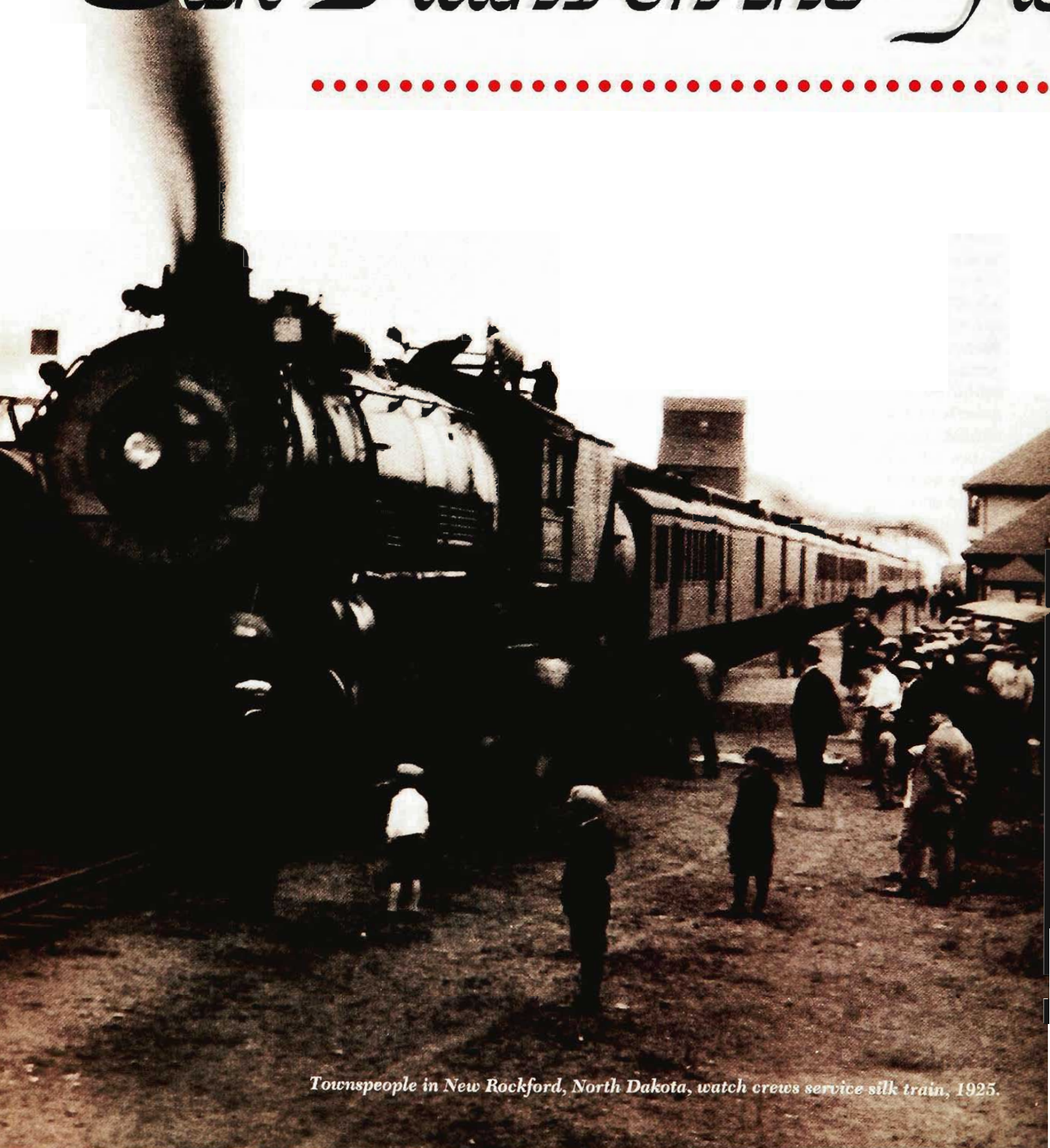


Silk Trains on the Great



Townspeople in New Rockford, North Dakota, watch crews service silk train, 1925.

t Northern Railway

GORDON L. ISEMINGER

“Soft . . . clinging, beautiful,” silk is the “queen of fabrics” and the “mother of endless loveliness.” “Nearest to poetry of all commodities in the world,” wrote one enthusiast, silk suggests the “liquid, caressing smoothness of the Orient, its shimmering beauty, its feminine sensuousness, its perfumed riches, its curtained mysteries.” Shrouded in myth, silk has always been associated in people’s minds with a romance denied to other business endeavors—“the romance of adventure and enterprise . . . of commerce and barter . . . of thrones and courtesans.”¹

The railroad industry in America has also provided fertile ground for legend and



Silk stockings and fashionable shoes, photographed at the Minnesota State Fair style show, 1920s

¹ *Literary Digest*, Apr. 14, 1928, p. 58–60; *Travel*, Feb. 1933, p. 24; *Arts & Decoration*, Feb. 1923, p. 12, 14–15; 82, 86, 92.

romance. Railroads, locomotives, and courageous engineers such as John Luther "Casey" Jones, the hapless Illinois Central engineer who on April 30, 1900, drove Engine No. 382 into the rear of a freight train and into legend, have been celebrated in story and song. Tin Pan Alley songwriters also traded on the popular appeal of railroads with such songs as "The Chattanooga Choo-Choo" and "The Atchison, Topeka and the Santa Fe."²

During the first third of this century, silk and railroading merged in the phenomenon of the "silk train," a train that rushed bales of raw silk skeins from West Coast ports through St. Paul and other midwestern rail centers to East Coast distribution points in New York, New Jersey, and Pennsylvania. Raw silk, the long, delicate threads unwound from silkworm cocoons, had long been transported by rail in the United States. Its rise in price shortly before World War I and high value for some years thereafter, however, dictated that it be moved across the continent on special express trains. Not until the late 1930s did decreasing prices, lower freight rates on all-water routes, competition from "artificial silk" (rayon and nylon), and deteriorating political relations with Japan bring to a close this remarkable chapter in business and transportation history.

What might be the first description of a silk train appeared in 1909. A writer in *Harper's Weekly* described it as consisting of a fast, powerful steam locomotive, a coach for the crew and guards, and a string of four or more baggage cars filled with bales of raw silk. Keeping to no schedule and maintaining the fastest speed consistent with safety, this "emperor of trains" was manned by crew members "without nerves," men who were "keyed to feverish hope and activity." Dispatchers and engineers, the account noted, conferred together "like trainers and jockeys."³

Like paddlewheelers racing down the Mississippi to New Orleans and tea clippers speeding from China to Boston, silk trains immediately captured the public's imagination. People gathered along rights-of-way and at railroad division points to catch glimpses of these trains, and they were featured in early moving pictures and newspaper accounts. Readers thrilled to magazine stories with such titles as "The Silk Extra: A Grudge Works Itself Out in the Cab of Old 7502" or "Silk Train: A Thrilling Railroad Story in which Seconds Spell Victory or Defeat. The stories frequently dealt with railroad men who had lost their nerve or life's purpose, only to

Gordon L. Iseminger is a professor of history at the University of North Dakota, Grand Forks. His major field of teaching and research is nineteenth-century Britain. Long interested in the ancient silk roads, he became aware of silk trains when he heard a National Public Radio reporter mention that they once passed through Minot, North Dakota.

find them in the cab of a speeding locomotive hauling cars full of silk.⁴

In this era, Japan produced as much as 90 percent of the world's raw silk—it was the country's principal export—and shipped about 90 percent of that to the ports of San Francisco, Portland, Tacoma, Seattle, and Vancouver. New York City, second only to Shanghai among the world's raw silk markets, was the center of the United States silk industry. Raw silk could have been transported entirely by sea from Yokohama to New York, via the Panama Canal, for half the freight costs of sending it by rail across the American continent. But low freight costs, important when shipping inexpensive commodities like wheat in great quantities, were a minor consideration when shipping costly silk. As long as silk commanded a high price, it could absorb the high freight costs incurred by transporting it quickly across the continent on silk trains.⁵

Seattle, a major silk port, was linked to points east in 1893 by James J. Hill's Great Northern Railway. The first Great Northern (GN) silk train on record left the city on December 2, 1910, carrying 1,656 bales of raw silk and 59 packages of silk goods. The train covered the 1,815 miles to the easternmost GN terminus in St. Paul in 57 hours and 45 minutes, before being switched to other rail lines on its way east. Until February 1937, when the GN ran its last silk train, it competed with such lines as the Northern Pacific and Union Pacific to be "the leading rail line in the handling of silk."⁶

² Stewart H. Holbrook, *The Story of American Railroads* (New York: Crown Publishers, 1947), 146, 429, 442.

³ Thaddeus S. Dayton, "Spinning Silk across the Nation," *Harper's Weekly*, Dec. 4, 1909, p. 11.

⁴ M. S. Kuhring, "The Silk Extra," *Canadian Magazine*, Apr. 1929, p. 14–15, 37; Courtney R. Cooper, "Silk Train," *American Magazine*, July 1932, p. 24–27, 120–21.

⁵ *St. Paul Daily News*, Aug. 25, 1924; Dayton, "Spinning Silk," 11–12; *Scientific American Supplement*, Apr. 23, 1910, p. 264–66; *Daily Journal of Commerce* (Seattle), June 24, 1925; William D. Wray, *Mitsubishi and the N.Y.K. 1870–1914: Business Strategy in the Japanese Shipping Industry* (Cambridge: Council on East Asian Studies, Harvard University, 1984), 408, 411; Walter A. Radium, *United States Shipping in Transpacific Trade, 1922–1938* (Stanford: Stanford University Press, 1944), 80, 112.

⁶ Here and below, see W. B. Jones, "Silk Trains: A Record of Achievement," *The Cascadian*, Apr. 1961, p. 1–8; Freeman Hubbard, "The Fast Silk Trains," *Railroad Magazine*, Apr. 1965, p. 13–24; Silk train materials, Nov. 30, Dec. 5, 1910, in Vice-President and General Manager Subject Files, 13077, Vice-President—Operating, Great Northern Railway Company Records, Minnesota Historical Society (MHS), St. Paul (hereafter cited as GN Records); Silk train materials, Feb. 7, 1937, Sept. 19, 1924, enclosure in Dec. 26, 1924—all in General Manager Subject Files, 31–45, Vice-President—Operating, GN Records (unless otherwise noted, all GN materials are in these files); *Railway Age* 77 (Aug. 30, 1924): 387.




Great Northern publicity photograph calling attention to the high cost of raw silk, draped over model's shoulders

Incomplete records make it impossible to determine exactly how many silk trains ran on the GN's Seattle–St. Paul route in this 27-year period, but the numbers are impressive, especially for the 1920s. In 1924 alone, the GN ran 34 silk trains, eight of them in one month. On September 19, three trains, totaling 36 cars, arrived in St. Paul within hours of each other.

Between 1925 and 1932, the GN ran 307 silk trains, an annual average of more than 38. The railroad repeatedly reduced its 1910 record of 57 hours and 45 minutes, until by the end of the silk-train era, the Seattle–St. Paul run usually took about 46 hours. A nine-car train leaving Seattle on August 14, 1924, made the railroad's fastest time, 38 hours and 50 minutes, a record the GN insisted was never broken by another road.

Speed mattered to silk shippers because, except for gold and silver bullion, raw silk was the most precious commodity shipped over a long distance by commercial carrier. When prices reached a peak of nearly \$18 per pound in 1920, a single train's cargo could be worth more than \$5 million. And, because raw silk is susceptible to damage from heat, moisture, fumes, or puncture, shippers minimized their risk by moving the silk as quickly as possible.⁷

⁷ Here and two paragraphs below, see *Whitefish Pilot* (Montana), Aug. 19, 1925; Hubbard, "Fast Silk Trains," 13–24; Andrew R. Boone, "World's Greatest Sea Race," *Popular Science Monthly*, Apr. 1935, p. 14–15, 105–106; Wray, *Mitsubishi and the N.Y.K.*, 411; *Seattle Daily Times*, Feb. 25, 1925; *Daily Journal of Commerce*, Oct. 4, 1924, June 26, 1925; *Travel*, Feb. 1933, p. 24; *Railway Age* 78 (Oct. 17, 1925): 725–26; Barrie Sanford, *The Pictorial History of Railroading in British Columbia* (Vancouver: Whitecap Books, 1981), 83.



When time Counts!

GREAT NORTHERN

New World's Record for Speedy Transportation of Silk

1784 Miles Seattle to St. Paul in 38 hours 50 minutes.

In the silk trade time literally means money. Interest on the millions of dollars tied up multiplies at the rate of thousands of dollars a day and in addition there is costly insurance. The old world's record Yokohama to New York, 8,300 miles, was 13 days, 3 hours, and 8 minutes. The new record made by the Admiral Line Steamer President McKinley, the Great Northern Ry., C. B. & Q. R. R., and Pennsylvania R. R. is 12 days, 14 hours and 36 minutes.

FIRST CARGO
 Steamer *Sya Maru* N. Y. K. Line loaded at Seattle 1:00 A. M. August 13th, loading of silk began at 7:30 A. M. Was completed at 12:55 P. M. and train of 10 cars left dock at 1:01 P. M. August 13th, arrived St. Paul 6:50 A. M. August 15th, distance of 1,784 miles in 38 hours and 24 minutes at an average of 45.7 miles per hour.
 Left St. Paul over the C. B. & Q. 6:50 A. M., arrived Chicago 4:15 P. M., distance of 431 miles in 9 hours and 47 minutes, an average speed of 44.1 miles per hour; delivered Pennsylvania Railroad 4:30 P. M. August 15th and arrived Jersey City at 7:20 P. M. August 15th, distance of 908 miles in 38 hours, an average speed of 34.9 miles per hour.
 Entire distance 3,123 miles, elapsed time 73 hours and 15 minutes. Average speed per hour including terminal delays 41.3 miles. Shipment consisted of 2,811 packages weighing 467,758 pounds.

SECOND CARGO
 Steamer *President McKinley* loaded at Seattle 8:30 P. M. August 13th, silk loaded at 11:45 A. M. the 14th. Train of 9 cars left dock at 1:00 A. M. August 14th. Arrived St. Paul 5:30 P. M. August 15th, distance of 1,784 miles. Time 38 hours and 50 minutes. Average speed 47.9 miles per hour.
 Departed St. Paul over the C. B. & Q. 3:59 P. M., arrived Chicago 3:19 A. M. August 16th, distance 431 miles, time 9 hours and 34 minutes, average speed 45 miles per hour; delivered Chicago over Pennsylvania Railroad 3:15 A. M. Aug. 16th, arrived Jersey City 3:25 A. M. August 17th, distance of 908 miles, time 35 hours and 1 minute, average speed 38.3 miles per hour.
 Seattle to Jersey City distance of 3,123 miles, elapsed time 73 hours and 25 minutes, average speed per hour including terminal delays 53.3 miles per hour. This shipment consisted of 1,261 packages with weighing 315,539 pounds.

The Great Northern Railway was able to make this new world's record from Seattle to St. Paul because its engines are of a new and more powerful type, the largest and finest of their class ever manufactured by the Baldwin Locomotive Works.
 Its equipment is up to the minute in every respect.
 Its roadbed is in the finest condition possible with extra heavy 130 lbs. steel rails where necessary.
 Oil is used for fuel on over 1,100 miles—the longest cinderless mileage of any railroad in the Northwest.
 Great Northern employees, many of them stockholders in the Road, are proud of their railroad and anxious to render service of the highest degree.

Travel and Ship Your Freight GREAT NORTHERN.



Cover of Great Northern's 1924 timetable, associating speedy passenger and freight service with the world record for transportation of silk

The high cost of insuring raw silk against damage, delay, and theft was the largest single expense for shippers. An hour's delay in delivering a shipment from Yokohama to New York could cost tens of thousands of dollars. Interest charges on the capital borrowed to purchase the silk were also high. On a shipment of 10,000 bales valued at \$10 million, for example, interest could be as much as \$1,650 per day. Because raw silk was imported duty free, it had to be billed in bond while being transported across the continent. Railroad companies had to furnish the bond, which might amount to \$2 million per train.

The unpredictability of the silk market was another reason for speed. Usually consigned to a New York bank or brokerage house rather than purchased by a manufacturer, raw silk was traded on the volatile commodities market. Its price could fluctuate considerably in a matter of minutes or hours, and a few minutes' delay in the delivery could mean the loss of thousands of dollars for a firm or speculator.

Shippers such as the GN also moved raw silk quickly because, when valued at hundreds of dollars per bale, it

was worth stealing. Many thieves preferred silk to gold or jewels because raw silk could not be marked and, since one skein looked like the next, it was impossible to trace. Moreover, demand usually exceeded supply, so stolen silk could readily be converted into cash for almost full value. Silk has always attracted thieves, but during the silk-train era, their operations were as efficient and profitable as those of rum-runners and bootleggers. Although silk cargoes were always heavily guarded, thefts were reportedly "staggering," eventually leading railroads such as the Lackawanna, Lehigh Valley, and Erie to refuse to transport it.⁸

Yet another reason for speed when shipping silk was that railroads used silk trains to attract publicity and to generate freight and passenger business. When oil-burning GN Engine No. 2517 made a record silk run in September 1925, the railway boasted in newspapers across the Northwest. Locomotives such as "the famous No. 2517," read the ads, "running smoothly and swiftly at uniform speed, pull the famous Oriental Limited without jerk or jar over a wonderful roadbed and thru low river-level passes of the Great Northern Cascades and Rockies. A clean, cinderless trip during which America's finest scenery may be viewed in comfort."⁹

Engine No. 2517 figured prominently in subsequent Great Northern publicity. Charles O. Jenks, GN vice-president of operations, announced in May 1929 the introduction of a new passenger train connecting Chicago and the Pacific Northwest in 63 hours. Named the "Empire Builder" in honor of the railway's founder, the train was "designed to meet the requirements of the faster schedules demanded in transcontinental service." When the Empire Builder on

⁸ *St. Paul Daily News*, Aug. 25, 1924; Hubbard, "Fast Silk Trains," 13–24; Edward H. Smith, "Queen Silk," *Saturday Evening Post*, June 26, 1920, p. 10–11, 166, 169–70, 173–74; Dayton, "Spinning Silk," 11–12; *Whitefish Pilot*, Mar. 20, 1925; Silk train materials, Sept. 22, 1921, GN Records.

⁹ Here and below, see Advertising copy, Dec. 1925, Advertising and Publicity Department, Magazine and Newspaper Advertisements, Articles, and Publicity, 1884–1970, GN Records, microfilm edition, Roll 1, Frame 115 (hereafter R[oll] and F[rame] numbers, Ad. & Pub. Dept., GN Records); Charles Wood and Dorothy Wood, *The Great Northern Railway* (Edmonds, Wash.: Pacific Fast Mail, 1979), 295, 298, 324–25.

its inaugural run left St. Paul Union Depot on June 11, 1929, it was behind "the famous No. 2517."

The fascination with silk trains and the keen competition among railroads for the silk business reflect developments in American history, especially during the 1920s. Following World War I, as many Americans threw off restraints, responsibilities, inhibitions—and women some of their clothing—King Cotton, King Wheat, and King Corn lost their thrones to Queen Silk. As one industry reporter noted, silk enjoyed "an opulent regency in the world of fabrics, an imperial position in industry." In 1874 the United States imported about 1 million pounds of raw silk valued at about \$4.5 million; by 1914 imports were about 26 million pounds, worth \$80.5 million; and by 1919 almost 45 million pounds, worth nearly \$330 million. Two decades later, on the brink of war, the country still imported 51 million pounds, a modest decrease from the previous year's 54 million. Price per pound rose from about \$4 in 1874 to almost \$18 in about 1920, making a bale weighing 130 pounds worth some \$2,300.¹⁰

In contrast, the Ford automobile dealer Kallevig Bros. & Baklund in Willmar advertised the new Model T Runabout, with starter, for a mere \$395. On the GN line, Willmar—with its marshaling (line-up) yard, roundhouse, repair shop, and division offices—was a railroad town of almost 6,000 people. A GN mechanic in Willmar could purchase his work clothes at reasonable prices: a heavy wool mackinaw cost \$9.95, all-wool Otis union suits \$1.65, overalls \$1.85, four-buckle overshoes \$3.15, work shoes \$3.45, and work shirts \$1.19. At



Trend-setting models attired in flowing, exotic fashions of the early 1920s

the City Cash Market, his wife could buy a pound of Mango Gipe Coffee for 47¢, a large box of Post Toasties for 23¢, and ten bars of Grandma's white laundry soap for 65¢. Compared to the cost of items in everyday use, raw silk commanded a regal price.

Despite the relative expense, the United States consumed more than 75 percent of the world's raw silk between the world wars. Low wages in Japan, increased purchasing power in the United States, better manufacturing techniques, and products such as "Fan-Ta-Si," which could be washed at home, made silk more affordable than it had been. Silk appeared in men's suits, shirts, socks, and ties. (Al Capone was famous for his ties, and the Teapot Dome scandal's Harry Sinclair slept in pink silk pajamas in prison.) Women abandoned corsets and petticoats for clinging silk dresses, sports clothes, lingerie, and hosiery. Strong and richly dyed, the fabric also found its way into ribbons, lampshades, brocades, and bedclothes.¹¹

Infusing the public imagination, silk became available not only at exclusive New York shops, but also at

¹⁰ Here and below, see Smith, "Queen Silk," 10–11, 166, 169–70, 173–74; *Arts & Decoration*, Feb. 1923, p. 14–15; Floyd Parsons, "Everybody's Business: Silk," *Saturday Evening Post* July 17, 1920, p. 37–38; *Willmar Tribune*, Jan. 28, Mar. 31, Apr. 28, June 16, Oct. 6, 13—all 1920.

¹¹ Geoffrey Perrett, *America in the Twenties* (New York: Simon and Schuster, 1982), 409; Frederick Lewis Allen, *Only Yesterday* (New York: Bantam Books, 1959), 72–74; *Arts & Decoration*, May 25, 1920, p. 25, 56; *Christian Science Monitor*, weekly magazine sec., Aug. 30, 1941, p. 6; George A. Brakeley, "Silk—Our Strongest Oriental Tie," *Asia*, Apr. 1917, p. 110–16; *Cut Bank Pioneer Press* (Montana), Sept. 24, 1926; *Business Week*, Aug. 7, 1937, p. 28–30.

establishments such as J. C. Penney's. Department stores sponsored "silk weeks" once or twice a year; at Bon Marché in Seattle, live models showed "brand new shimmering silks" and home economists, seamstresses, and artists were on hand to answer questions. Customers could purchase the fabric and have dresses cut out, sewn, and fitted free of charge.¹²

Because of its great tensile strength and elasticity, silk was especially suited for making women's hosiery. As women shortened their skirts in the 1920s, they exposed their legs above their knees, covering them with "diaphanous nothings," wrote one observer. The average American woman may have spent more than 10 percent of her clothing budget on silk stockings.¹³

Advertisements "dancing on the edge of propriety" encouraged women to purchase silk stockings and consider them a necessity rather than a luxury. Pictures of shapely legs, "sheathed in the most gossamer of silken hose," advertised everything from auto ignition systems to shingles, washing machines, and phonographs. Magazines carried stories with provocative titles such as "Silk Stockings: A Story Told from Real Life."¹⁴

Many American women willingly denied themselves other things to have silk stockings, snubbing hosiery made from rayon, nylon, and cotton lisle. When Japan moved into French Indochina in 1941, the United States government seized all raw silk in the country to ensure a supply for parachutes and powder bags for propellant charges. A silk-stocking "panic" ensued, as women "stampeded" hosiery counters at department stores. In July sales of silk stockings increased in some cities by 300 percent. Stores added extra sales help, and Gimbel's in New York called in ten "husky detectives" to handle the "stocking-mad women."¹⁵

Further propelling the silk-train phenomenon in the Roaring Twenties was the era's fascination with speed and setting records in contests such as marathon dancing and flagpole sitting. Excitement ran high in the age of ballyhoo when Charles A. Lindbergh made his solo flight across the Atlantic in May 1927. Similarly, when the Ford Model A made its highly anticipated debut in December 1927, millions of people braved rain, snow, and freezing temperatures to catch a glimpse of it.¹⁶

Responding to the times, the GN produced its own ballyhoo and stunts. The company assembled record-length trains of everything from silk and apples to Buick automobiles. In July 1924, a train of 125 cars containing enough shingles to roof every house in a town of 10,000 people—the largest shingle shipment ever transported across the continent—passed over the GN route from Seattle to St. Paul. Newspaper accounts and newsreels drew attention to the train's length and cargo.¹⁷

But silk trains were more than publicity stunts. Pound for pound, silk earned more revenue for the GN than any other product, eight times as much per train mile as its crack passenger train, the Oriental Limited.

"That," wrote William P. Kenney, traffic vice-president, "is why this silk business is so good."¹⁸

With ample reason, Seattle advertised itself in the 1920s as the "Silk Port of America." Through it 20 thousand to 30 thousand bales of raw silk worth \$20 million to \$30 million entered the United States each month. Closer to Japan by one or two days' sailing time than the other major U.S. ports, Seattle welcomed five times as much silk in 1924 as San Francisco. Customs records indicate that raw silk was often the northern city's principal import for particular reporting periods. The *Seattle Daily News* and *Daily Journal of Commerce* featured the arrival of silk shipments in their marine activities sections, always with prominent headlines and often with pictures of ships and captains.¹⁹

Three major shipping lines dominated in delivering silk to Seattle. One was the Admiral Oriental Line with its famous ships named for presidents, the large, fast, dependable "535s" put in service in 1921. From 1922 to 1925, these liners alone brought in more than \$300 million worth of raw silk. The two other significant carriers were Japanese: Nippon Yusen Kaisha (NYK) and Osaka Shosen Kaisha. Enjoying advantages that other Japanese shippers did not, NYK profited from arrangements concluded with the GN and from its fleet of fast, specially designed, diesel-powered ships with "silk

¹² *Spokane Press*, Aug. 16, 1924; *Cut Bank Pioneer Press*, Dec. 4, 1925; *Seattle Daily Times*, Aug. 3, Nov. 11, 1924, Apr. 12, 1925; *Whitefish Pilot*, Sept. 4, Nov. 13, 1923, Feb. 10, 1925; *Farmer's Provost* (New Rockford, N. Dak.), Sept. 11, 1924.

¹³ *Mentor*, Sept. 1929, p. 17–19, 64, 66, 68; *Whitefish Pilot*, May 27, 1927.

¹⁴ Betsy Sharkey, "You've Come A Long Way, Madison Avenue," *Lear's*, Mar. 1993, p. 93–94; *This Fabulous Century: Sixty Years of American Life, 1920–1930* (New York: Time-Life Books, 1969), 3:126–27; *The American Heritage History of the 20's & 30's* (New York: American Heritage Publishing Co., 1970), 102; *Atlantic Monthly*, Jan. 1922, p. 134–35; Constance Duveen, "Silk Stockings: A Story Told from Real Life," *Woman's Home Companion*, Apr. 1914, p. 14, 64–65.

¹⁵ *Business Week*, Aug. 9, 1941, p. 24–26; *Newsweek*, Aug. 4, p. 11–13, Aug. 11, p. 40, and Aug. 18, p. 38—all 1941.

¹⁶ Silas Bent, *Ballyhoo* (New York: Boni and Liveright, 1927), xiv–xv; Allen, *Only Yesterday*, 154; Ethan Mordden, *That Jazz: An Idiosyncratic Social History of the American Twenties* (New York: G. P. Putnam's Sons, 1978), 214–15; Leslie R. Henry, *Henry's Fabulous Model A* (Los Angeles: Floyd Clymer Publications, 1959), 33–36.

¹⁷ *Cut Bank Pioneer Press*, July 4, 1924.

¹⁸ Silk train materials, June 8, 1925, GN Records.

¹⁹ *Daily Journal of Commerce*, Dec. 12, 1924, May 5, June 24, 1925; *Seattle Daily Times*, Sept. 8, 1924, Mar. 31, 1925.



Silken bridal fashions displayed in Dayton's department store window, Minneapolis, 1923

rooms' to protect the precious bales from damage while crossing the stormy Pacific.²⁰

Keenly competitive, the companies set records both

²⁰ *Daily Journal of Commerce*, July 14, 1928; John Niven, *The American President Lines and its Forebearers 1848-1984* (Newark: University of Delaware Press, 1987), 70-71; Boone, "World's Greatest Sea Race," 14-15, 105-106.

for size and speed of shipments—yearly, monthly, and, sometimes, daily. In 1924 the average time required for Admiral Oriental ships to cross the Pacific from Yokohama was 9 days, 20 hours, and 7 minutes, some 83 minutes less than the average time required in 1923. Then, the *President Grant* made the passage in 8 days, 23 hours, and 10 minutes, arriving in Seattle on May 10. On September 7, the *President Jefferson* docked at

Seattle with a cargo valued at more than \$16 million, the most valuable shipment of silk ever received at a U.S. port. Little more than a year later, the Osaka Shosen Kaisha liner *Arabia Maru* delivered the largest silk shipment ever to arrive in Seattle, 10,124 bales of raw silk and 60 tons of silk goods.²¹

Of the railroads that vied to transport raw silk from Seattle to New York, none courted the business more aggressively than the GN, and none enjoyed its advantages. By the 1920s, it justifiably prided itself on being the leading rail line handling silk.

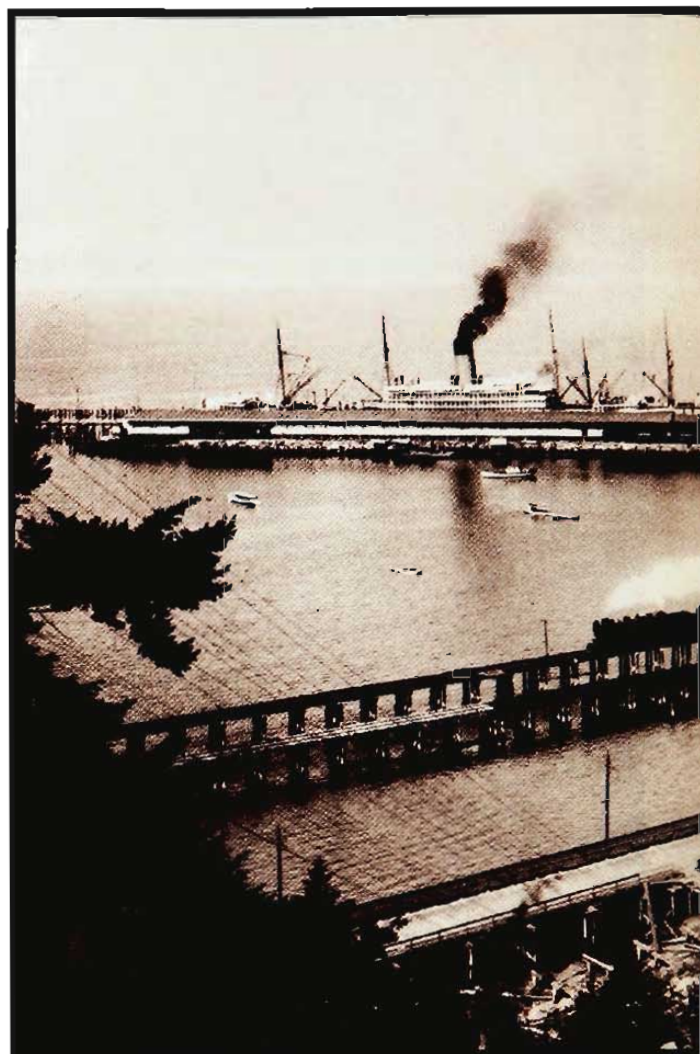
Empire Builder James J. Hill—like other forward-looking American businessmen—realized that China and Japan contained nearly one-third of the world's population and that the potential for commercial ties to the United States was limitless. China alone, Hill maintained, could consume fully a third of the U.S. agricultural production and much of its iron and steel. He estimated that if the people of a single Chinese province could be induced to use an ounce of wheat flour per day, a market for 50 million bushels of American wheat per year would be created. Hill's instincts were correct. When China began purchasing American flour—shipped to Seattle on the GN—the demand for wheat increased, wheat prices went up, midwestern farmers looked more kindly on railroads, and GN profits rose.²²

Hill also had a special interest in Japan. To siphon the lucrative Asia trade into Seattle and away from Vancouver and the Canadian Pacific Railway, Hill in 1896 forged the first of the GN's agreements with Japan's NYK steamship line and secured favorable rates enabling the GN to gather up freight from across the eastern and southern United States for shipment to far-off Japanese markets.

To garner the trade moving between Europe and Asia through the Suez Canal, Hill formed the Great Northern Steamship Company in 1900. Commissioning the two largest freight carriers ever floated, the *Minnesota* (called a "floating hotel" by one Japanese observer) and the *Dakota*. Hill thus connected Seattle with the ports of Yokohama and Hong Kong. In 1917 and again in 1921, the GN and the NYK renewed their contracts, perpetuating a formidable partnership in the transport of raw silk.

Another advantage the GN had over its competitors was that Hill, an economy-minded, far-sighted manager, constructed a railroad that could carry the largest possible volume of freight at the lowest possible unit cost. Consequently, his GN line to Washington was better engineered and built than any other western road. By maintaining a 1.0 percent maximum grade across the Rocky Mountains (the maximum on other lines was 2.2 percent), the GN greatly reduced its need to use expensive double engines in the mountains.²³

The GN enjoyed other advantages. Nowhere between Seattle and St. Paul did it need to make time-



In Seattle's harbor, the *Minnesota* and *Dakota* off-load to waiting

²¹ *Seattle Daily Times*, Sept. 7, Dec. 5, 1924; *Daily Journal of Commerce*, June 15, Dec. 30, 1925.

²² Here and two paragraphs below, see Ralph W. Hidy et al., *The Great Northern Railway: A History* (Boston: Harvard Business School Press, 1988), 122, 124, 152–53, 159; Joseph G. Pyle, *The Life of James J. Hill* (Garden City: Doubleday, Page & Co., 1917), 2:52–56, 59; Albro Martin, *James J. Hill and the Opening of the Northwest* (1976; reprint, St. Paul: Minnesota Historical Society Press, 1991), 471, 544–46; Sanford, *Pictorial History*, 34–35; Holbrook, *Story of American Railroads*, 173, 181–83; James J. Hill to M. A. Hanna, July 27, 1898, Letterpress Books, 1866–1916, microfilm edition, R11, F467–68; to M. A. Hanna, Apr. 24, 1897, R11, F220; to D. Willard, Aug. 13, 1912, R14, F282; to A. J. Blethen, Aug. 21, 1909, R13, F354; enc. in Hill to Charles Elley Hall, Mar. 16, 1914, R14, F679—all in James Jerome Hill Papers, James Jerome Hill Reference Library, St. Paul (hereafter cited as Hill Papers).

²³ Here and two paragraphs below, see Pyle, *Life of James J. Hill*, 2:70; Elwyn B. Robinson, *History of North Dakota* (Lincoln: University of Nebraska Press, 1966), 228, 237–38; Hill



trains at Great Northern Pier 89

consuming detours around large bodies of water. The long, level stretches between Cut Bank, Montana, and Minot, North Dakota, and over the Willmar Division in Minnesota were “fast” track—heavy rails, easy grades, and gentle curves that allowed sustained high speeds for

to: E. D. Adams, Mar. 28, 1898, R11, F370; to John Kennedy, July 30, 1898, R11, F474; to Louis Edgerton, Oct. 4, 1908, R13, F152; to George F. Baker, June 14, 1910, R13, F667; to George W. Thayer, July 16, 1913, R14, F511; to Gaspard Farrer, Sept. 23, 1911, R14, F134–35; enc. in Hill to Hall, Mar. 16, 1914, R14, F677—all in Hill Papers.

²⁴ Hidy et al., *Great Northern Railway*, 159, 171; Hubbard, “Fast Silk Trains,” 20.

²⁵ Here and three paragraphs below, see Silk train materials, May 2, 1923, GN Records; Hubbard, “Fast Silk Trains,” 13–24; Boone, “World’s Greatest Sea Race,” 14–15, 105–106; *Daily Journal of Commerce*, Dec. 3, 1924, June 24, Nov. 4, 1925, June 2, 1928; *Seattle Daily Times*, Apr. 28, 1925.

goods and passengers. In 1912 the GN inaugurated service on the Surrey Cutoff, a 224-mile-diagonal across the huge rectangle of eastern North Dakota and the GN’s longest, straight stretch of track.

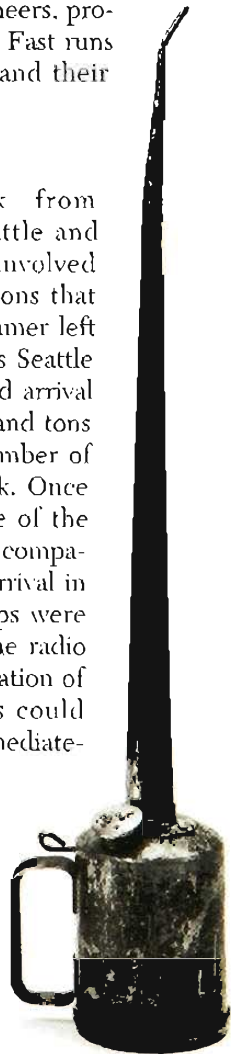
No railroad was so dedicated as the GN to improving roadbeds, equipment, and service. It filled natural depressions, widened embankments, replaced wooden bridges and trestles with stone and steel, laid heavier rails, improved rolling stock, and held staff and train crews to high standards of training and efficiency. These heavy expenditures paid off. The GN moved large volumes of freight faster and more profitably than its competitors, and on the eve of World War I, Hill declared the GN in “excellent shape.” No road in the United States, he boasted, had track as uniformly good for such long distances nor enjoyed the GN’s record for safety.

To utilize these advantages, Kenney, the traffic vice-president, relentlessly sought to increase the GN’s volume. In 1922 the company reopened a foreign office in Asia, primarily to solicit silk business. When a competing road challenged the GN, Kenney—his confidence unwavering—asked that the challenge be accepted. Jenks, operations vice-president, always complied, but often reluctantly, and veteran engineers, protective of their locomotives, grumbled. Fast runs put extraordinary stress on the men and their equipment.²⁴

Moving raw silk from Yokohama to Seattle and on to New York involved detailed preparations that were timed to the minute. After a steamer left Japan, the shipping company cabled its Seattle representative with the ship’s estimated arrival time, the number of bales of raw silk and tons of silk goods in the cargo, and the number of the pier at which the ship would dock. Once the vessel came within radio distance of the West Coast, the ship’s captain sent the company’s port captain a projected time of arrival in Victoria, British Columbia, where ships were held for medical inspection. Also in the radio message was information about the location of the silk in the ship’s hold, so crews could arrange to begin unloading the silk immediately after the ship docked.²⁵

Before the silk reached Seattle, often before it left Yokohama, the GN (or its competitors) had been

Great Northern Railway oil can, used after 1900





Bales of raw silk being rushed from the Great Northern's dockside warehouse to waiting silk-train baggage cars

awarded a contract for transporting it across the continent. As the ship neared Seattle, GN personnel went into action, doing everything possible to avoid even a minute's delay. A GN customs clerk and representatives of its operating and traffic departments boarded the ship at Victoria. En route to Seattle, they prepared the customs-clearance documents and all other necessary papers. The ship's manifest included a detailed listing of where the silk had been loaded and where each bale or package was consigned, which the men transmitted to the GN freight agent in Seattle. A vice-president secured insurance for the silk, while the transportation superintendent arranged with other railroads such as the Chicago, Burlington & Quincy and the Pennsylvania to run the silk from St. Paul to Chicago and on to New York. Someone else engaged special armed agents to guard the train. A GN attorney obtained the permits to move the silk through customs without delay.

Meanwhile, personnel from the mechanical department prepared the waiting baggage cars by thoroughly cleaning and inspecting them; sealing doors and vents to keep out dust and moisture; removing or padding splin-

ters, lamps, stoves, and anything else that might puncture the bales if they shifted while in transit; removing or capping steam lines; and covering windows to block out prying eyes. Men tested brakes, jacked up wheels, inspected the brasses or bushings, and then tested and inspected everything a second time. An engine, a coach for the crew and guards, and the baggage cars waited at the pier for the silk to arrive.

Before the ship docked, the crew opened hatches and ran out the gangplanks. Stevedores followed the boarding officer on board and began moving the silk to the warehouse where the bales were sorted according to the bill of lading. To guard against theft and smuggling, customs officials checked the bales, and when the customs appraiser released the silk, it was trundled into the waiting railroad cars. Doors were then locked and sealed. Because the conductor already had his orders and wheel report, the train did not have to stop at the terminal office. On occasion, silk trains passed out of the yard on their way to St. Paul before the ship's passengers had disembarked.

Typical was the arrival of the *President Grant* at

Legends of the Silk Road

The silk road from Seattle to St. Paul, Chicago, and New York, although neither as famous nor as significant as the one traversed by Marco Polo and plundered by Genghis Khan, has its own legends. Some are true; others are partly true; and many, springing from the reminiscences of veteran railroaders, are only that—legends.

Among the most enduring beliefs is that silk trains were always given a clear track; all others, including crack passenger and fast mail trains, moved out of the way by going “into the hole” (onto a siding). In fact, the GN’s No. 27, the fast mail running between St. Paul and Seattle, took precedence over all trains. On those infrequent occasions when a misguided dispatcher ordered No. 27 onto a siding to allow a silk train to pass, Vice-President Jenks demanded an explanation and issued a reprimand. Jenks insisted that “nothing on the railroad” take precedence over No. 27.¹

Also untrue is the story that the same locomotive pulled silk trains the entire distance between Seattle and St. Paul. Locomotives in regular service were changed at division points with the crews, on the average of every 150–200 miles. Only No. 2517, on its record run in September 1925, covered the entire distance between Seattle and St. Paul. And, contrary to another legend, No. 2517 did not power the famous record-breaking run between Seattle and New York.

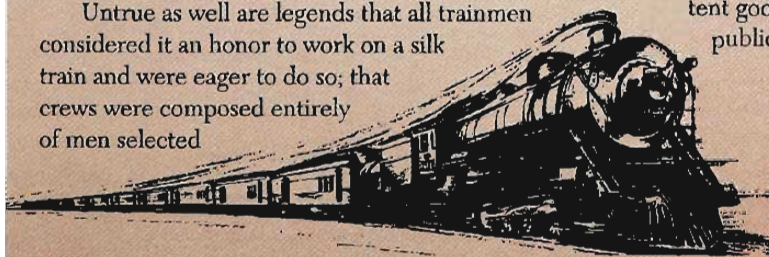
Untrue as well are legends that all trainmen considered it an honor to work on a silk train and were eager to do so; that crews were composed entirely of men selected

for their ability and judgment; and that they stayed with the train the entire distance. Except on occasions when record runs were being attempted, crews changed at division points and took turns as they would with regular freight trains. The next crew up took the next train out, whatever its cargo.

Crewing a silk train was strenuous work, however, and engineers sometimes declined the assignments. The sustained high speeds, the open crossings, the chances of hitting stray animals on tracks, the possibility of hotboxes or other mechanical failures, and the responsibility for anything that went wrong on the run were stresses that some engineers avoided.

The most unlikely legend associated with silk trains is that their cargoes contained live silkworms. Old timers’ stories of sending boys into the hills around Williston to gather mulberry leaves for voracious silkworms are like stories about snipe hunts—listener, beware! Raw silk consisted of fibers drawn from cocoons in which the silkworms had already been killed.

The most persistent legend associated with GN silk trains is that they always ran at the fastest possible speed, 80 to 90 miles per hour on the “fast” track between Cut Bank and Minot and on the Surrey Cutoff. Some did attain high speeds for short stretches, but as long as a train was on schedule, it made no effort to make better time. Even No. 2517’s record run was not made at top speed. Consistent good time was more important, although the GN’s publicity sometimes led people to believe otherwise.



¹ Here and below, see Hubbard, “Fast Silk Trains,” 14, 17; Silk train materials, enc. in Oct. 4, 1924, June 23, Dec. 19, 1927, GN Records; Wood and Wood, *Great Northern Railway*, 295.

Seattle’s Pier 41 with 3,221 bales of raw silk on June 10, 1925. Docking at 3:15 P.M., the *President Grant* began unloading its silk cargo at 4:03 P.M. and finished the work at 5:55 P.M. Five minutes later, men began loading

the bales into 12 baggage cars. The train pulled out at 8:20 P.M., just a little more than five hours after the steamer had first docked.²⁶

For the GN to realize the greatest advantage from a fast run, drama was as much a requirement as speed. The arrival of a particularly valuable silk cargo in Seattle on a liner that had made exceptionally fast time from

²⁶ *Daily Journal of Commerce*, June 24, 1925.

Yokohama represented a great opportunity, and just such a fortuitous juxtaposition occurred in early August 1924. For some time the GN had been moving silk between Seattle and St. Paul on a 56-hour schedule. In July 1924 the rival Northern Pacific (NP) made the same run in 44 hours and 18 minutes, bettering by almost an hour the GN record set more than a dozen years earlier with eight cars of silk. Accepting the challenge, the GN set out to break the new record with a 12-car silk train leaving Seattle on August 2.²⁷

Good time was made on the Western Division, but then problems plagued the train. Car 2063 entered Williston, North Dakota, with a rough journal, which was cooled with water to prevent overheating (a "hot-box") until the train reached Minot. Nineteen precious minutes were then lost in replacing a bushing ("brassing the box"); the same journal box caused a 12-minute delay a short time later. The longest and most vexing problem occurred at Davenport, North Dakota, where the rails of the NP and the GN crossed at the "interlocking plant." The crew of a special NP train that passed through earlier in the day had neglected to switch back the tracks. When the silk train arrived on the night of August 3, a Sunday, it took the crew 28 minutes to locate the towerman, whose job it was to change the tracks. Outside Davenport there was more trouble with hotboxes. Although the GN managed to better the NP's time by 63 minutes, the difference was not enough to discourage the NP from trying again.

Extensive preparations began immediately to improve the GN record. The dramatic moment came when a large shipment of raw silk reached Seattle on August 13, some 400 thousand pounds from the *Iyo Maru* filling ten baggage cars plus nearly 326 thousand pounds from the *President McKinley* filling nine. Special port crews moved the silk to the dock, warehouse, and waiting train in three hours. Working at top speed, they loaded each car in just eight minutes. Only the most experienced crew members were selected for the trains, and engineers were allowed to choose their favorite locomotives from those known to be most reliable and capable of sustaining high speeds without requiring frequent water stops. The two GN trains left Seattle within hours of each other, making record times—3 hours and 18 minutes between Wenatchee

and Hillyard, Washington, and 8 hours and 9 minutes from Cut Bank to Williston. On the latter leg, the trains averaged more than 53 miles per hour.²⁸

Seasoned railroad men described the trains' performances as "phenomenal." No one made any mistakes. At division points, crews inspected air hoses and steam lines, checked brakes, lubricated journals, and switched locomotives in four minutes or less. Not so much as a



²⁷ Here and below, see Silk train materials, July 23, Aug. 4, 1924, GN Records.

²⁸ Here and three paragraphs below, see Silk train materials, Aug. 14, 15, 16, 18, 20, 1924, GN Records; clipping, Aug. 25, 1924, R6, F337, Ad. and Pub. Dept., GN Records; *Seattle Daily Times*, Aug. 17, *Daily Spokesman Review* (Spokane), Aug. 16, *Whitefish Pilot*, Aug. 15, 19, *Cut Bank Pioneer Press*, Aug. 22, *Wenatchee Daily World*, Aug. 14, 16, *Havre Daily Promoter* (Montana), Aug. 15, 16, *Minot Daily News*, Aug. 15, *New Rockford Transcript* (North Dakota), Aug. 22—all 1924.

single hotbox delayed the trains. Even the weather cooperated. No mountain winds slowed or immobilized the trains by blowing sand from beneath the locomotives' drive wheels.

The first train reached St. Paul in 39 hours and 28 minutes and arrived in Jersey City 75 hours and 15 minutes after leaving Seattle. The second made even better time: 38 hours and 50 minutes to St. Paul; 9 minutes in

St. Paul in switching to the Burlington road; and 9 hours and 19 minutes from St. Paul to Chicago, where it was switched to the Pennsylvania. The silk reached Jersey City 73 hours and 25 minutes after leaving Seattle, having departed Yokohama a record 12 days, 14 hours, and 36 minutes earlier. Bettering the standing record of 13 days, 3 hours, and 8 minutes, the GN achievement, according to a company news release, was "a big victo-

Great Northern's gleaming new Engine No. 2517 at St. Paul Union Depot, 1929



ry" for the United States "in the most dramatic of the races for commerce, the raw silk transport race."

GN President Ralph Budd saw the accomplishment as one that would not be equalled by any railroad "for a long time." Vice-President Kenney was equally jubilant: "We surely hold all records," he wrote, "and I think time made on these trains will put us in good shape." Vice-President Jenks agreed but hoped that his department would not have to do "any more such fast running," and he ordered that silk trains continue to maintain a 56-hour schedule between Seattle and St. Paul.

But the GN did make more fast runs, many of them. All were at the urging of NYK officials or in response to challenges by competing railroads. In September 1924, just one month after the phenomenal run, the Union Pacific attempted to beat the GN's record. The UP, warned Kenney, was also soliciting the silk business "very strongly." NYK officials noted the performance of competing roads, played one off against the other, and pressed for ever faster times. In December 1924, the GN began moving silk between Seattle and St. Paul on a regular 52-hour schedule, but, warned Kenney, this was not enough to maintain supremacy. In July 1925 the running time for GN trains dropped to 50 hours and in December to 48 hours.²⁹

To impress Japanese shippers, remind its competitors of its commanding position in the business of transporting raw silk, and convince the railroading public of its reliability in handling passengers and freight, the GN in September 1925 sent Engine No. 2517 on a well-publicized endurance run—reported as the longest continuous run ever made by a single locomotive. Eighteen cars of silk valued at more than \$5 million, "the largest individual silk shipment ever transported in the Northwest," heightened the drama.³⁰

Engine No. 2517, the "Marathon," was a mountain-type, P-2 oil-burning engine—sleek, fast, and powerful. It was one of 28 Baldwin-built 4-8-2 locomotives (4 leading wheels, 8 driving wheels, and 2 trailing wheels) that the GN put into service beginning in 1923 as part of a major equipment upgrade. The "ultimate in railroad steam locomotion" and "marvelously reliable," P-2s were the heaviest, fastest, and most efficient passenger steam locomotives ever built for transcontinental service. Carrying 5,000 gallons of fuel oil and 12,000 gallons of water, they were capable of sustaining high speeds, and they set many records. Until scrapped in the 1950s, P-2s were used on every GN "name" train—the Oriental Limited, the Fast Mail, the Glacier Park Limited, and the Empire Builder.

Leaving Seattle on September 25 at 4:30 P.M. and making the run to St. Paul in five hours' less time than the schedule of the Oriental Limited passenger train, No. 2517 was coupled in St. Paul to No. 27, the fastest

long-distance mail train in the world. Delayed on its return journey by twenty minutes because the west-bound mail from Chicago arrived late, No. 2517 made up the time and arrived back in Seattle on schedule. It had traveled 3,578 round-trip miles in just under 100 hours, with stops only to change crews and take on fuel oil and water, a feat never before accomplished by any American railroad, perhaps by no other railroad in the world. The average speed for the run was 45 miles per hour, including stops, inspections, and 24 crew changes. Between Cut Bank and Williston and over the Breckenridge and Willmar divisions, the silk train had averaged more than 50 miles per hour, faster than diesel-powered trains decades later. The record was all the more remarkable because No. 2517 was a stock engine with no special modifications for the trip. In commemoration, large replicas of No. 2517 were later exhibited in the windows of GN ticket offices in Chicago and other major cities.³¹

Within months of this outstanding performance, GN silk trains made another remarkable run. In January 1926, four of them consisting of 43 cars of silk valued at \$11,280,000 left Seattle together. Not 10 hours separated the trains as they moved through Whitefish, Montana, and sped along to St. Paul.³²

Because speed and spectacular achievements fascinated Americans in the silk-train era, the Fox Film Company approached GN officials in February 1928 with the proposal to produce a motion picture entitled *The Silk Train*. Vice-President Kenney initially agreed to cooperate, if the GN could be assured of enough publicity to justify the expense and bother. Not wanting filming to delay silk-train schedules, however, he raised so many objections and imposed so many conditions that the film company dropped the project.³³

For the sake of documentation, Kenney should perhaps have allowed the film to be made, because by 1928 the days of silk trains were numbered. Although the GN could compete successfully with other railroads and ultimately reduced the Seattle–St. Paul time to 46 hours, it could not con-

²⁹ Silk train materials, Sept. 20, Dec. 19, 1924, July 9, 13, 24, 27, Aug. 10, Dec. 13, 1925, GN Records.

³⁰ Here and below, see Wood and Wood, *Great Northern Railway*, 324, 381–82, 453, 551; Jones, "Silk Trains," 1–8; Hidy et al., *Great Northern Railway*, 162; *Whitefish Pilot*, Nov. 6, 1925; *Railway Age* 77 (Sept. 27, 1924): 555–58.

³¹ Clipping, *Anoka Union*, Feb. 10, 1926, R6, F479, Ad. and Pub. Dept., GN Records; *Railway Age* 78 (Oct. 17, 1925): 725–26, 78 (Oct. 10, 1925): 668–69; Hubbard, "Fast Silk Trains," 13–24; *Glasgow Times* (Montana), Oct. 23, 1925; *Whitefish Pilot*, Nov. 6, 1925.

³² *Whitefish Pilot*, Jan. 5, 1926.

³³ Silk train materials, Feb. 13, 1928, GN Records.

trol the price of raw silk. From a high of nearly \$18.00 per pound in 1920, prices dropped to \$3.56 in 1930 and \$1.30 in 1934. As the price declined, shippers began using the longer but cheaper water route to New York through the Panama Canal, thereby reducing the demand for fast trains.³⁴

These developments had an inevitable impact on West Coast ports. Although the Seattle Chamber of Commerce tried to maintain the volume of silk moving through the port by inducing railroads to reduce rates, silk receipts dropped rapidly. In 1931 the NYK, among the largest and most aggressive Japanese shipping firms, all but ceased delivering silk to Seattle.³⁵

As silk prices dropped, interest and insurance costs also declined to the point where they offset the longer time required for the all-water route to New York. Before 1929 American ships operating out of Seattle and California had carried the bulk of the raw silk to the United States. In 1928, according to the Silk Association of America, only 5 percent of the raw silk entering the United States did so via the all-water route through the Panama Canal. By 1930 the figure had increased to some 36 percent, and by 1939 more than 90 percent passed through the canal, almost all of it on new, fast Japanese ships.

Because the Japanese dominated the silk trade from production to marketing, Japanese exporters could determine how it reached its market. Raw silk was Japan's major money crop, the principal means by which the country earned its foreign exchange and paid for its imports. At times, as in 1933, the government sent missions to the United States to encourage silk consump-

tion as a means of stabilizing prices. At other times, the Japanese government tried to limit production or keep raw silk off the market to drive up prices. After 1937, the country needed sales to the United States to finance purchases vital to its war with China. Although the decline in price facilitated the shift to the cheaper all-water route, it was the initiative of Japanese shipping companies and their close association with silk-trading firms that gave them an undisputed domination in the direct Japan-Atlantic Coast trade.³⁶

Lower prices for raw silk and declining silk receipts at Seattle meant that after 1928 the GN ran fewer and shorter silk trains. Gone were the days of nine, ten, or more cars—Engine No. 2517 had made its endurance run with 18. Silk trains of four, five, and six cars became common. Whereas the GN had once willingly distributed small shipments among four baggage cars, the minimum number required by eastern railroads for a special train, the company became reluctant to do so. Many special trains now carried not only silk, but berries, cherries, and fresh salmon. Increasingly, the GN attached silk cars to passenger trains.³⁷

In 1934 and 1935, the railway ran no silk trains. Instead, annual totals of 35 and 50 cars of silk were attached to the eastbound Empire Builder running to St. Paul. By 1936 Queen Silk was increasingly being subjected to the indignity of riding from Seattle to St. Paul in the consist of No. 402, a mixed train. No more did her loyal subjects line the tracks or crowd into division points to catch a glimpse of her as she flashed by. On February 7, 1937, the GN ran its last silk train—four baggage cars and a coach.³⁸

The decline of silk trains did not mean, however, a decline in the demand for silk in the United States. Despite strained political relations and threatened boycotts against Japanese products, the United States imported 54 million pounds of silk in 1938. More than 90 percent of it was used to produce the 564 million pairs of silk stockings that American women purchased that year. An era had ended, however, and on March 9, 1939, the GN carried its last shipment of raw silk before the United States entered World War II.

For three decades the famous GN silk trains captured the public's imagination and satisfied its yearning for romance. While the trains rushed over the Seattle-to-St. Paul portion of the silk road, they generated publicity, excitement, and revenue. But, like the ancient silk road from Xian through Tashkent to Constantinople, the silk road-on-rails from Seattle through Minot to St. Paul and New York is no more.

The photos on p. 16, 19, 24–25, and 28–29 are courtesy the Burlington Northern Railway Archives, Fort Worth Texas; p. 26 is courtesy the Great Northern Railway Historical Society, Minneapolis. All other items are in the MHS collections.

³⁴ *Literary Digest*, Jan. 15, 1938, p. 7–8; *Time*, Jan. 10, 1938, p. 58–59, May 8, 1939, p. 76–77; *Newsweek*, Aug. 11, 1941, p. 40, Mar. 6, 1939, p. 51, Mar. 13, 1939, p. 49–50; *Business Week*, Mar. 11, 1939, p. 18–20; *Daily Journal of Commerce*, Jan. 19, 1928; Walter A. Radius, "Japanese Shipping Tightens Grip on Raw Silk Trade," *Far Eastern Survey*, May 10, 1939, p. 120–21.

³⁵ Here and below, see *Vancouver Sun*, Nov. 19, 1931; Radius, *United States Shipping*, 78; Hubbard, "Fast Silk Trains," 13–24; Silk train materials, enc. in Feb. 8, 1930, GN Records; Radius, "Japanese Shipping Tightens Grip," 120.

³⁶ *Asia* 32 (Sept.–Oct. 1932): 484–85, 527, and 39 (May 1939): 304; *Business Week*, Sept. 2, 1933, p. 24, Mar. 12, 1930, p. 15–16, Mar. 11, 1939, p. 18–20; *Newsweek*, Mar. 13, 1939, p. 49–50; Radius, "Japanese Shipping," 121–22; Radius, *United States Shipping*, 78.

³⁷ Silk train materials, Dec. 21, 29, 30, 1931, Jan. 12, 18, July 11, 1932, Apr. 4, May 5, 17, 1933, GN Records.

³⁸ Here and below, see Silk train materials, Nov. 28, 1934, Jan. 3, Aug. 12, 26, Sept. 27, 28, Nov. 29, 30, 1935, Sept. 28, Oct. 5, 1936, Feb. 7, Aug. 12, 1937, Mar. 9, 1939, GN Records; *Daily Journal of Commerce*, May 14, 1925; *Vancouver Sun*, Nov. 19, 1931; Radius, *United States Shipping*, 80, 112; Radius, "Japanese Shipping," 120.



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