

DON SIMS

Coupled behind a string of Southern Pacific F-units, a 1950's era, steel, Bangor & Aroostook ice-cooled refrigerator car with plug

doors climbs the Sierras. In the post World War II years, refrigerator car designs changed to meet the growing needs of shippers.

The post war refrigerator car—a brief history: Pt. I

A look at developments leading up to post-war car construction/**Dave** and **Jennie Lambert**

Picture yourself in this hotseat. You're the chief executive officer of a large capital-intensive transportation enterprise. Your company has been buffeted by a 10-year depression followed by a four year world war. Expensive new technologies loom and threaten revolution in your business. Meanwhile, your capital equipment—refrigerator cars—is worn out, obsolete. Your competition is hungry and subsidized by the same government that taxes your meager profits, and your customers are vocal, well-organized, politically connected and pulling you in different directions about the equipment and service they expect. Get the picture? Then you sense what it was like to be president of Santa Fe Refrigerator Dispatch, or

Fruit Growers Express, or American Refrigerator Transit, or Pacific Fruit Express just after World War II.

In this article, we'll walk a mile in the shoes of these gentlemen as they manage their rapidly changing businesses.

A brief history of the refrigerator car

At least one rail car historian, C.A. Richardson, writes that the Pennsylvania Railroad's W.W. Chandler is the father of the refrigerator car. In 1857, Mr. Chandler fitted 30 boxcars with double sides, roof and floors. The first insulating material—sawdust—filled all the air spaces.

The cars were loaded, then boxes containing ice were brought aboard

and placed in the center of the cars. Waste water discharged through a hole in the floor between the doorways.

While Mr. Chandler conducted his experiments, J.B. Sutherland of Detroit received the first patent for a refrigerator car on November 27, 1867. Early in 1868, D.W. Davis, also of Detroit, patented an improved car which became the most widely used. A Davis patent car gets credit for beginning the dressed beef industry because it carried the first successful shipment of that commodity from Chicago to Boston.

These earliest shipments consisted only of dressed beef and dairy products. They yielded encouraging results. Attempts were made to follow these experiments with fresh fruits and vegeta-

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**Table 1: Freight refrigerator cars owned
By owner type—excluding Canadian cars prior to World War II**

Private cars					
As of Jan. 1	Railroad owned*	Railroad controlled	Owned by other than shippers	Owned by shippers & packers)	Total
1927	44,511	90,905	10,705	20,799	166,920
1928	44,228	93,091	15,114	20,586	173,019
1929	43,047	92,997	18,526	20,995	175,545
1930	41,608	94,046	18,722	20,886	175,262
1931	39,183	96,505	20,303	20,116	176,107
1932	37,524	96,386	19,226	19,874	173,010
Data gap					
1935	29,491	96,557	22,678	10,050	158,776
1936	27,055	91,068	23,831	9,928	151,882
1937	25,380	91,456	23,128	9,911	149,875
1938	23,424	92,512	23,814	9,742	149,492
1939	22,159	91,270	23,897	9,473	146,799
1940	21,414	89,981	24,411	9,032	144,838
1941	20,759	87,679	25,162	8,569	142,169

* Includes Santa Fe Refrigerator Despatch

Uneven cooling froze some of the berries and allowed others to spoil.

By and large, early fresh fruit and vegetable experiments failed, or succeeded only marginally for three main reasons: re-icing en route was impossible, the fruit had ripened too far when loaded, and the cars had insufficient ice capacity.

Undaunted, Mr. Earl developed the "Tiffany" car, a design with larger capacity ice "chambers". The Tiffany design became hugely successful and launched the fresh fruit and vegetable industry. The first California strawberries arrived in New York in 1888. Fresh California oranges headed east the same year.

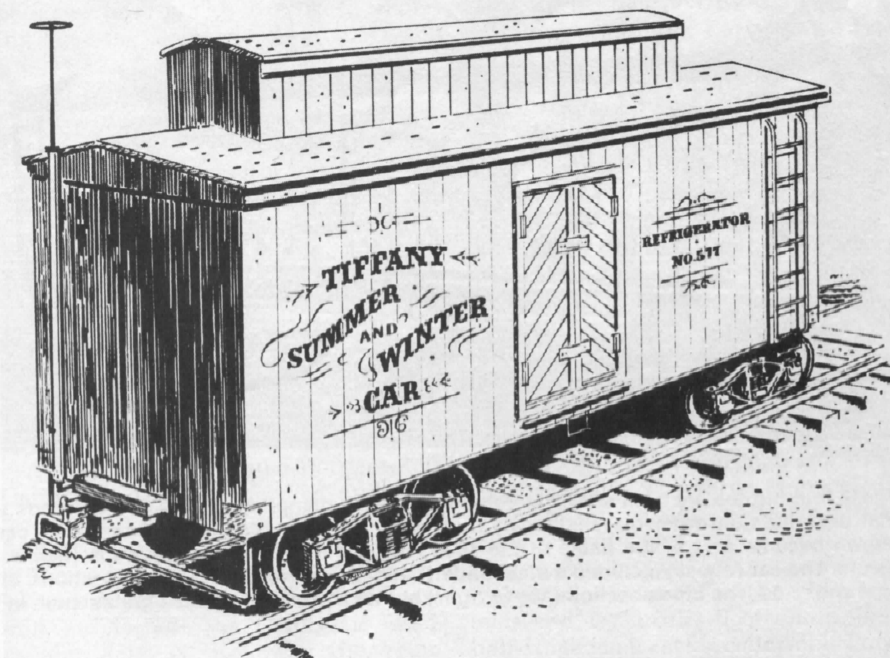
At this point in their development, practically all refrigerator cars were owned by private car lines—such as Mr. Chandler's Star-Union Line—or by individuals. The railroads settled into

bles. In 1865, Mr. Parker Earle of Illinois took the first shot at shipping fruit under refrigeration. He constructed "chests" large enough to handle several fruit containers. Each chest had an ice compartment. Several chests were loaded in a single car.

The cars had to be handled on expedited express schedules. High express tariffs and excessive damage doomed this scheme financially, although it succeeded logistically.

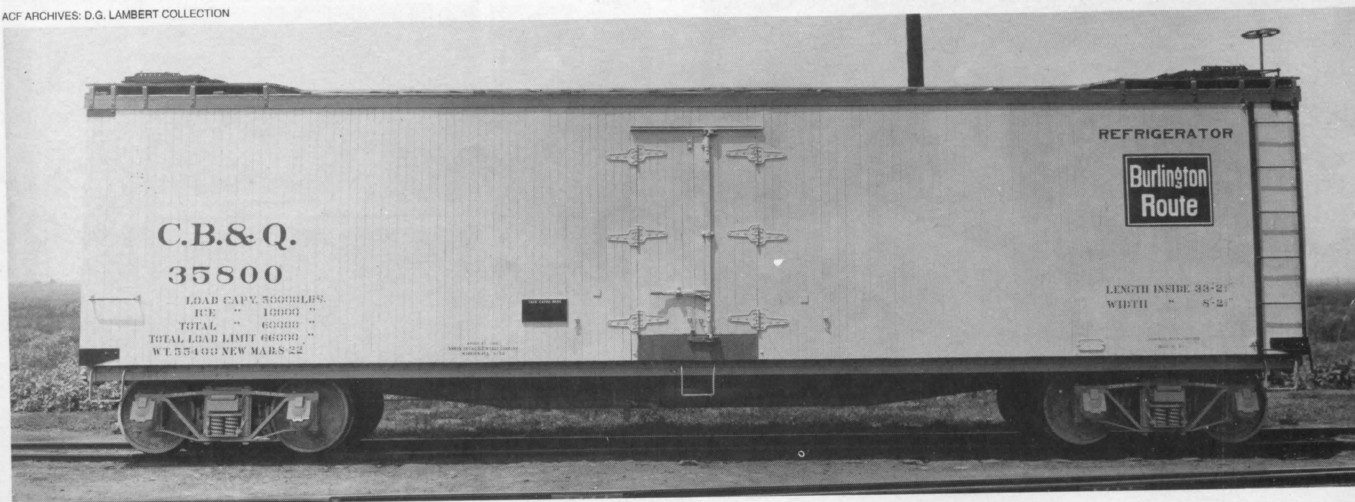
In 1868, Mr. Davis fitted one of his cars to back haul strawberries. A cylinder of ice and salt situated in each of its four corners refrigerated the car.

This drawing (right) shows the original Tiffany Patent "Summer and Winter" car. The raised cupola on the car's roof was the original overhead bunker. CB&Q 35800 (below) is a member of the 1,000 car 35000-35999 class of "USRA" refrigerator cars. While no reefers were built under USRA auspices, the design was popular.



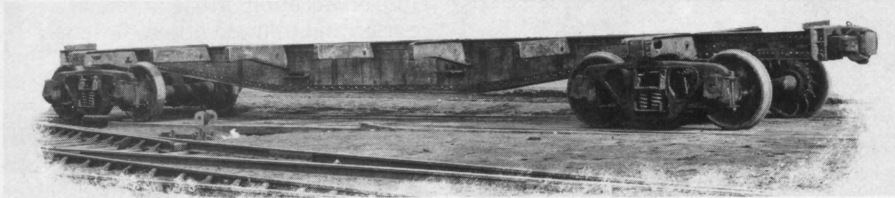
D.G. LAMBERT COLLECTION

ACF ARCHIVES: D.G. LAMBERT COLLECTION



RAILROAD MODEL CRAFTSMAN

Post war refrigerator cars



ACF PHOTO: D.G. LAMBERT COLLECTION

This builder's photograph shows the USRA underframe minus the sidesill. Notice the deep fishbelly centersill and the symmetry about the centerline of the centersill. The side bearers are steel "pressings". The centersill is made of built-up steel shapes.

a wait-and-see attitude.

Thus, standardization was a pipe dream. The interior dimensions of cars varied as did their amounts of insulation. This described the situation from the 1880's until after World War I.

After dealing with boxcars, gondolas and hopper cars, the Freight Car De-

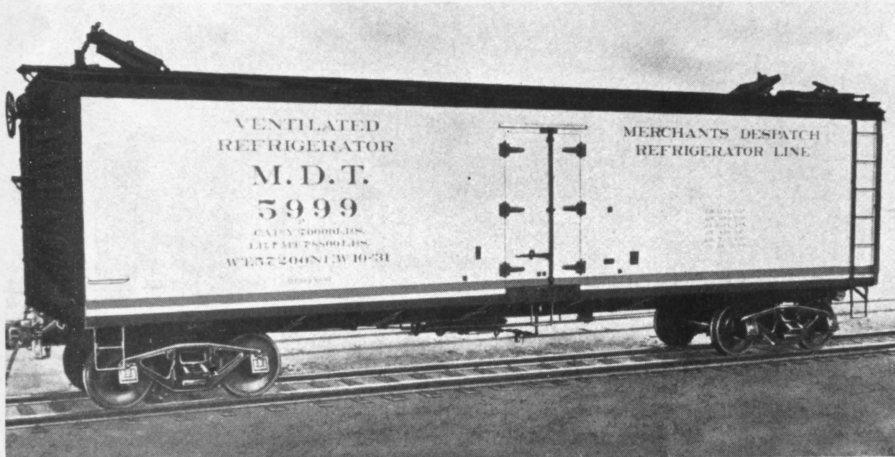
sign Committee, originally the Eastern Operating Committee, of the United States Railroad Administration (USRA) turned to refrigerator cars. Although no refrigerator cars were ever built under USRA auspices, the railroads, by now building reefers for their own lines, embraced the standard de-

sign enthusiastically. By late 1921, USRA design standard common or "regular service" (AAR Mechanical Classification RS) refrigerator cars rolled off car builders' assembly lines.

The standard USRA cars embodied great improvements over their laissez-faire-era sisters. They had a rigid steel underframe, increased wall, floor, end and ceiling insulation, and waterproof coatings were employed in the floor.

The standards drawn by the mechanical engineers and draftsmen of the USRA were generally employed for the next 15 years.

During and subsequent to this 15-year period, radical car designs were proposed and built: overhead bunkers;



MERCHANTS DESPATCH TRANSPORTATION CO. ARCHIVES. COURTESY OF LOUIS CUNNINGHAM

These four photos are from a 1932 Merchants Dispatch pamphlet that described an order of 1,000 newly built cars. The features shown became part of the basis of the 1934 AAR car improvements. The car (above) included a steel underframe, superframe, roof and ends. The cross section (above right) shows the materi-

als and methods used in construction. The interior view shows the floor racks, canvas floor, insulated bulkhead and obstruction free walls (below left). The closeup of the ice bunker with the center sections of the metal bulkhead removed (below), shows ice grates both in the half and full stage positions.

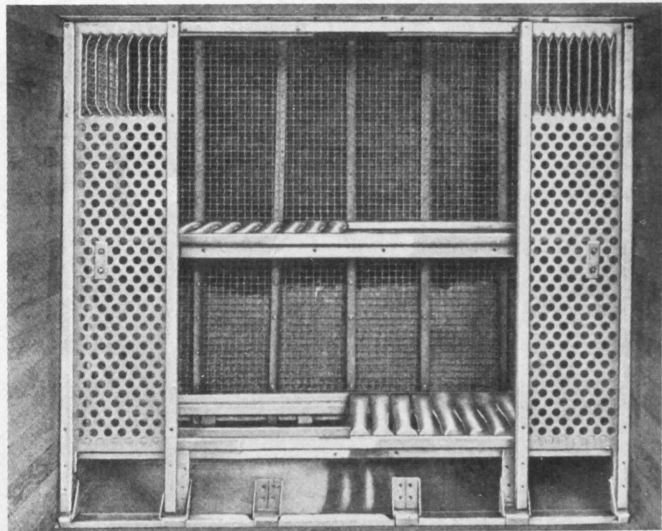
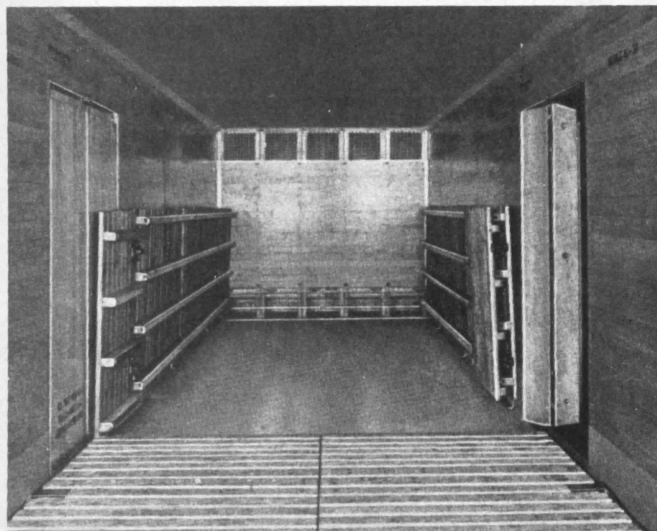
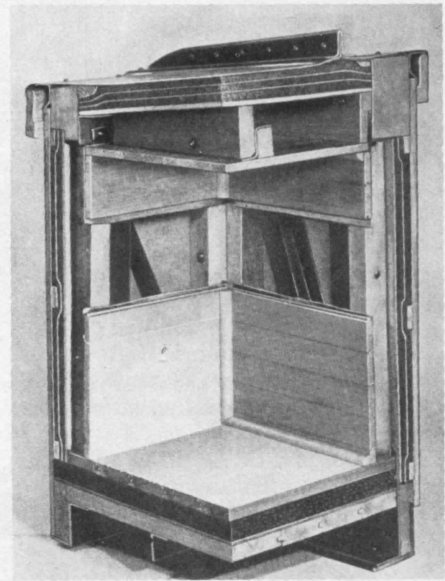


Table 2: Freight refrigerator car ownership by AAR mechanical classification—January 27, 1955

Jan. 1	Class RS	Packer Cars*	Class RB	Class RP**	Total cars owned
1941	119,419	20,829	1,746	1	142,169
1942	119,092	20,959	1,771	1	143,078
1943	118,765	21,089	1,797	1	141,867
1944	117,639	20,636	1,700	1	140,195
1945	115,858	20,045	1,650	1	137,818
1946	115,175	19,275	1,796	4	136,537
1947	113,377	19,374	1,950	3	135,026
1948	113,779	18,394	2,112	3	134,673
1949	110,636	18,004	2,237	3	131,260
1950	108,311	19,094	2,300	6	130,160
1951	105,715	18,612	2,664	29	127,109
1952	105,019	18,266	2,857	169	126,733
1953	104,278	17,457	3,223	184	125,581
1954	102,724	16,656	4,659	386	124,859
1955	101,240	17,477	4,974	642	124,782

Notes:

*Packer cars are Class RA, RAM and RSM—not suitable for the shipment of fresh fruits and vegetables.

**Class RP is the mechanical refrigerator class.

underslung heaters (particularly in Canada); half-stage icing; dry ice refrigeration and even mechanical refrigeration!

These car designs faced the same objections that all innovations face: they are untried; they are incompatible with present equipment; they required (unavailable) trained personnel; they may not be what customers (shippers) really want.

In 1934, the Mechanical Advisory Committee of the American Association of Railroads, working closely with the U.S. Department of Agriculture, submitted a comprehensive engineering report to Joseph P. Eastman, the New Deal's Federal Coordinator of Transportation. This report contained a major section on refrigerator cars and launched a car design and building program. These new cars featured the new AAR (April, 1934) standard underframe, steel ends and roof and thicker insulation throughout.

Unfortunately, the railroads and car lines, barely able to maintain their existing equipment in the heart of The Depression, were unable to build new equipment in great numbers. Table 1 shows that wrecks and retirements far outstripped replacements during the 1930's. The usable car fleet was steadily shrinking.

The shippers organize

The car builders and railroads had long contended that shippers had no coherent sense of the equipment they needed. Hence, the railroads and car lines dictated refrigerator car design.

In January, 1944, the United Fresh Fruit and Vegetable Association met at the Blackstone Hotel in Chicago. The refrigerator car situation was inked in as an agenda item for this trade

group's annual meeting. Alarmed shippers saw how quickly cars were wearing out—the average age of the fleet was 11-12 hard years—and foresaw a shortage. Table 2 shows how well-founded this sense of unease was. They knew a major car building program would have to begin after the war, and they wanted a voice in the design of those cars. The shippers reasoned that without intelligent planning, railroads and car lines obviously would imitate the cars already in use. "The outmoded cars of 1912-17 would be perpetuated for another quarter-century and a golden opportunity would be lost for years to come." (UFF&VA Yearbook, 1947 Edition)

Accordingly, the United Refrigerator Car Committee was formed and met for the first time at the Blackstone on August 9, 1944. It comprised 15 geographically diverse shippers of the various fresh commodities. The new committee elected the energetic and capable John N. Kelley of the Fruit Dispatch Company, the domestic subsidiary of the United Fruit Company of South America (known to the railroads as the "banana trust"), as its first chairman. He was to remain the chair for the next 12 years.

The world of refrigerator cars did not look good to the committee that hot Chicago August afternoon. Since no cars would be built during the war, existing cars, despite their age and decrepitude had to be kept running, although adequate repairs could not be made. Thus, the total car fleet grew smaller by the month.

The committee drafted detailed recommendations and shot them off to all railroads, car lines, car builders, the AAR, the ICC, the U.S. Department of Agriculture and the Office of Defense

Transportation (ODT).

They created a sensation. Railway Mechanical Engineer in its October, 1944, issue was typical of the trade press as it opened:

"It is therefore a matter to be given serious attention by the railroads and private car owners when an association of refrigerator car users proceeds to study its needs and to formulate them in terms of a specification for the refrigerator car which will best satisfy its members."

The AAR's Subcommittee on Refrigerator Car Construction emerged as the voice of the railroads and car lines. A \$100,000 grant from the AAR, a considerable sum in 1944, paid for a two-year investigation of the shippers' recommendations.

The subcommittee hired C. A. Richardson as a full time director of research and cited him in Chicago. His research staff comprised one representative each from the UFF&VA, the National Association of Frozen Food Producers, the USDA, Mechanical Car Committee of the private car lines and three from the AAR.

A breakthrough occurred during a meeting of the UFF&VA's United Refrigerator Car Committee in New York, June 6, 1945. Mr. Wayne Johnson, president of the Illinois Central Railroad, startled the group by offering to build a refrigerator car of new design. This lightweight (aluminum superstructure) car, the famous IC 51000, was to be the first car built to the United Refrigerator Car Committee's recommended practices. It featured lightweight, all-metal (aluminum and steel) construction; standard dimensions, suited to maximizing the payload; steel wheels within easy-riding trucks; improved, cushioned draft gear; four inches of insulation in the sides and ends and 4½" in the floor and ceiling; half-stage icing racks; collapsible bulkheads; side wall flues; improved floor racks; Preco mechanical floor fans (air circulation devices); and a built-in thermometer—readable from outside the car.

Illinois Central 51000 was begun at the railroad's McComb, Illinois shops on August 12, 1946. It was ready for testing the next month. Because of the delay between the commitment and the follow through, IC 51000 just barely beat SFRD 13000, a stainless steel lightweight car built by Continental Steel Corp. of Los Angeles, and PFE 45698, a Reynolds aluminum-clad car rebuilt in the company's Los Angeles shops from a steel-sided R-40-14 class car, originally built in 1941. Fruit Growers Express' shops at Indiana Harbor, Indiana, turned out its alu-

Post war refrigerator cars

minum-clad experimental car, FGEX 38374, one month later.

Calendar 1946 was a good year in John Kelley's view. He was gratified that promises made by the railroads and car lines at a UFF&VA Refrigerator Car Committee meeting in January were largely being kept by year's end. He looked forward to the "Class of '47" consisting of the following car deliveries:

Northern Refrigerator Car	500
Merchants Dispatch Trans.	1,000
American Refrigerator Transit	500
Santa Fe Refrigerator Dispatch	350
Illinois Central	300
Fruit Growers Express	300
Pacific Fruit Express	(new) 5,000
	(rebuilt) 1,500

The two-year research program, however, stumbled along. The UFF&VA became increasingly restive. The

bureaucrats of the AAR and the U.S. Department of Agriculture squandered nearly the entire testing period on insulation efficacy studies. The United Refrigerator Car Committee fumed that this was moot as the entire industry had standardized on 4" and 4½" following the success of IC 51000 and its sisters of the Class of 1946 and '47.

Finally, in September, 1947, the UFF&VA had had enough. It strongly

**Table 3: "Class of 1947" post war refrigerator car building program
New cars built and delivered—October 31, 1947**

Railroad owned	1941-46 incl.	Jan-Mar. 1947-incl.	Apr.-June 1947-incl.	July-Sept. 1947-incl.	October 1947	Total Jan 1, 1941- Oct. 31, 1947 incl.	Remaining to ship
A.T. & S.F. Rwy	1	350				351	
Illinois Central	201					201	
Northern Pacific							250
Grand Trunk Western							
Atlantic Coast Line							50 ¹
Other Railroads							
Total	202	350	0	0	0	552	300
Private railroad owned or controlled car lines							
American Ref. Transit	678	22	52	428	255	1,435	1,565
Burlington Ref. Express	300					300	
Fruit Growers Express	796				122	918	978
Merchants Despatch	293	17		475		785	500
Northern Ref. Line, Inc.	800			3 ²	47 ²	850	
Pacific Fruit Express	2,002		823	1,553	483	4,861	2,141
Railway Express Agency							500 ¹
Western Fruit Express	400					400	400
Winona Ref. Car Corp.							
Total	5,269	39	875	2,459	907	9,549	6,084
Private non-shipper owned car lines							
Central West Ref. Desp.							
Dairy Shippers Despatch							
Gen'l Amer. Trans. Corp.	10					10	
Union Ref. Transit Co.							1,000
Mather Stock Car Co.	185					185	
North American Car Corp.							
North Western Ref. Line							
P. and P. Car Line, Inc.							
St. Louis Ref. Car Co.	165	50				215	100 ⁴
Western Ref. Line Co.							
Total	360	50	0	0	0	410	1,100
Packers Owners							
Armour Ref. Line							2,000 ³
Campbell Soup Co.							
Cudahy Car Lines	200					200	150 ³
Morrell Ref. Car Co.							
Wilson Car Lines	600	25	25	50		700	100 ³
Total	800	25	25	50	0	900	2,250
Other Shipper Owners							
Liquid Carbonic Co.							
Mathieson Alkali Works							
Shippers Car Line Corp.							
Total	0	0	0	0	0	0	0
Grand Total	6,631	464	900	2,509	907	11,411	9,734

Notes:

¹ Express refrigerator cars:

ACL 3000-3049

REX 6100-6599.

² Heavily insulated cars NHIX 900-949, assigned to Northern Pacific

³ Meat rail cars, AAR mechanical classification RSM.

⁴ "Beer cars", AAR mechanical classification RB.

exhorted Mr. Richardson to suspend all further insulation studies and move ahead with trails on such improvements as sliding doors, pelletized loading devices, double-deck floor racks, low safety door steps, inside reading thermometers and shock-absorbing draft gears.

The car building program proceeded slower than the industry, as well as its customers, had hoped. Although 11,400 refrigerator cars of all types were built from 1941 through October 31, 1947—and 9734 were back ordered or hadn't yet shipped—obsolescence exceeded new or rebuilt car delivery (Table 4).

The reasons for this unhappy situation proved many. Prior to World War II, car builders replaced destroyed and retired cars immediately to maintain the numbers agreed upon in the equipment trusts which financed them. During and following the war, material shortages, particularly steel and railway specialties, made this practice nearly impossible.

Uncertainty is the mortal enemy of decisiveness, and rail and non-rail competition fueled a hesitancy among the railroads and car builders. Indeed, it was just this kind of uncertainty that the UFF&VA attempted to diffuse with its vigorous espousal of the 40-ft Class RS refrigerator car.

During the war, the ODT ordered the cessation of citrus fruit and concentrate shipments in refrigerated Atlantic coastal steam ships, and pressed the ships into military service. Although this service was never resumed—thus, finally paving the way for the mechanical refrigerator car—the railroads and car lines had to plan as if it would.

The Office of Defense Transportation, through ICC Service Order No. 95, mandated refrigerator car pooling during the war. Hence, the government relieved the railroads and car lines of control of their own property. Perverse-

Table 4: Development in freight refrigerator car ownership after World War II

January 27, 1955

Cars Owned on January 1st	New cars on order	During the year listed:		Cars owned at end of year	Loss in ownership
		Actually retired	New and other installations		
1945 137,818	2,405	2,914	1,633	136,537	1,281
1946 136,537	1,719	3,184	1,673	135,026	1,511
1947 135,026	9,563	7,792	7,439	134,673	353
1948 134,673	8,353	8,737	5,324	131,260	3,413
1949 131,260	7,062	8,618	7,518	130,160	1,100
1950 130,160	1,717	7,221	4,170	127,129	3,051
1951 127,129	5,548	5,325	4,949	126,733	376
1952 126,733	5,189	5,650	4,501	125,581	1,152
1953 125,581	2,793	4,869	4,180	124,892	689
1954 124,889	2,843	5,525	5,418	124,782	107
1955 124,782	2,024				

Total loss: 13,036

ly, the ODT failed to rescind Order 95 until February 29, 1948—two and a half years after the war's conclusion.

As we'll see, the rejoicing over this return of assets to their owners was not universal among the car lines. Obvi-



D.G. LAMBERT COLLECTION

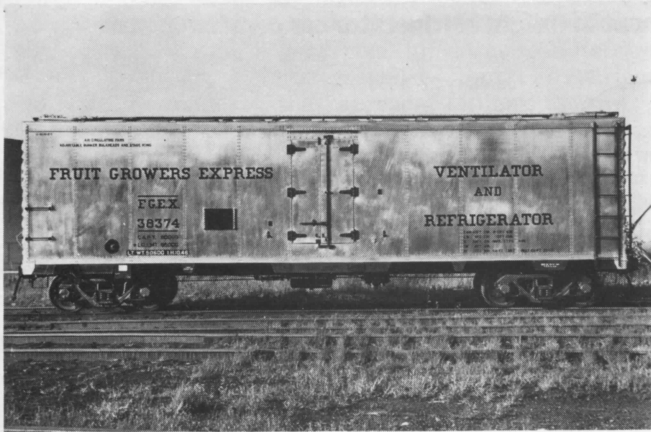
IC 51000, a lightweight aluminum and steel car built by the IC (above), was the first car built to the United Refrigerator Car Committee's recommended practices. It was followed closely by the stainless steel SFRD 13000, built by Continental Steel, and PFE 45698, an aluminum clad car rebuilt by PFE from a 1941 steel-sided reefer (below right).

TWO PHOTOS: DICK WHITTINGTON; PRECO INC.; D.G. LAMBERT COLLECTION



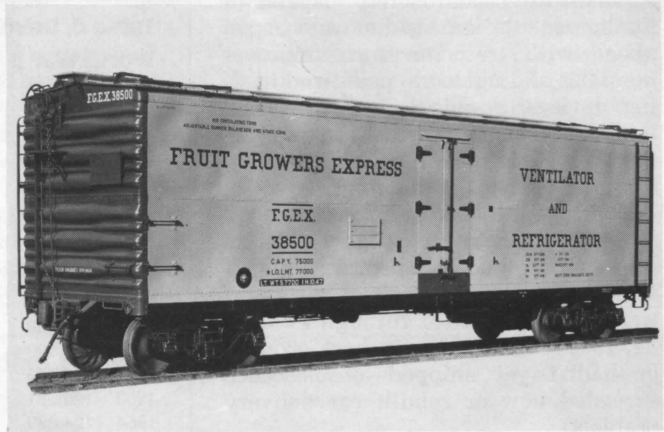
RAILROAD MODEL CRAFTSMAN

Post war refrigerator cars



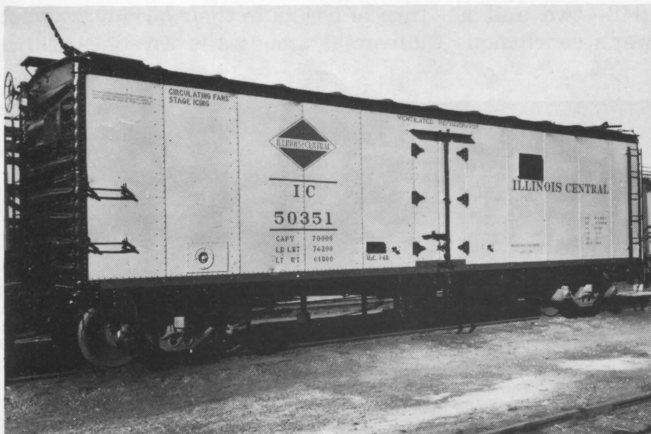
D.G. LAMBERT COLLECTION

In 1946 the FGE shops also turned out an aluminum reefer based on the URCC's recommendations (above). FGE 385000, IC 50351



PRECO INC.; D.G. LAMBERT COLLECTION

(series 50300-50499) and WFEX 66697 (series 66625-66679) were built in 1947 and also followed URCC guidelines.



DICK WHITTINGTON, PRECO INC.; D.G. LAMBERT COLLECTION



PRECO INC.; D.G. LAMBERT COLLECTION

ously, this government meddling fostered uncertainty among fleet owners and car builders. Table 5 shows refrigerator car utilization under Service Order 95.

With uncertainty came apprehension—quickly followed by bickering, finger-pointing and general infighting. Pacific Fruit Express earned much favorable publicity among the consuming public—and the enmity of its competitor—by trumpeting that it had, since 1941, built 7000 new cars by late 1947. A smug Western Fruit Express internal memo noted "...the PFE is practically the only large refrigerator car company which has not a sufficient number of cars to meet their (sic) requirements." A classic case of pride going before a fall.

Finally, in January, 1948, a fed-up UFF&VA United Refrigerator Car committee held a meeting at the Palace Hotel in San Francisco. Executives of the refrigerator car companies were seated at the head table and invited to give the crowd their two-cents worth.

They did not let the opportunity go

to waste. Mr. Plummer the PFE couldn't resist the temptation to bruit his 7,000 new cars, 5,000 of which were delivered in 1947 alone. To this number was added 9,300 cars rebuilt in PFE shops. He concluded by saying that, because of Service Order 95, PFE cars were being used outside PFE territory and he looked forward eagerly to the pool's dissolution.

A tough act to follow, but O.M. Stevens, president of American Refrigerator Transit Company, was equal to the task. He was building several thousand new cars, he claimed, and maintaining his present fleet. He was "...fed up..." with the pool and wouldn't go to his board of directors, controlled by the Wabash and Missouri Pacific, for millions of dollars for equipment he couldn't control.

Now the cheese truly started to bind. Mr. Underwood, president of Merchants Dispatch Transportation Corporation, speaking next, favored the immediate breakup of the pool. MDT had spent millions of dollars repairing and building new cars while its "improvident neighbors" had not seen fit to do

the same.

There was little doubt that this improvident neighbor was the Fruit Growers Express Company. Table 4 seems to justify this conclusion.

Intramural bickering was far from uncommon. The "Associated Companies" consisted of Fruit Growers Express—the largest and most influential member—controlled by 19 eastern and southeastern railroads; Western Fruit

Table 5: Refrigerator car performance during ICC service order No.95 (World War II pooling arrangement)

Typical Class RS refrigerator car was operated:

- 60% under load
- 30% empty
- 10% idle

Of the fourteen (typical) trips per year:

- 5 were under bunker ice
- 1 under heater
- 8 under ventilation (or top ice)



DICK WHITTINGTON: D.G. LAMBERT COLLECTION



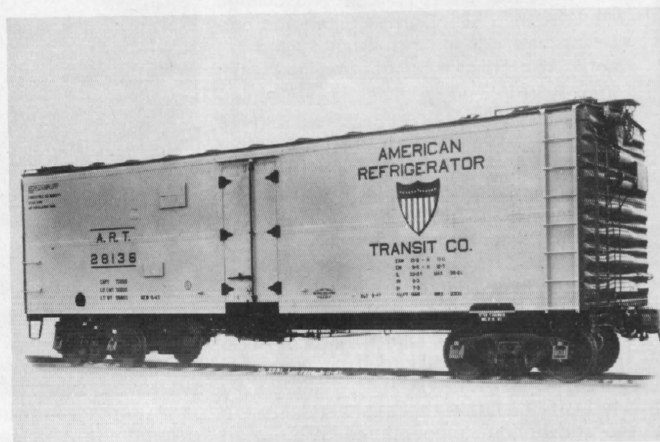
PRECO INC.: D.G. LAMBERT COLLECTION

Along with three of the four cars on the previous page, these cars were also part of the "Class of '47": PFE 5062 (series 5001-8000),

NP 91072 (series 91000-91249), MDT 9179 (series 9000-9499), and ART 28136 (series 28000-28899). All followed URCC guidelines.



PRECO INC.: D.G. LAMBERT COLLECTION



ART PHOTO: D.G. LAMBERT COLLECTION

Express, a subsidiary of the Great Northern Railway; and Burlington Fruit Express, a subsidiary of the Chicago, Burlington & Quincy Railroad. When formed in 1924, the Associated Companies pool was based upon a mutually agreed ratio of cars owned and contributed.

By the end of World War II, FGE's share began to lag. WFE called them on it. A tart memo from the president of WFE to his FGE counterpart minced no words:

"As to the cars owned or operated, WFE had an increase in 1946 of 9.9% over the average for 1924-28 (the base period for the car ratios for the Associated Companies), whereas the FGE showed a decreased of 13.2%. This seems to indicate, as far as ownership goes, that we are carrying more than our share of the load at the present time, and if we are to increase our ownership another 1,000 cars (as FGE had asked them to do) it would seem only fair that FGE should increase its ownership proportionately, or approximately 2,200 cars."

Meanwhile, FGE cars were being re-

Erie business car 25 us seen trailing (and lettered for) one of the AAR's innumerable insulation efficiency studies, this one during the summer of 1947. The four refrigerator cars preceding No. 25 are (l. to r.) unknown, ART, SFRD and PFE "Class of '47" members.

AAR PHOTO: D.G. LAMBERT COLLECTION



Post war refrigerator cars

fused on western lines because of sagging center sills, rotted framing and other mechanical ills. Clearly, the dissolution of the refrigerator car pool

would not be a good thing for the Fruit Growers Express Company, which was relying heavily on PFE, SFRD and other Order 95 refrigerator cars to

serve its customers.

Next month, we'll continue our look at the history of the development of today's modern refrigerator cars.

The Preco story

An innovative California company with a strong railroad pedigree pioneered and developed forced air circulation. Cortland T. Hill, grandson of the "Empire Builder" James Hill, formed the Pacific Railway Equipment Company (officially Preco, Inc. as of July 1, 1944) in 1937. The Light-weight Pendulum-Suspension Passenger Car was the upstart's first product. Prototypes were built for and tested by the AT&SF, the CB&Q and the GN. The technology was perfected, however, in the Talgo Train.

In late 1938, Mr. Hill became associated with William E. Van Dorn, a gifted and prolific inventor. Among his patents were US 2,214,210 (dated 9/10/40) and US 2,349,315 (5/23/44) both titled "Air Circulating System(s) for Refrigerator Cars and the Like". The summary from the 1944 patent notes that the invention provides the "...location of circulating fans in the space beneath the loading floor or floor rack, and between that floor rack and the main floor of the car".

These fans, driven from one of the wheels on each truck, or from an external electric or gasoline motor when the car is stationary, produce a forced circulation of air counter to gravity flow. This anti-gravity flow in the ice bunker serves to equalize the top and bottom temperatures of the load quickly, thereby reducing spoilage and allowing for greater car capacity utilization. In addition, the fans provided pre-cooling for "field warm" vegetable in the absence of larger precooling facilities.

The Western Fruit Express Company took an early interest in the Preco fan system. In an internal memo dated October 30, 1939, WFE compared overhead bunker cars with fan-equipped cars and described the latter as follows:

"This system consists of seven centrifugal fans on a horizontal shaft extending across the width of the car immediately in front of each bottom bulkhead opening and driven by a drive wheel in contact with one of the car wheels at each end of the car while the car is in motion. The fans can be driven by an electric motor when the car is stationary..."

The Pacific Fruit Express Company similarly espoused the Preco fan. PFE placed 7,000 new cars in service between 1941 and early 1947 (including 5,000 in 1946 alone) and rebuilt another 2,500. Nearly all of these cars were fan equipped.

The UFF&VA enthused that the Preco fan was highly desirable for the "modern" regular service refrigerator car.

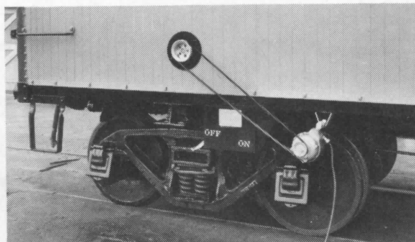
By 1950, bearing failures began to plague the older, floor mounted mechanical fans. Often, these failures led to refrigerator

car fires. Happily, Preco was, at this same time, perfecting the electrical fan system. As before, a car wheel drives the alternator of the fan. However, unlike the belt-driven mechanical fans, a shock-absorbing coupling links the fan directly to the alternator. Hence, only one alternator is needed per car. To keep the fans rotating in the same direction, regardless of the direction of travel of the car, an automatic reversing switch is built into the three phase alternator.

Subsequent to October, 1951, Preco shipped only electric fan systems.

Electric fan-equipped refrigerator cars looked somewhat different from their mechanical fan-equipped sisters.

Preco also built ice-handling equipment and a form of mechanical refrigeration involving bottled gas. The company survived in the 1980's as a job shop for specialty steel fabrication. As of this writing, Preco is inactive.—DAVID LAMBERT



FIVE PHOTOS: DICK WHITTINGTON, PRECO INC.

The Preco fan system drew the warm air from the top of the car down and recirculated it through the ice bunkers. When the car was not in transit, the fans were run via a belt hooked to a small motor that was attached to the outside of the car (above). In transit, the fans were operated via a drive wheel that engaged the car wheel (top right). The fans were mounted on a shaft (below) and extended across the width of the car immediately in front of each bottom bulkhead opening (right). This diagram (bottom) shows the counter airflow in an ice and salt reefer with its Preco mechanical, floor mounted forced air fans operating.

