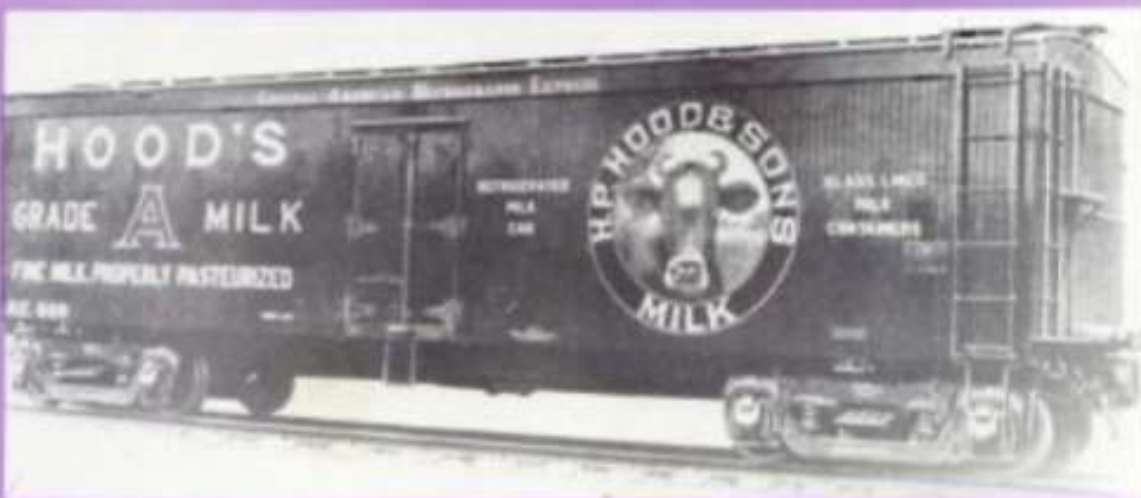




DISPATCH



MILK TRAINS!

SEE IN THIS ISSUE...

THE STORY OF TRANSPORTING MILK BY RAIL

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COVER PHOTOS — (upper): A "modern" GPX bulk-milk tankcar No. 803, and (lower): Hood's milk refer GARE 809 in the late 30's.

MILK RUN!

THE STORY OF MILK TRANSPORTATION BY RAIL

BY JAMES A. KINDRAKA



EASTBOUND LACKAWANNA PASSENGER TRAIN at East Orange, New Jersey, on May 26, 1936. The first two cars behind DL&W 4-8-4 No. 1643 were "BFIX" Borden bulk-milk tankcars.

MILK RUN! *The expression conjures up many things in our minds these days...*

Personally, it takes on great meaning when the elevator stops at every floor! We all relate this expression to railroads, but how do we really know about the true relationship of milk and trains?

THOUGH SOME MILK TRAINS made many stops, few were the slow creatures our mind conjures up. Most ran on passenger-train schedules, and many milk cars — once full — became head-end cars in regular passenger consists. The perishable nature of milk meant these cars had to be loaded and shipped to market *fast*. Depending on distances, the complete cycle of loading, shipping, unloading, cleaning and backhauling took only 24-48 hours.

Loaded cars went to market in passenger trains or as part of fast freights. Sometimes, when enough cars were present, a dedicated "unit" milk train would run — again on a fast passenger-train schedule. The clean, empty cars were generally returned to their points of origin via the more leisurely pace of a local freight. Virtually no other car on the railroad was utilized as often!

But that is getting ahead of our story; let's go back to when milk and the railroads first got together...

THE HISTORY OF MILK TRANSPORT

The year was 1841, William Henry Harrison was in the White House, and railroads were a recent "invention." Milk in most small cities was still supplied from farms within the city limits or by farm wagon from a short distance away. The large cities, like New York, Boston and Philadelphia, relied mostly on milk from "mash cows." These were animals kept in the delivery stables of numerous breweries and distilleries within the cities and fed on process waste. The

Continued —>



E. C. EDMEYER PHOTO - H. W. ARELING COLLECTION

MILK RUN!

THE CANDY COMPANIES: *Mars, Hershey and Baker were always big users of milk cars as this string of bulk tankers attests. Both Mars and Baker treated their wood and steel cars as rolling billboards their entire service life.*

milk produced was known as "swill" milk, and it always had a slightly "milk punch" flavor. It sold for six cents a quart.

In 1841, a station agent for the recently built New York & Erie Railroad in Orange County, New York — one Thomas Selleck by name — reasoned that he could double the farmer's income (over selling the milk as butter) and still compete with the city's swill milk. The farmers took a while to convince, but in the spring of 1842, one named Philo Gregory agreed, and New York City's first rail shipment of milk — 240 quarts — was made. By the summer of 1843, people were lining up for a block at the Erie's Reade Street terminal for fresh, sweet Goshen milk — at four cents a quart! The cans, containing 60 to 70 quarts, were kept cold via "...a tin tube filled with ice inserted in the top and stirred...." There are also reports of rail transport of milk into Baltimore from Frederick, Maryland, on the Baltimore & Ohio in 1840, and into Boston on the Boston & Worcester as early as 1839; but these were less well documented. Regardless, from these modest beginnings, milk transport on the railroads grew rapidly.

The same Orange County farmers who scoffed at Thomas Selleck's idea in 1841, shipped over six-million quarts to New York City just five years later! By the time the Civil War engulfed the nation, milk revenue was an important part of a railroad's income in many areas, not just in the Northeast. The old Morris & Essex Railroad (which eventually became the DL&W) began to develop country milk stations in

1872. The 40-quart can had been standardized as the container of choice, and it was weighed, cooled and loaded on the trains here. As the practice caught on, the stations began to dot the landscape. In 1900, Vermont alone had over 200 milk stations for rail shipment. In that same year, Boston alone had over 700 registered milk dealers!

Up to now, the milk cans were shipped in available boxcars, or in head-end baggage cars. Blocks of ice were placed on top of the cans for "refrigeration." What a mess! The introduction of refrigerated cars in the 1880's signaled another major step in milk transport. These basic cars were either insulated or iced and hauled in individual cans. Not only did this reduce the mess in handling, but it greatly extended the range of milk service into cities. In 1881, the Ontario & Western Railroad conducted a successful trial, sending a carload of milk from Delhi, New York, to New York City, a distance of 195 miles.

THE MILKSHEDS

With the advent of refrigerator cars and the ever-increasing size of cities and their milk demand, the railroads began going farther away and in more directions for milk. When drawn all together on a map, these various rivers of milk, all flowing into one area, took on the appearance of a giant watershed — hence the name "milkshed" was born. In 1886, New York City's milk came from 50 to 195 miles away, depending on the railroad. By 1916, milk was coming to the city from many locations, the most distant borders of

which are listed below:

Pennsylvania Railroad	503 miles
New York Central Railroad	469 miles
Eric Railroad	488 miles
Lehigh Valley Railroad	401 miles
West Shore Railroad	339 miles
New York, Ontario & Western RR ..	325 miles

Milksheds surrounded many other cities, not just New York. Unfortunately for the railroad historian, New York, Boston and Philadelphia were the only cities extensively covered by government reports on milk shipments. Other cities require more digging, but the task is not impossible.

Boston's milkshed extended into Maine, Vermont, New Hampshire, Pennsylvania and New York. One of the city's inbound milk routes extended across the Vermont border to Sherbrooke, Quebec. Cream shipments to Boston came all the way from Kansas. Chicago's milkshed was also very extensive, running as far as 335 miles into the fertile dairy areas of Wisconsin. Chicago received milk over the lines of eight railroads — the Pennsy, Monon, Rock Island, Milwaukee Road, Chicago & North Western, Chicago Great Western, and the Eric — from Iowa, Minnesota, Wisconsin, Illinois and Indiana. A few other cities are listed herewith (using 1937 data):

	Longest Route (miles)
Milwaukee	50
Cleveland	150
Pittsburgh	110
Philadelphia	300
Richmond	110
Atlanta	100
New Orleans	145
Los Angeles	175

Dozens of smaller cities, both small and large, received milk shipments over the rails. Many of these were single-line shipments of one or two cars. Later in this article, I will attempt to cover more of these, along with actual routing and carriers.

THE EXPANDING MARKET

The demand for milk continued to grow; between 1911 and 1921, Boston's annual milk demand doubled from 90- to 180-million quarts. By 1938, that swelled to just under 250-million quarts — 69 percent of it delivered by rail! In contrast, that same year, New York City received 1.2-billion [that is with a "B" folks] quarts, Chicago 497-million quarts, and Los Angeles 308-million quarts. An average of 45 percent of all this was transported by rail, which overall filled about 100 carloads per day for each city listed.

The daily per-capita consumption of milk in U.S. cities was actually rising about four times faster than the population. A 1922 table from the *New England Dairyman* listed daily milk consumption (in quarts) in 27 U.S. cities from coast to coast. A sampling has

been listed below:

Boston	505
Los Angeles	485
Denver	465
Omaha	420
New York	350
Minneapolis	350
Kansas City	340
Washington, D.C.	305
Fort Worth	265

EQUIPMENT DEVELOPMENT

The handling and cleaning of all these individual cans was beginning to become burdensome, and the next quantum leap for milk train-service was at hand. A few early attempts at placing tanks in refrigerator cars were tried around 1904, but while successful in principle, the design could not stand the strain of day-to-day rail service. Mainly, the bars and bolts attaching the tanks within an existing car tended to tear loose in service. The Boston & Maine condemned these early cars in 1914. Two other attempts in the Toledo area (one on an interurban line) in 1916 and 1920 also proved technically feasible, but failed to generate any interest within the industry.

That brings us to Thomas Otto, son of the owner of the Harmony Creamery Company in Pittsburgh. He convinced the Pfudler Company, a long-time supplier of glass-lined steel tanks to dairies and breweries, and the Baltimore & Ohio Railroad to combine expertise and greatly modify existing refrigerator cars. The cars had their ice bunkers removed, and two 2,500-gallon tanks were installed at either end of each car. Each car's frame was reinforced to handle 12" x 12" timber tank cradles. Three such reefers made a 105-mile run from West Farmington, Ohio, to Pittsburgh during August of 1921. The milk arrived with virtually no increase in temperature, and the era of bulk-milk tankcar service began.

One of the refrigerator cars was displayed at the National Dairy Show that fall in Minneapolis. The following year, the Wieland Dairy Company in Chicago combined with the General American Refrigerator Express Company — a joint venture between the General American Tank Car Company and the Pfudler Company — to build refrigerated glass-lined milk tankcars. These were the first cars constructed solely for bulk-milk transport. They had two 3,000-gallon tanks mounted directly on a steel chassis and rode on passenger-type trucks. Regular service began during June of 1922.

Originally, milk cars were indistinguishable from other equipment, but by the turn of the century, wooden refrigerator cars — many lettered for particular dairies — were in use. The major shift came in the '20's, when bulk-milk handling began in earnest. Bulk cars were owned or leased to individual dairies or co-ops. This meant most were either lettered for General American Refrigerator Express

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The History of Milk Transport by Rail

R. & TUCKER PHOTO - OMI COLLECTION

THIS BUILDER'S PHOTOGRAPH of Borden's "GPEX" No. 998, a 6,000-gallon bulk-milk tankcar was taken during August of 1946. This was General American - Pfaudler's ultimate design. Borden leased a sizable fleet of these cars to supplement their own "BFX" and "BFEX" cars.

(having GARE reporting marks) or for the dairy lessee — such as Hoods, Borden, Sheffield, etc. These "private-owner" cars allowed the dairies more control over both their utilization and sanitation. Their basic design was really fixed by the Wieland Dairy experiments in 1922. The cars had steel underframes, with passenger-type trucks, buffers and couplers. Train steam and signal lines were installed to facilitate handling the cars in passenger consists. Steel cradles to hold the two tanks at the opposite ends of each car were riveted directly to the frame for strength. Each tank had a 3,000-gallon capacity, and was made of seamless glass-lined steel.

During the 1940's and '50's, cars were built housing twin 4,000-gallon tanks, but the 6,000-gallon total-capacity cars predominated. Both the car itself and the tanks were insulated, usually with cork. The tanks were fitted with a manway, for cleaning and agitators, plus other necessary thermometers and valving. Cars were generally equipped with air compressors and sanitary air lines to facilitate unloading. Early cars had floors of steel sloped to the center to make cleaning easier. Later, the floors were done in stainless steel, and the tank heads were covered, also. Improvements made over the years were mainly in the areas of sanitation, stability and streamlining.

Because of insulating and bulk handling, these cars no longer needed ice bunkers. Earlier cars car-

ried brine cooling coils, but these were only used to pre-cool the cars before loading, not during transit. Filling the car with 6,000 gallons of cold milk was generally enough to maintain the temperature. In a much celebrated test, a 6,000-gallon car, CARE No. 700 of the Ripon Milk Company, made a 101-hour trip from Marshfield, Wisconsin, to Miami, Florida, in February of 1925. The exterior temperature changed 66 degrees during the trip, but the milk temperature rose less than two degrees F! The car was handled by four railroads en route: the Soo Line, Pennsy, Southern and the Atlantic Coast Line. In September of the following year, another such trip was made as result of urgent calls for milk following a hurricane. Cars from Janesville, Wisconsin, reached Miami in 54 hours, via the Milwaukee Road, Pennsy, Southern and the Florida East Coast.

While the key components of the private-name milk cars did not change much over the years, their exterior construction did. Originally, the side sheeting was wood, and the roof was removable for access to the tanks. In the 1930's, the removable roof idea was discarded as unnecessary. Some 50-foot cars were built with rounded roofs, and they were virtually indistinguishable from express reefers of the time, except for the lack of ice hatches. Later in the '30's, some of the older wood cars were refitted with steel sheeting. As the 1940's began, entirely new

steel cars were built in both 6,000- and 8,000-gallon capacities. These cars had both their roof lines and side sills rounded. The streamlining was in keeping with the general theme of railroad design of the time, but served a more practical purpose of easier cleaning and better sanitation. The last of these bulk-milk cars was built by General American Pfaudler in the post-war '40's. During the '30's, the General American Pfaudler Transportation Corporation was formed, and reporting marks on some of their older wooden cars and all the new leased steel cars were changed to GPEX.

THE BORDEN CARS

No discussion of private-owner bulk-milk tank-cars would be complete without mention of the rather unique Borden cars. In the mid-1930's, the Borden company shops built cars employing a cover, complete with doors and fittings over tanks already fastened to the floor. The cars had the appearance of a butter dish or inverted bathtub on a flatcar. An additional unique feature was a vertical aluminum fin down the car's center. These fins were removed, except on the ends, as Borden's contribution to a scrap-metal effort at the beginning of World War II. The cars carried BFIX reporting marks and were used in the Chicago and New York-area operations of Borden's Farm Products Division.

Only a limited number — 35 — of these cars were ever produced, and Borden supplemented their operations by leasing more of the GARE and GPEX bulk cars. During the car's life it appeared in three different paint schemes. By 1960, only 22 of the originals remained, finishing out their service lives in Borden's chemical and glue divisions.

RAILROAD-OWNED CARS

The railroads also maintained their own fleets of dedicated milk-service cars, but these cars did not handle bulk shipments — only cans. After the turn of the century, these cars comprised mainly groups of wood-side steel-underframe reefers or insulated box-cars. The trend generally was toward insulated cars and away from iced reefers. Again, these cars were equipped with trucks and appliances for passenger-train service.

Railroad-owned milk cars came in 40- and 50-foot varieties, being similar in appearance to express reefers, but without the rooftop ice hatches. Individual railroad designs varied quite a bit, ranging from insulated celestery-roofed baggage cars on the Southern Pacific to redone outside-braced USRA boxcars on the Maine Central. Few of the railroad-owned milk-service cars were ever rebuilt with steel sides. Their use generally declined at a more rapid rate than cars used for bulk-milk service, and in 1958, the Boston & Maine had 35 new 52-foot steel cars built for milk service. Fifteen of the cars were mechanical reefers, with four six-foot plug doors each. They were built to haul bottled milk from a Vermont creamery

to a retail food-store distribution area in Massachusetts. The other 20 cars were identical, and were used for hauling iced milk cans. These were the last cars built in the U.S. specifically for milk service. All the cars were painted Pullman green, with white lettering. They carried the more modern B&M herald, with a large white "B" and a blue "M."

OPERATION

Milk-train operation varied from milkshed to milkshed, depending on size. In smaller ones, cars were collected by pre-dawn trains and delivered at downtown dairies before noon. The cars could then be unloaded, cleaned, sanitized, pre-cooled and returned in evening trains to complete the cycle. In the larger milksheds, the trip to the dairy could take all day, with the delivery in the evening hours and return the following day. The 48-hour turnaround necessitated the lessee to have duplicate cars (or cans) to keep everything moving.

For the modeler, this provides a wealth of operational possibilities. In many cases, creameries were located at or near small-town passenger stations so that head-end milk cars could be switched in and out of passenger trains. Many people are unaware how much switching might go on at the head end of a passenger train. This was especially true of the lessor trains on the timocard. The crack trains generally did not haul milk cars that might need switching. This allowed them to meet shorter intercity timetable requirements.

However, secondary passenger trains might be involved in head-end switching at each stop. For example, a Dairymen's League Co-op train originated with one bulk milk car in West Chazy, a town in up-state New York, adjacent to Lake Champlain. Over the next 80 miles, the train stopped at six more stations for milk and added cars at the Peru and Westport stations. The typical procedure at each station was for the road engine and milk car(s) to uncouple from the train, switch tracks and back into the local milk plant. The milk was then pumped-in as rapidly as possible, and the train would be remade for the journey to the next station. At Montcalm Landing, the three loaded bulk milk cars were added to another Delaware & Hudson passenger train, bound non-stop for Albany, New York. There, the cars were interchanged with the New York Central for the final trip into New York City.

The small maps accompanying this article show several routes into various milksheds. They are meant only as a few examples. At one time or another, virtually every city of any size had milk flowing along railroad routes.

Another operational aspect the modeler can consider involves on-line processing. In many areas, cars of milk cans — both railroad and private — arrived from several locations at a small-town creamery. Here, milk was unloaded, cooled and processed or

Continued —>

MILK RUN I *Continued...*

pasteurized for loading into private-name bulk cars. The cars might carry bulk loads of whole milk, skim milk, cream, or even ice cream "mix" for the city dairy. In the city, the products were then packed, or frozen and packed, in the case of ice cream. These bulk loads could make journeys of several hundred miles, as in the example of cream shipments to Boston from Kansas, cited earlier.

In the cities, several cars from numerous trains

might be grouped together at a dairy operation. Long-solid milk-consist trains did run, but only in the largest milksheds, like New York and Boston. They were generally mixtures of all types of cars. In many cities, the dairies were not located on railroad sidings, so milk cars were spotted on tracks, and the milk was transferred to tank trucks. This provides an additional operating aspect for the modeler to consider, one which can employ an existing yard, with only the addition of the few correct period milk trucks.



W. W. AMELING COLLECTION

GPEX NO. 791 OF BROOKLYN, New York's Grandview Dairy was photographed in the late 1930's. It was built in March, 1937, and may well be among the last of the wooden bulk milk cars. It already carries the General American - Pfaudler Corporation letterboard common to all the steel milk cars.

GPEX NO. 1029 is an example of an 8,000-gallon bulk-milk car. These were the largest of the bulk-milk cars, measuring 51'-6" over couplers. Among the companies leasing these cars were the Embassy and Bowman dairies in the Midwest and H. P. Hood and Dairymen's League Co-op in the East.

PHOTO COURTESY BNC/GARSTENS COLLECTION



MILK RUN!

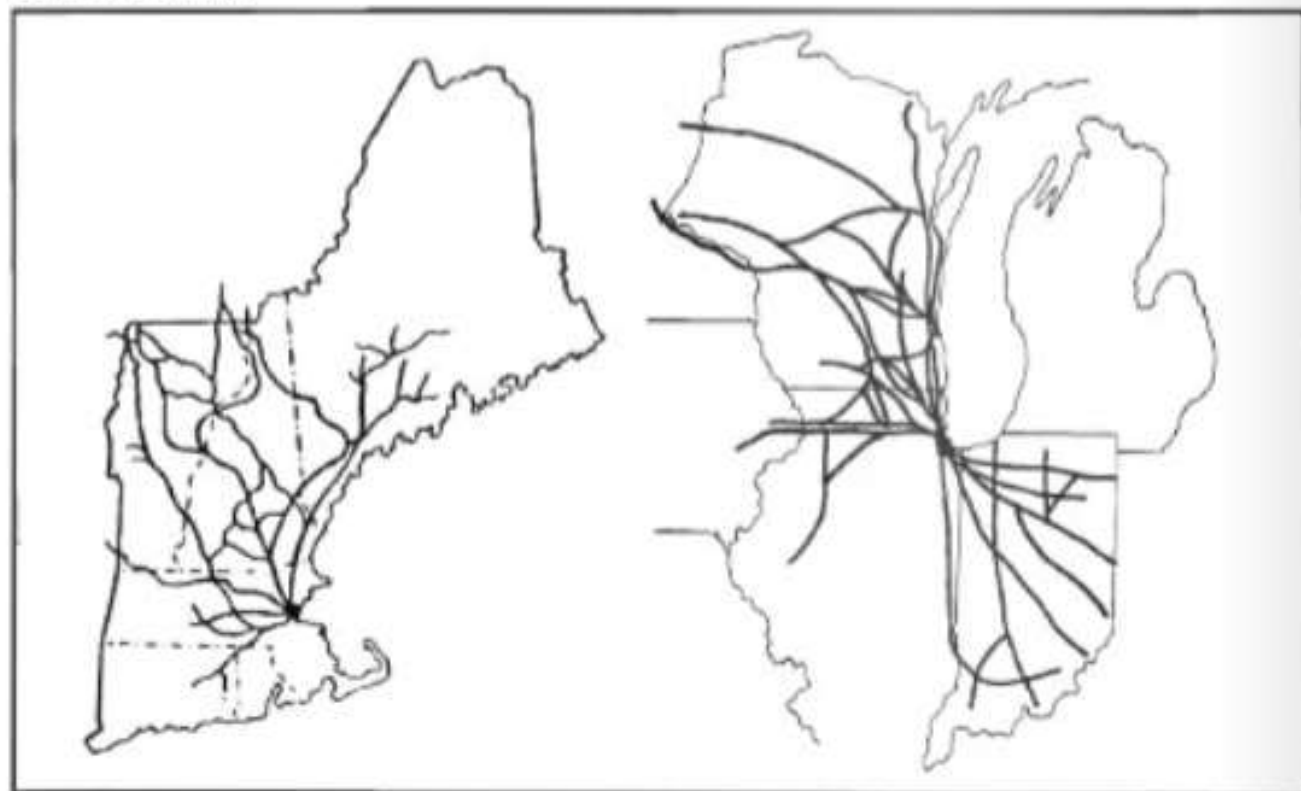


U.S. HISTORICAL SOCIETY PHOTO—DAN BERNARDI COLLECTION

THIS PHOTOGRAPH OF A BORDEN MILK TRAIN was taken in the Jersey City terminal about 1950. Most evident in the scene are BFIX No. 521, one of the famous Borden cars with its fin partially removed; NX No. 1434, a National Car Company flatcar with a removable milk tank on it; and GPEX No. 996...(?), a General American - Pfandler steel bulk tanker leased by Borden. The tank aboard NX No. 1434 was a true intermodal design, which could be lifted off and set on a truck trailer for road transport.

TYPICAL MILKSHEDS: The two maps below show how the railroad networks funneled milk into Boston (left) — ca. 1920 — and Chicago (right) — ca. 1930 — which formed each city's "milkshed."

COURTESY JAMES A. KENDRICK



THE MILK CAR'S DEMISE

Actually, the beginning of the demise of railroad milk service began with the 1904 experiments to put tanks in freight cars. While it took another 20 years for the railroads to catch on, companies like Pfau-ler, D. H. Burrell (later to become today's Cherry-Burrell Corporation) and Heil (an early pioneer in tank-truck development) saw an opportunity for bulk-milk tanks mounted on motor-truck trailers. In some areas, the transition from rail to tank truck was almost immediate. In Detroit, during 1915, 84 percent of the city's milk arrived by rail. In just 10 years, the portion hauled by trucks went from 16 to 89 percent! Of the remaining 11 percent, over half was handled by Detroit United Railway interurban cars; 75 miles from Flint to the Gable Creamery Company.

In other milksheds, the change was not so rapid. Initially, the truck tankers absorbed increases in demand for milk, and the railroads' business remained fixed. However, in the 1930's, the bulk-milk tankers' efficiencies over handling individual cars began to seriously erode the railroad-owned car portion of the business. In 1931, 27 railroads rostered a total of 2,174 milk cars. By 1962, only nine percent were left, split among six railroads. By contrast, the handling of milk in private-name bulk tankcars continued to be fairly strong into the decade of the '60's. Although never as numerous as railroad-owned cars, 40 percent of the fleet (in number) was still around as late as 1964. All of these cars were steel rebuilds, or the new GPEX cars of the 1940's.

Although the trucking industry was a major cause of milk revenue loss to the railroads, the final blow was the curtailment of passenger-train service during the 1960's. Private-owner bulk-milk service was quite competitive with trucks, especially on captive routes of some of the major dairy and candy companies. However, the service depended heavily on the fast, scheduled service the passenger trains provided. As more and more local trains began exiting the timetables, the dairy companies lost the ability to move milk rapidly and reliably, hindering the reliability of their operations. They were forced to go to the alternative — trucks.

Amtrak signaled the end of privately owned passenger trains in the U.S. in 1971, and the last scheduled milk train was operated during August of 1972 on the Boston & Maine between Eagle Bridge, New York, and Boston, Massachusetts. The era ended with the demise of the trains the service depended on during the 130 years that followed Thomas Selleck's and Philo Gregory's original innovations.

The few railroad-owned milk cars left simply went to insulated-boxcar service, or they were scrapped. The bulk-milk tankcars found other uses in transporting chemicals, vinegar, orange juice, beer and wine. There are reports of some cars hauling blood from the Omaha stockyards to Chicago for processing (drying) during peak livestock-handling periods. A few of the GPEX cars were still bumping

around in the early 1980's, as water-service cars on the Illinois Central Gulf.

Milk-train service on U.S. railroads lasted for over 130 years, and it covered the entire country. The foregoing article barely scratches the surface of all the equipment and operating possibilities for the modeler. It was meant to provide some background and generate some interest.

FOR FURTHER READING

For those of you who find yourselves interested in learning more about milk trains and their equipment, the following articles and references would be worth investigating:

Railroad Model Craftsman ran a two-part series on milk-car service called "To Market by Rail" in the February and March, 1986, issues. The articles covered both railroad- and private-owner cars, and it included 3.5 mm. scale diagrams of some of the ones referred to in this article.

RMC also ran an interesting article on milk containers on flatcars in the May, 1988, issue. This is an aspect of railroad milk service not covered in this article. Container service for milk never caught on nationally, but was used in the New York City area, especially by Borden.

Model Railroading ran a series on modeling milk trains. It began in the May/June, 1986, issue with an article covering the Midwest.

For anyone who has access to a good archival library, you can attempt to locate the Dairy Industries Supply Association's *Association Quarterly* for May, 1939 (Volume 2, Number 2). This issue includes a history of the first 100 years of milk transportation. It has some tremendous photographs of both railroad cars and milk tank trucks of the 1920's and 1930's.



PHOTO COURTESY RMC/CRASTENS COLLECTION

GPEX NO. 544 is an example of early steel milk-car designs. This view, taken in October, 1938, highlights the car's rounded roof and channel sill. Also evident are the buffer, chains and steam lines which every car carried for passenger-train operation.



PHOTO COURTESY INVOGARSTENS COLLECTION

A STRING OF BRAND NEW 6,000-gallon bulk-milk cars was about to be pulled away from General American's plant in January, 1948. The view highlights the rounded roof and sill design of General American's newest cars. The streamlined design was not only aesthetically pleasing, but also made the cars easier to clean.

CHICAGO'S WIELAND DAIRY bulk-milk tankcar WDX No. 734 in 1932. Note the lift rings to remove the car's roof.

H. W. AMELING COLLECTION

**MILK
RUN!**

