signaling was unwarranted. 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?"[22]

Another obstacle 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 1945 and 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," state regulatory commissioners said in a 1954 report. Between 1945 and 1953, the tax added $1.4 billion to the federal treasury, but boosted the price of a one-way first-class ticket between New York and Chicago from $35 to $40.25.[23] (The tax was lowered to 10 percent by Congress in 1954 and rescinded at the request of the John F. Kennedy administration in 1962.)

Full-crew laws passed by many state legislatures further burdened passenger trains. The laws required a fireman aboard every diesel passenger train, even though there was no fire to tend. 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 result, crews were changed a total of eight times on the *Denver Zephyr* that ran between Chicago and Denver in 16.5 hours, and the crews shared a total of 10.33 basic-days' pay.[24]

Union work rules had been a matter of controversy in railroading for years. But the practice of "featherbedding" (requiring unneeded crew members on trains under labor contracts) took on added urgency in a period of inflationary wages. During the 1930s when the streamliner movement got under way, the average wage on a railroad was

seventy cents an hour. With railroad wages climbing to $1.94 an hour by 1954, the costs from the basic-day system soared. “This type of wage agreement has loaded wage costs so heavily on the passenger trains that these costs alone have often been the decisive factor necessitating the discontinuance of the operation of trains,” an expert declared.[25]

Indeed, high operating costs were a greater problem than loss of patronage. Through 1955, the number of passengers carried on the average intercity train was only slightly less than the average carried in 1939. But the inflationary spiral had a deadly outcome. Revenues that should have been used for new equipment and faster service were instead being dissipated by wages and taxes.

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To be sure, railroad executives deserved part of the blame for the declining state of the American passenger train. Many companies competed foolishly among themselves rather than against buses and planes and dispatched 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 at 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 railroads became defeatist and used operating losses hastened by their own policies to convince regulators that passenger service was no longer necessary or desirable.

Frequently, though, the government’s mindset and regulatory apparatus served to accelerate the decline. 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 across the Northeast, Congress balked, letting the authorizing legislation die in the stated belief that the railroads were seeking to “monopolize” transportation. Pillorying railroads, in fact, became something of a pastime in the postwar period. For example, between advertisements touting automobiles, *Time*

magazine grumbled in 1948, "The U.S. citizen, in his capacity as a passenger, has generally been regarded by the railroads as a damn nuisance."[26]

A different regulatory environment was established for air carriers. In 1938 Congress passed the Civil Aeronautics Act, which avowedly *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 artificially high rates for air mail. But such public underwriting of private enterprise paled beside the 1946 Airport Development Act. The law called for construction of more than two thousand new airports and authorized $500 million to help cities and states build them. The aid was justified on the grounds of national defense and supported by the argument that the government always offered financial help to promising new forms of transportation, including the railroads in the nineteenth century. Underneath the lofty rhetoric, however, lay special-interest politics. "Every town had its congressman ever ready to proclaim the . . . absolute necessity for airline service," wrote former CAB official Charles J. Kelly Jr. in *The Sky's the Limit*. Subsidies would be needed "just to get the feeder lines on their feet. But future growth would soon make all airlines profitable—at least that was the theory." Washington also began spending large sums on control towers, approach-line lanes, weather-reporting systems, and air-traffic controllers, who were government employees. As of June 1952, the installation, operation, and maintenance of these airway aids cost the taxpayer $645 million. By 1960 the federal government had spent more than $2 billion expanding and improving airport infrastructure.[27]

Thanks to the federal government's generosity, airlines experienced a tremendous boom. Between 1946 and 1959, the airlines' share of commercial intercity travel leaped from a negligible 6 percent to a commanding 39 percent. The increase came almost entirely at the expense of the passenger train. Airlines drew comparatively few people away from highways but gained an overwhelming share of "business-class" passengers

that used overnight Pullman sleepers or daytime parlor cars.[28] By 1959 the railroads' market share (excluding commuter-train operations) was down to 29 percent—only two percentage points above intercity bus volume, and even the most progressive railroads had trouble stabilizing passenger service.

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A fundamental shift in federal spending priorities helped pave the way for America's postwar car culture. Highways, Bruce E. Seely pointed out in *Building the American Highway System,* once were considered the responsibility of local and state government. During the depression, Congress underwrote new programs to build roads and bridges in order to create jobs, but it 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 of 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.[29]

On 12 July 1954, Vice President Richard M. Nixon waved the promise of a $50-billion road-building project before governors assembled at Lake George in upstate New York. At a time when the annual federal budget totaled $71 billion, this was very big money—roughly $1 trillion worth of construction work today. "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 alleviate "metropolitan area congestion, bottlenecks, and parking."[30]

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, [Gov.] 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."[31] Eisenhower, who had been greatly impressed by the German autobahns when he was supreme allied commander in Europe, agreed.

Eisenhower picked Clay, the hero of the Berlin Airlift and a man who was accustomed to thinking in sweeping terms, as his key adviser on highways. From the outset, the Clay Committee couched the planned construction in cold war terms. Dubbing superhighways "roads for survival," Clay and his colleagues wrote in their report to President Eisenhower: "It has been 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 both 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."[32]

The unprecedented 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 rail industry make significant changes and improvements, but to the general public, the railroads were run by whiners or plunderers. Eleven years after V-J Day, the train was no longer considered essential either to the nation's transportation needs or 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 also contributed to the downfall of an important tax-paying industry only added to the sense of frustration among railroad officials. "When the president signed the 1956 bill, I told

him he had just signed the death warrant of American passenger service" Howard E. Simpson, president of the Baltimore & Ohio Railroad, recalled in an interview. An apparently indifferent Eisenhower replied, "We'll see."[33]

Simpson was right. The impact of the interstates was shattering. Between 1956 and 1969, a total of 28,800 miles of interstate highway were opened to traffic. In the same period, 59,400 miles of railroad were taken out of passenger service. Trains that figured prominently in the great speed-up of the 1930s were excised from the timetable or combined with other trains. The streamlined cars built for the *20th Century Limited* were sold to the Mexican National Railways, and the world-famous train itself made its last run on 2 December 1967. 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. In 1969 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.[34]

Save for the popular Metroliner trains that began operating in the New York-Washington corridor in 1969, the once-blazing torch of intercity train service had dimmed to a faint dot on the horizon when the National Railroad Passenger Corporation (Amtrak) took over passenger operations from the railroads in 1971.

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"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 26 May 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 respects to the train that had opened a new era in land transportation. Twenty-six 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. Budd had been rereading Chaucer's *Canterbury Tales,* in which the god of the warm spring wind, Zephyrus, promised renewal. He thought the name perfect for a fast train that would serve the agrarian Midwest. And for over a quarter of a century, the *Zephyr* had breezed past farms and small towns on various Burlington lines, destined to run off 3.2 million miles in the 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."[35]

It was a bittersweet moment, for the *Zephyr* had 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. After Murphy spoke, Lenox Lohr, president of the museum, took hold of the engine's brass throttle. The diesel was started and the wail of its horn flooded the museum grounds as Lohr yanked on the whistle cord four times. Then the engine 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.

Notes

1. The trip, for example, was on the front page of the 27 May 1934 *New York Times, Chicago Tribune, Denver Post, Philadelphia Bulletin,* and *Rocky Mountain News* and was reported on nationwide radio hookups.

2. Coverdale & Colpitts, *Report on Streamline, Light-Weight, High-Speed Passenger Trains as of June 30, 1941* (New York, 1941).

3. Sheldon Cheney and Martha Cander Cheney, *Art and the Machine: An Account of Industrial Design in 20th-Century America* (New York: McGraw-Hill Book Company, 1936), 98–100.

4. Mark Reutter, "The Life of Edward Budd, Part 1; Pulleys, McKeen Cars, and the Orgins of the *Zephyr,*" *Railroad History* 172 (spring 1995): 27–28.

5. The weight was before the installation of the diesel engine and power equipment. See Rupen Eksergian, "The Design of Light-Weight Trains," *Transactions of the American Society of Mechanical Engineers* (September 1934): 668–72, and Coverdale & Colpitts, *Report on Light-Weight Trains of the* Zephyr *Type* (New York, 1935), 10.

6. Franklin M. Reck, *On Time: The History of Electro-Motive Division of General Motors Corporation* (La Grange, Ill., 1948), 72.

7. E. G. Budd Company, *The Performance of Budd-Built Trains* (Philadelphia, 1935), no page numbers; Coverdale & Colpitts, *Report on Streamline, Light-Weight, High-Speed Passenger Trains as of June 30, 1938* (New York, 1938), 31. In another example, the streamlined *Hiawatha,* introduced in May 1935 between Chicago and the Twin Cities, earned $3.65 a mile, but cost only $1.06 a mile. Data included in "Proceedings of the American Association of Passenger Traffic Officers" (8–9 October 1935, Cincinnati, Ohio), 42.

8. The success of diesel-electric engines spurred an improved generation of steam power, the most successful of which was the 4-8-4 type locomotive. The 4-4-2 steamers used on the *Hiawatha* were also impressive performers.

9. Mark Reutter, "The Lost Promise of the American Railroad," *The Wilson Quarterly* (winter 1994): 18–19.

10. Donald M. Steffee, "Twenty Years of Speed," *Trains* 17, no. 7 (May 1957): 43.

11. Steffee, "North America's Mile-a-Minute Runs," *Railroad Magazine* (February 1939): 8.

12. Reutter, "Lost Promise of the American Railroad," 20.

13. Steffee, "North America's Mile-a-Minute Runs," 11.

14. Ralph Budd, "A Million Miles of New Railway Travel," *Civil Engineering* (April 1936): 232.

15. "Speed Limit—Ninety Miles!" *Railway Age* 107, no. 16 (14 October 1939): 593.

16. "A 300 Per Cent Increase in Travel," *Railway Age* 115, no. 10 (4 September 1943) and "Another Year of Achievement," ibid. 117, no. 21 (18 November 1944): 778–79.

17. "Future Track and Structures," ibid. 117, no. 21 (18 November 1944): 775; "A Look Ahead into Postwar Transportation: A Speech by Edward Budd" (Chicago, 26 May 1944), reprinted in *Railroad History* 173 (autumn 1995): 101.

18. "News and Editorial Comment," *Trains* 19, no. 2 (December 1958): 5.

19. Lucius D. Clay, *A Ten-Year National Highway Program: A Report to the President* (Washington, D.C.: Government Printing Office, 1955), 29.

20. E. B. White, "Letter from the East," *The New Yorker,* 20 February 1960, p. 42.

21. "Passengers: Profit or Loss?" *Fortune* (August 1944): 256.

22. "Millions for Signals," *Trains* (November 1950): 49; also see "Signaling Ordered on High Speed Lines," *Trains* (August 1947): 4–5.

23. Walter R. McDonald, *The Railroad Passenger Deficit Problem* (Washington, D.C.: n.p., 1954), 7.

24. Interstate Commerce Commission, "Railroad Passenger Train Deficit," Docket No. 31954, decided May 18, 1959, p. 449.

25. McDonald, *Railroad Passenger Deficit Problem,* 31.

26. "New Hopes and Ancient Rancors," *Time,* 27 September 1948, p. 27.

27. Charles J. Kelly Jr., *The Sky's the Limit: The History of the Airlines* (New York: Coward-McCann 1963), 171; McDonald, *Railroad Passenger Deficit Problem,* 8; U.S. Senate Committee on Commerce, *National Transportation Policy,* 87th Cong., 1st sess., 1961.

28. McDonald, *Railroad Passenger Deficit Problem,* 8. In 1954 an air carrier (American Airlines) reported for the first time a greater total of intercity passenger miles than the Pennsylvania Railroad, which had been the nation's leading common carrier for decades.

29. Bruce E. Seely, *Building the American Highway System: Engineers as Policy Makers* (Philadelphia: Temple University Press, 1987).

30. Clay, *Ten-Year National Highway Program,* 1.

31. Stephen E. Ambrose, *Nixon: The Education of a Politician, 1913–1962* (New York: Simon and Schuster, 1987), 365.

32. Clay, *Ten-Year National Highway Program,* 7. Other members of the committee represented a who's who of the highway lobby. They included Stephen D. Bechtel, president of Bechtel Corporation (highway engineering); William A. Roberts, president of Allis Chalmers Manufacturing (road-building equipment); and David Beck, president of the International Brotherhood of Teamsters (truckers who gained business every time a high-speed road was opened).

33. Asked about the railroads' plight at a 26 January 1960 press conference, President Dwight Eisenhower said, "No one could be more concerned than I am about the plight of the railroads. I think they are governed by antiquated laws and regulations, and, frankly, I think some of their trouble is their own." He defined their self-made trouble as a "proliferated" system that resulted from the nineteenth-century boom in railroad construction. Howard Simpson was interviewed before his death by historian James D. Dilts. (James D. Dilts, correspondence with the author.)

34. Reutter, "Lost Promise of the American Railroad," 28–29.

35. *Chicago Tribune,* 27 May 1960.